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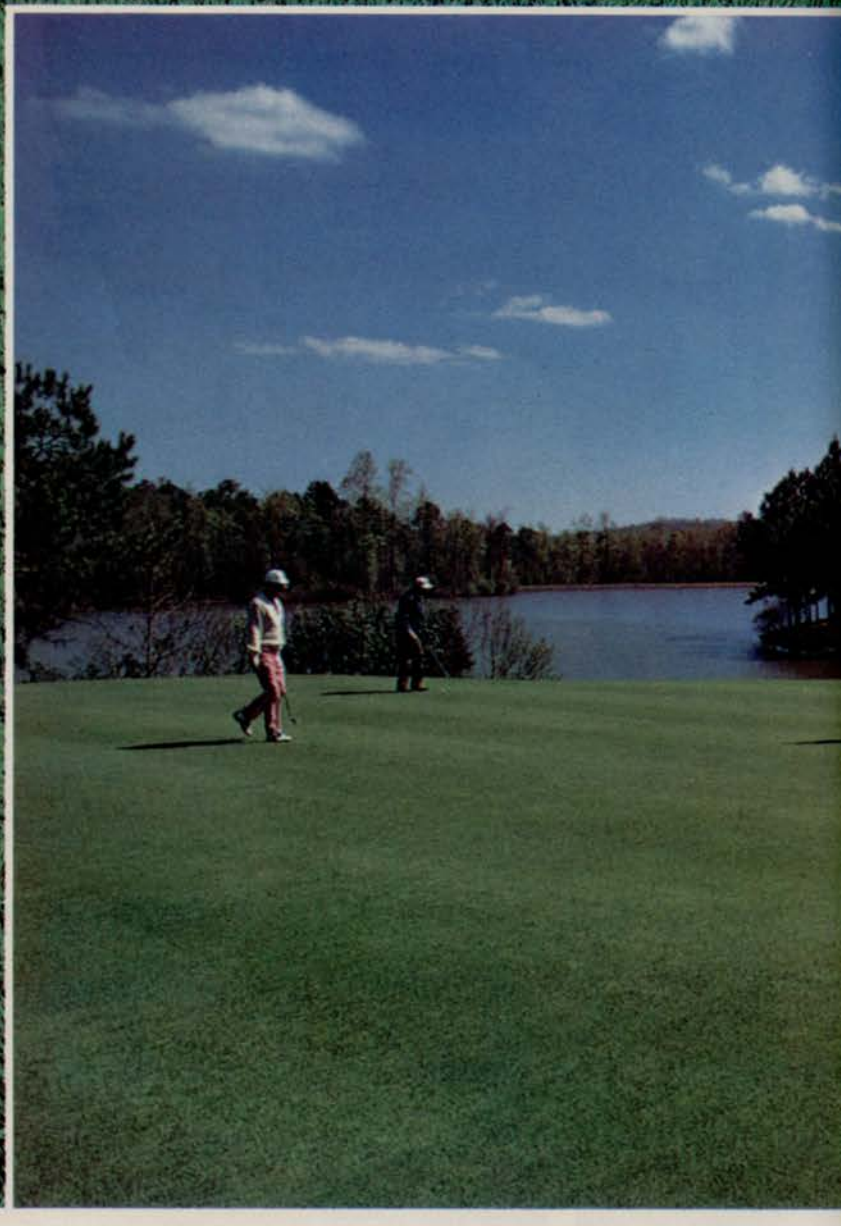

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Knocks out more diseases: BAYLETON offers the broadest spectrum of disease control of any leading turf fungicide. This includes tough diseases like dollar spot, brown patch, Fusarium blight, red thread, striped smut, certain rusts and pink and gray snowmold.

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Fast-acting: Systemic activity provides rapid, uniform protection of the grass plant against disease organisms.

Eases resistance worries: BAYLETON attacks more than one site of fungal activity, so resistance is unlikely. This helps relieve one of your most critical fungicide concerns.

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the motor. Both pump and motor can be in a single housing, or they can be separated in what is called a split system.

In operation, when the control treadle is near neutral, the transmission is in low range. As the treadle is advanced, the ratio is gradually changed to high range. Thus, when climbing steep grades or doing heavy work, it's important for the operator to ease up on the control, returning the transmission to low range.

With one control for speed and forward and reverse motion, a machine with a hydrostatic transmission is exceptionally simple to operate. In addition, vehicle speed can be varied independent of engine speed, improving maneuverability without affecting the performance of implements such as mowers, sweepers, etc. Another advantage is it can act as a braking system, increasing safety and operator control and reducing brake wear.

Finally, because this transmission is sealed, it can operate in dusty environments, providing long, trouble-free performance with normal maintenance.

