Building Self-Preservation Into Turf Equipment

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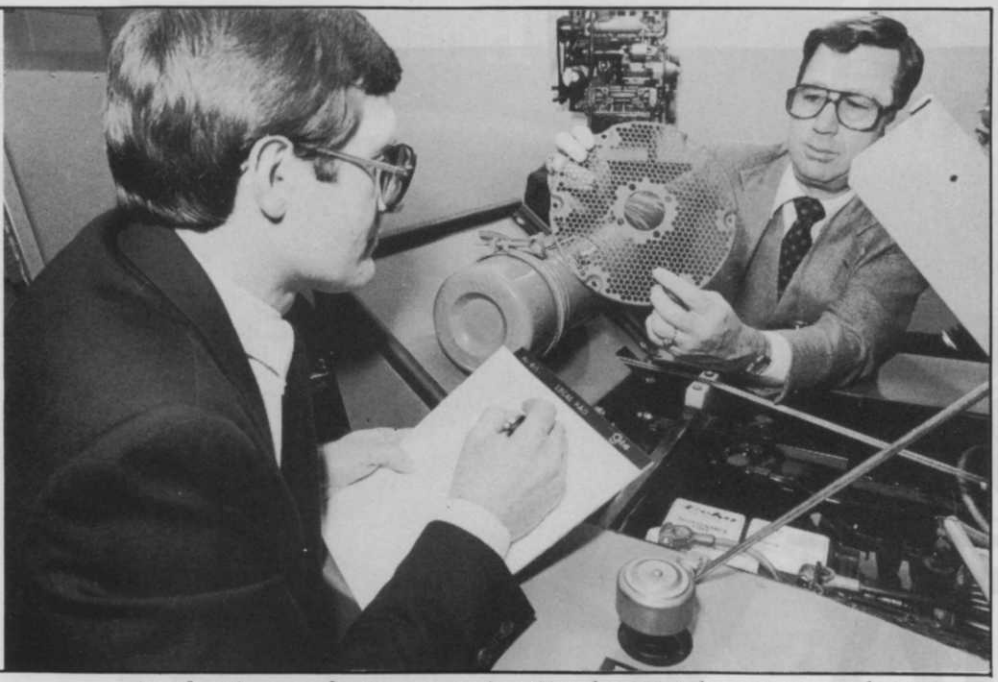

Overheating can destroy an engine. *Simple air intake systems are being improved with devices which prefilter ambient air from a high location and ducts it to the engine. The result is longer engine life.*

The evolution in turf equipment hasn't been confined to improving or expanding the tasks these machines perform, despite their growing sophistication.

Along with doing the work expected of them better and in less time, turf and grounds care people now more than ever demand a longer trouble-free life with reduced maintenance as an added bonus.

Public and private mandates haven't changed for attractive and useful parks, golf courses, recreational and other turf areas. Only the budgets have.

The turf equipment engineer's assignment has been very clear: design machines that do more, last longer and are easier to maintain.

While hydraulics and other systems and components that together mow, aerate, sweep or perform many other chores, have been constantly improved, nothing moves without power.

Evaluate power

In other words, the demands on our engines have never been greater, making it manditory for a variety of power plants to undergo a process of intense evaluation before one is selected.

Tough duty

In the same way, the turf machine user should evaluate the engine with the same care he applies to assessing overall function and key features like hydraulic versus conventional mowing.

The importance of engine evaluation can hardly be overstated when one considers the tough world of turf care. These machines are run for long periods of time under varying load conditions. Oftentimes, operators have little or no sensitivity to mechanical devices, overloading their machines and routinely subjecting them to other abuses. And, as budgets tighten, regular maintenance sometimes suffers.

On top of all that, turf machines operate in harsh environments of dust, dirt and other particulates that are often made even worse by high ambient temperatures and a surface seemingly designed to test every fastener.

Seasonality plays a role, too, with year-around turf use for some regions and six months of service for others.

There are the so-called "systems machines", such as our Turfcat II line, which with attachments like a dozer blade or snow thrower are used for clearing walks and drives in winter — or sweeping anytime of the year with a rotary broom. These versatile machines and the diverse and frequently harsh conditions under which they operate call for engines with a high degree of self-preservation designed and built into them.

Smooth power

In mid-sized turf equipment perhaps the first item for your evaluation is the number of cylinders. Two-, three- and four-cylinder engines — gas or diesel — will outwear and be smoother than single-cylinder power. Though there are exceptions to the rule, generally multi-cylinder engines are more sophisticated with features that add up to better performance and increased longevity. But, no matter how many cylinders, an engine will depend on the machine around it and system components to be designed in such a way as to help assure a long, productive life.

