

Check the manufacturer's rating to see how steep a slope they recommend you mow with their machine. Some mowers are intended specifically to handle steep slopes while others feature modifications that allow them to mow hillier terrain.

■ **Axle Spacers And Wide Tires.** You can purchase axle spacers and wide tires to modify some mowers to better handle slopes. These two items help spread the machine's weight across a broader area, improving traction in rough areas and on slopes.

■ **Self-Leveling.** If you are mowing a 20-degree slope, then your body is also tilted at the angle unless the machine has a self-leveling feature. Some machines level the entire cab while others focus on the seat. The goal is to keep the operator as upright as possible for safety and comfort.

Self-leveling features adjust with either a hydraulic sensor or operator weight, depending on the model and manufacturer. The Excel UTR adjusts the seat automatically to 20 degrees. "When you start to feel uncomfortable, you probably are mowing too steep a slope,"



Kubota F2100 sports a low center of gravity and four-wheel-drive for mowing slopes.

says Don Consolver, Excel Industries, Inc.

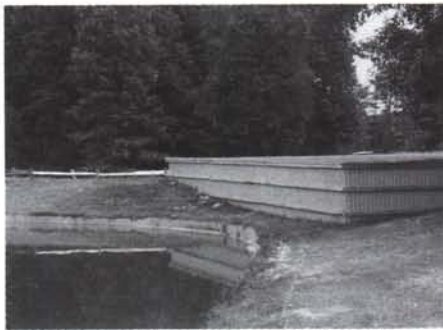
■ **Dual Hydrostatic Drive.** With dual hydrostatic drive, the left and right wheels have independent drives. This allows the operator to operate the wheels

separately, offering control for making turns on slopes, says North.

■ **All-Wheel Drive.** The ability to switch into all-wheel or four-wheel

continued on page 22

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Mowers

continued from page 21

drive gives the operator more control in difficult areas. The additional drive wheels offer traction if one of the wheels slips.

Some machines have allowed the operator to switch into four-wheel drive. Other machines selectively switch into four-wheel drive when they detect wheel slippage.

■ **Front Differential Lock.** A front differential lock enables the operator to lock together the front wheels. This aids traction if one of the wheels is slipping. The wheels work together to move forward. In four-wheel drive, the front differential lock gives the mower even more traction.

■ **Roll Over Protection System.** From a safety standpoint, ROPS is important for any machine that will constantly be used on steep slopes. "If you are going to be operating on slopes, a roll bar can save your life," says Larry Weyers, assistant director of engineering, Kubota Tractor Corporation.

Some machines provide this feature as standard equipment while others offer it as an option. A seat belt is part of the ROPS safety equipment. Encourage operators to wear their safety belts so they are not thrown free of the machine and crushed. ROPS is designed to protect operators in the operator's seat. If the operator is thrown out of the seat, ROPS can't protect him.

"Check your ROPS for service, just like other components," Weyers says. Make

Train mower operators to investigate on foot any area they are unsure about.

sure the bolts are tight and the seat belt functions correctly.

■ **Cutter Deck Mount.** The majority of specialized slope mowers are either front or belly-mount. Rear-mount mowers can present a problem when you mow difficult terrain. Instead of looking forward to avoid obstacles, the operator tends to look back at the mowing unit.

Decks are mounted on machines with various degrees of maneuverability. Some decks can *float* from side to side while others can *float* from back to front. The deck's ability to move allows the cutting unit to ride smoothly over bumpy terrain, helping to prevent scalping.

■ **Engine Lubrication And Carburetion.** Engines require adequate lubrication in order to operate properly. When you are operating a mower at an angle for a length of time, the engine can wear excessively if it is not equipped with a pressurized oil system. The oil system should be large enough to provide adequate lubrication

for the conditions in which the mower will operate.

Some carburetors won't allow enough fuel to flow through the system on slopes greater than 15 degrees, North says. Most mowers are available with a selection of engine options. Check with the engine or equipment distributor to be sure the engine you choose is equipped to handle slope mowing.

Safety First

Before you turn anyone loose to mow steep slopes, walk the area. Be sure the mower and the operator can safely handle the slope. If the operator is scared, don't send him out until he is comfortable about his ability to do the job.

Train mower operators to investigate on foot any area they are unsure about. "Watch out for wash outs. In seldom-mowed, rough areas, tall grass can obscure deep ruts," Consolver cautions.

When mowing slopes, Consolver and North recommend mowing horizontally. Weyers says Kubota recommends mowing up and down slopes using four-wheel drive mowers.