In the future there will be even more applications of hydraulic systems, making turf care equipment safer, more versatile and easier to operate. They'll be lighter, too, with the development of smaller systems with increased pressure leading to more compact machines.

Electronic controls incorporated in hydraulic circuits will sense loads and instantly adjust valve or pump action, reducing operating costs.

And new component designs will result in even quieter systems for improved operator comfort and unobtrusive operation.

Troubleshooting

One of the best rules to follow when faced with a hydraulic problem is, don't assume anything.

Here's just one example of what we mean: because a failure anywhere in a hydraulic system always shows up first at the working end, the assumption too often has been that the cylinder or motor is malfunctioning. One of them may be at fault but so could a variety of other components, including some that are not related to the system itself.

Instead of the expense and downtime in changing a hydraulic cylinder, setting the engine at the proper rpm is all that may be needed.

In this example, like in others we could cite, the assumption compounds the problem since the system won't operate any better than it did before the replacement. And this means more time and money will be lost.

So, when faced with a hydraulics problem, the best place to begin is at the beginning, setting all assumptions aside.

For our purpose here the beginning is understanding system components, what can happen to them and how to maintain them. This is basic preventive maintenance. It's easily the simplest and lest expensive way to keep your equipment productive.

Reservoir—The reservoir does more than hold hydraulic fluid. Its walls act as heat exchangers, keeping fluid at an effective working temperature. What's important here is to make certain reservoir walls are free of grass, dirt, etc., since these act as insulation. A heavy buildup could lead to a breakdown of the fluid and suggest failure of various components, easily made but improper assumptions.

Filter—Its job is to remove contaminants, anything foreign to the fluid. Changing the filter as required or needed is the easiest and least expensive preventive maintenance you can perform. You simply spin off the old canister and spin on the new one. Its cost is minimal compared to replacing a valve bank due to excessive wear caused by contaminants.

How do contaminants get in the fluid? Many ways. Not all hydraulic systems are closed so they can be introduced by the ambient air. Since this could happen during manufacturing, it's a good idea to change the filter on a new machine after the first 25 hours of operation. If dusty conditions prevail during operation, you'll want to consult your manual for recommended frequency of change.

Contaminants also can enter inadvertently in other ways. For example, by not using a clean cloth for wiping the dipstick when checking fluid level, lint and dirt particles may be introduced.

Filter design is a science unto itself, with the micron rating carefully selected for a specific system. This means using the exact replacement is critically important.

Why? Consider the micron method of rating. We can see 40 microns on up. Obviously, a 10 micron filter is extremely fine, the size of one particle of talcum powder. If a rating of 10 is recommended and a 30 is used, you can expect a problem in the system at some time in the future. The 30 simply won't do the filtering job that's required.

Generally, the filter should be changed every 250 hours of operation. But the best advice is to follow the manual, and use the replacement available from the company that made the equipment.

Hydraulic Fluid—Unlike engine oil that receives contaminants from combustion, hydraulic fluid can last a long time if kept clean and not overheated.

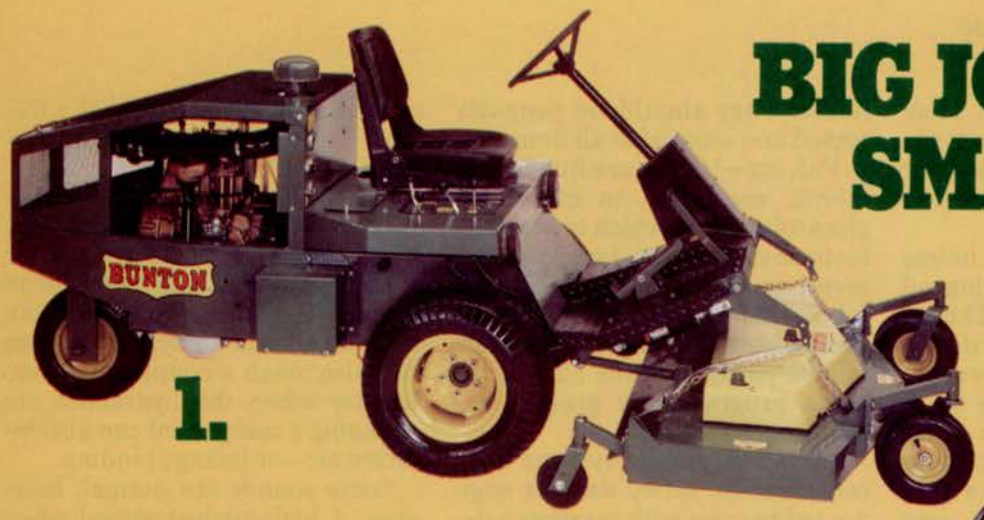
Because of advances in oil and seal technology, engine oils are more commonly acceptable for hydraulic use, with an SAE rating of SE or SF 10-30 performing well in many systems. Please note, however, that a straight weight oil, normally a 20 (or a 30 in hotter climates), should be used in the EATO hydrostatic transmissions—not a multigrade.