Carburetion

Gas and diesel engines alike require a relatively specific ratio of clean air-to-fuel to function properly, so the air cleaner for each power plant should be sized to filter out damaging dust and dirt of turf care while allowing proper aspiration. One way to decrease performance and reduce engine life is to upset that ratio by not replacing the air filter at proper intervals and letting it become clogged.

To avoid clogging turf equipment engineers have gone a step further from the traditional placement of the air cleaner atop the carburetor on the engine. We take in air through a screened opening just behind the operator's seat and then duct it to the cleaner. The cleaner itself is non-traditional, too, because we use a large, industrial unit.

Cooling

Cooling the engines of turf equipment is far more involved than keeping the temperature in line on cars, trucks or even many agricultural machines. It's not enough to draw air in the conventional manner for either liquid- or air-cooled power plants. Turf machines require controlled air via special ducting, using precleaners to remove dirt that would eventually build up on radiator cores or cooling fins, thus raising engine temperatures to damaging levels.

In addition to looking for ducting and precleaners, check for the position of the air intake. It should draw from the ambient atmosphere; not from air preheated by the engine.

Lubrication

Lawn and garden tractor engine technology simply can't be used for turf machines. Usually that type of power has splash lubrication. That may be quite satisfactory for several hours of periodic work, but the duty cycle of the turf machine requires full flow lubrication to make certain all moving parts constantly receive a quantity of oil that relates to the work being performed. As power demands and rpm increase, so does the flow of oil to reciprocating and rotating parts.

But, engine oil can do more than lubricate. It also can cool, so watch for added touches like a larger remote oil filter and possibly an oil cooler. Check for a warning light on the control panel to let you know operating temperature has reached a level that, if sustained, could damage the engine. The latest machines may even have heat sensors that signal the operator.

Inside the engine

You can easily see engine peripherals — cooling, carburetion, exhaust system, and so forth. But what you can't see beyond the new paint of the engine may be even more important to performance, life span, and maintenance.

Take the valves. In addition to admitting the air-fuel mixture and exhausting combustion gasses, valves maintain compression, and thus, the power you required when you specified the machine.

To make certain power remains consistent, you'll want to look for a variety of features, such

as rotators for both intake and exhaust valves. These cause valves to turn minutely as they actuate to help assure proper seating. Valve stem wipers are another desirable feature. These nonmetallic "sleeves" prevent carbon buildup on the stems by wiping off traces of that element with every stroke. Excessive carbon on the stems can deteriorate their guides, allowing sump oil to escape into combustion chambers, reducing plug performance and increasing oil consumption.

High temperatures created by sustained operation could cause valve warpage were it not for the special high-carbon alloy steel (such as Stellite) used for the valves in some engines. Besides loss of compression, severe warpage can lead to a breakdown.

The power you count on is primarily maintained by compression rings pressure fitted on the pistons. Those engines that use high-grade steel in compression rings will deliver many thousands more hours of performance. The difference in head gaskets can spell blow-by. A top quality product such as the metal-clad Graphoil gasket resists erosion from extreme combustion pressures, gasses and sustained high operating temperatures. The small extra cost of a quality product is negligible when compared with the downtime involved in replacing a head gasket.

Combustion chambers vary, too, with the more sophisticated head design almost always worth the investment. For example, crowned head chambers create a highly turbulent swirling action to optimize the air-fuel ratio. This adds up to more power from a smaller displacement — and more economical operation.

Intake and exhaust manifold design should be considered, too.

Other features to watch for include industrial-grade bearings, heavy-duty crankshaft, and a mechanically driven fan (turf machine speeds are too slow for ram air cooling common in automotive road speeds).

Vibration and sound

How the engine is mounted will influence performance, too. Isolated mounts, those that separate and cushion the engine from the frame, greatly reduce vibration, which is as important to operator comfort as it is to component life.

An industrial-grade muffler not only makes sense from a standpoint of longer wear and less resistance to exhaust pressures, its quieter operation is less stressful for the operator and better conforms to noise restrictions.

Cursory appraisals of turf equipment have no place in today's economic climate. Functionally, machines may look quite alike. Even performance specifications may be similar.

It's only when the buyer goes well beyond the obvious that the product designed for a decade or more of regular use begins to emerge. The engine should head an evaluation list, for measuring the productivity of the machine begins with its performance.

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