Watch for leakage. It could be caused by higher pressures due to water within the system. It shouldn't be there.

If you want to know what is going on inside a hydraulic system (or engine), for a nominal charge (sometimes it's free) you can have the oil analyzed at periodic intervals. Several major oil companies now offer an analysis that documents levels of various substances within the oil. For example, traces of valve metal and contaminants increasing with each analysis would indicate a valve problem ahead as well as the need for more frequent filter replacement. All you do is send a small vial of the used oil to a com-

Continues on page 58

BIG JOB OR SMALL...



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pany offering the service. They take it from there. The thing to remember is to do it at the same hour interval so the data shows a progression.

As we mentioned earlier, unless broken down from overheating, oil will last for a long time. This in mind, the "filter buggy" was developed. This portable unit is brought to the machine to clean the oil. It typically uses a 3 micron filter which results in oil that is cleaner than when new. (Note: using a filter finer than recommended in your system will restrict flow to the point where it will bypass the filter, clearly undesirable.)

Pump—Remember, flow is related to the speed of the hydraulically operated device. Pressure is related to the force. Keeping these facts in mind makes trouble shooting easier. For example, if the speed of a lift is too slow, the problem may be in the pump and not in the cylinder.

Pumps, life valves, are subject to wear from contaminants in the oil. A substance so fine as to feel slippery can cause damage.

Lines—Whether flexible or rigid, always replace a line with its exact equivalent. Lines are engineered for specific flow and pressure. Installing one that is larger or smaller than the original changes the system—and changes the action so that a hydraulically powered component will, for example drop rapidly rather than ease down. Too small a line will slow motion. And a line with a thinner wall may rupture.

A common problem source with lines is vibration that loosens connections. When tightening, use this rule: make the connection finger tight, then tighten ⅛th turn more or one flat of the nut. That's all. Keep in mind, the threads of a fitting don't make the seal; rather, it's the taper of the flare and adapter, the ferrule of compression fittings or the O-ring that does the sealing. Overtightening can damage the seat, ferrule or O-ring, or break the ends of tubing or hoses, causing leakage. Speaking of leaks, remember if oil can get out, dirt can get in.

Obviously, you'll want to keep an eye out for chafing of flexible hoses. They should be properly routed and secured at all times.

Valving—Valves are fine instruments, machined to extremely close tolerances, which is why contaminants can be so damaging. Remember, like any fluid, oil will follow that path of least resistance. This means that slight wear from minute particles in the oil will become progressively greater, altering performance.

All our hydraulic systems have relief valves, safety devices engineered to open with maximum designed pressure is reached. The rule to follow is never, never tamper with them. Here's the reason: the entire system is designed to operate at a specific pressure. For example, a gang arm of our HF-15 mowing tractor operates at from 400 to 800 psi. Shimming up the relief valve to make arm operation faster could increase pressure by as much as 700 percent, but not increase speed, leading to pump, fitting or other component failure. Keep pressure at the recommended level by using a gauge whenever making adjustments in this area.

If you are really puzzled over valve performance, don't hestiate to call your distributor. Getting the answer to a few questions can avoid considerable damage, expense and time.

Motors & Cylinders—Like a pump, a hydraulic motor is subject to less wear because it runs intermittently. Contaminants, however, will take their toll by damaging closely meshing aprts.

Cylinders are more vulnerable, with rods exposed to dirt when they stroke out during operation. They should regularly be cleaned to keep contaminants out of the seal area. Often chemicals used on turf will deteriorate protective seals and rod wipers.

Inspection—Here's where a few moments can substantially reduce downtime and costs, if the operator knows what to look and listen for and follows a set routine.

For example, the dipstick can reveal more than fluid level. Whitish oil may indicate that water or air has gotten into the system. A gritty feel is a clear danger sign of contaminants. Dirt that has collected around fittings can mean a leak and call for a slight tightening of a fixture. Fresh oil spots where the machine is parked pinpoint problem areas. During washdown, hoses should be checked for chafing, bends or crimps.

On the audible side, pumps emit a metallic rattling sound that can indicate air is in the system. But this can also mean a coupling is loose. Chatter when the hydraulics are actuating a component can also indicate air—or linkage binding.

Some sounds are normal, however. A high-pitched squeal when activating a gang arm may merely indicate a relief valve has opened. The moan of a hydrostatic transmission is not unordinary.

Trouble-shooting—This is an area that is difficult to chart. It really begins with knowledge of hydraulics and builds through experience.

Most trouble-shooting should start with the process of elimination. When a system malfunctions, look for the obvious. For example, when a reel mower stops, it may be nothing more than a golf spike caught in the blades. Turn off the system and spin the reels by hand to dislodge the spike or whatever else might be caught.

But if the solution isn't the obvious, then move further into the process of elimination. In a system with more than one pump, try switching the lines. If the problem persists, you'll know it's not in the pump. Similarly, other lines can be switched to check valve banks and cylinders or motors. (Take care to clean connections before making the switch to avoid contamination.) Naturally, all components should be inspected for leakage, chaffing, etc. Keep in mind that oil thins when hot, finding wear passages and decreasing working pressure.

One helpful device is an instrument that measures flow and temperature between components. Learning to use it could save considerable time and unnecessary expense.

But most of all remember that hydraulic systems, indispensable to transmitting power, are highly reliable and virtually maintenance free—especially when they are understood and properly looked after. **WTT**

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WT&T

VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *How effective are wood ashes as fertilizer or as a replacement for lime? (Ohio)*
A: The nutrient value of dry, unleached wood ashes is about two percent potash and negligible nitrogen.

Wood ashes may be 20% to 50% lime with the ash of hardwoods such as oak, elm and beech containing one-third more calcium than the ash of softwood. With this composition, it would require 4,000 to 10,000 pounds of wood ashes to be equivalent to one ton of ground agricultural limestone. Due to the light weight of dry ashes, it would take considerable quantities to substitute for lime.

Q: *Is there any information available that will tell me how long it may take one man to mow one acre of grass using a 48" Yazoo mower? (Florida)*
A: Assuming effective width of cut is 42" and typical mowing speed 3.5 miles per hour, published estimates of time requirements to mow one acre with a 48-inch power unit range from 29 to 42 minutes. Of course, many factors will influence this estimate, including type and height of turf, obstacles and slope, and the operator's skill. You may find useful the "Guide to Grounds Maintenance Estimating," available from the Professional Grounds Management Society, located at 7 Church Lane, Pikesville, Maryland 21208.

Q: *Is it possible that the new sulfur-coated urea fertilizers, because they become chopped up during mowing, cause surges in growth and subsequent slowdown, thus thickening and thinning of turf? I notice a lot of bare spots on greens using this type fertilizer and wonder at the reason.*
A: The use of sulfur-coated urea on close-cut turf such as golf greens should be limited because of losses due to mower pickup and breakage of the sulfur coating which will release urea in the first week following application. Even with the use of superfine sulfur-coated urea and mowing without a catcher, at least 10 percent of the application will have its coating broken resulting in immediate release of the urea.

Several researchers have observed an irregular or spotted response of turf following sulfur-coated urea application which is attributed to the small number of particles applied per unit area and movement of the particles with rainfall or irrigation water.

Q: *What is the best grass or mixture to use in clay soil with medium care? (Georgia)*
A: Your location (Athens) is on Piedmont soil and in the warm, humid climate of turfgrass adaptation zones. A mixture of Tall fescue (90%-95%) and Kentucky bluegrass (5%-10%) can be used in your area. For names of specific cultivars most adaptable to your region, contact your local extension service.

Send your questions or comments to: Vegetation Management c/o WEEDS TREES & TURF, 757 Third Avenue, New York, NY 10017. Leave at least two months for Roger Funk's response in this column.

Q: *Last spring, the ground beneath several elm trees was littered with small twigs. Could this be caused by squirrels? Although squirrels were seen in the trees, they were never seen feeding on the branches. (Illinois)*
A: If you get up a little earlier in the morning this spring, you will probably find that the squirrels are cutting off the twigs and eating the elm seeds.

Q: *What will control bindweed between nursery rows? (Pennsylvania)*
A: Glyphosate (Roundup) has reportedly given better control than Amitrol-T.

Q: *If available, could you please publish information on the types of root systems of trees common to our area. I have not been able to find this information anywhere. (Indiana)*
A: The following list was obtained from West Virginia University. It is important to note that the list is for *initial* roots only. Many factors including genetics, soil conditions, stage of maturity and whether or not the tree has been transplanted can influence root development.

INITIAL ROOT SYSTEMS

Long tap roots without prominent laterals.
Most pines, including:
longleaf
sugar pine
red pine
jack pine
pitch pine
shortleaf
Oaks, such as:
red
white
chestnut
black
Hickories
Eastern red cedar
American chestnut

Prominent laterals, short taproots
balsam fir
Norway spruce
red spruce
Sitka spruce
Eastern hemlock
Western hemlock
Southern cypress
sugar maple
yellow birch
American beech
Southern white cedar (after first year)

Long tap roots and prominent laterals
black walnut
yellow poplar
black locust

Plastic root systems (easily influenced by soil environment)
red maple
boxelder
white pine (based on recent information)
Southern white cedar (first year only, then lateral system)