Mowing slopes safely and efficiently involves using properly balanced equipment designed to do the job. If you change decks on your mowers, be sure the tractor unit still has adequate counterweight to handle slopes. Ask your equipment distributor about counterweights when you order new mower decks or other attachments. Combine safety with good mowing technique, and your slopes will look good from any angle. □



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FORTRESS COURSE TO OPEN

The Fortress, the only golf facility in Frankenmuth, MI, is scheduled to open in July. It was designed by Dick Nugent Associates and is owned by Zehnders, who also own an independent family restaurant.

The Fortress is located on the site of a nine-hole public course. The existing holes were torn out and replaced with a 6,820 yard, par 72 course in the style of a prairie links.

The Fortress reflects characteristics of golf's early Scottish origins where wind is always a factor, and the holes play through and around fescue covered mounds to well guarded, sectioned greens.

YOUCHE REMODELING BEGINS

Indiana's Youche Country Club remodeling project began September 5 and will continue until its scheduled reopening in June 1993.

The north nine holes (Holes 4-6 and 12-17) are being remodeled but will be open for play this summer. The south nine holes remain open until August, when they are scheduled for remodeling.

Dick Nugent Associates design includes adding four new ponds, redoing the fairways in bentgrass, rebuilding four greens, resurfacing all 18 greens, and adding a number of bunkers.

DUICH JOINS TEE-2-GREEN

Dr. Joseph M. Duich has joined Tee-2-Green Corp. as a technical advisor and consultant. The retired Penn State turfgrass science professor assisted professor H.B. Musser in developing Penncross creeping bentgrass, released in 1955. He later developed Penneagle and PennLinks creeping bentgrass.

As a consultant and technical advisor, he will address golf course superintendents' questions and management practice inquiries concerning the "Pen-Pals" creeping bentgrasses.

NEW MANAGER FOR TURF-SEED



Russell Hayworth joined Turf-Seed, Inc. as southwest marketing manager. He will be marketing all Turf-Seed varieties and blends, including Citation II, Quickstart, Charger, and the "Penn Pals" creeping bentgrasses. He will also be involved with new product development and testing.

Hayworth attended Oregon State University and was involved in Oregon grass seed production for 10 years. For the last four years, he marketed turfgrass seed in Southern California and Arizona.

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EXPLORING EQUIPMENT

Oil Maintenance Practices

Engine oil is a major factor affecting the performance and service life of your engines. Monitoring the oil levels and frequent oil changes are essential for maintaining and prolonging the life of your commercial equipment.

Equipment operators often are responsible for monitoring and changing the oil. At the beginning of each season, train operators in proper oil maintenance procedures. Use this article to explain the importance of a clean, adequate engine oil supply.

Engine oil performs the following vital functions:

● **Lubrication.** Oil maintains a film between moving parts to help prevent metal-to-metal contact, which causes friction and engine wear. The key to an oil's ability to lubricate is its viscosity, or resistance to flow. The higher an oil's number, the higher its viscosity will be. For example, a 40-weight oil is thicker than 20-weight.

● **Sealing.** The same oil film that provides lubrication also assists sealing to maintain engine efficiency. Oil provides sealing both in the combustion chamber and with seals and shafts. It helps the piston rings seal pressure in the combustion chamber.

● **Cooling.** Your engine's oil also carries heat away from the hot areas, especially the piston and cylinder head.

● **Cleaning.** The term "detergent oil" refers to the cleaning capabilities of engine oil. Many engine oil additives assist in keeping the engine clean. About half the test criteria an engine oil must meet concern detergent properties. These detergents are necessary because of combustion by-products that find their way into the oil. Detergents keep varnish and deposits from forming in the engine, and to some degree remove existing deposits.

Checking the Oil

Running your lawn mower's engine with insufficient oil can cause serious engine damage, resulting in costly repairs or down time. Therefore, it is important to check the engine oil every time you use equipment.

The following is a typical procedure for checking a lawn mower's engine oil. Refer to your operator's manual for the proper procedure for your mower:

- Stop the engine and position the mower on a level surface.
- Clean the area around the oil filler cap/dipstick.
- Remove the oil filler cap and wipe the dipstick clean.
- Insert the dipstick into the oil filler neck, but do not screw it in.
- Check the oil level shown on the dipstick.

If the level is low, add the recommended oil to the upper mark on the dipstick. Do not overfill.

Commercial equipment is operated under the toughest conditions, so it's helpful to have a mower equipped with a system such as Honda's Oil Alert. An alert system warns the operator when the engine oil level begins to fall below a safe limit, indicating the operator should stop the engine immediately and add oil.

Why Change The Oil?

Adding oil regularly isn't enough. You need periodically to drain the old oil and replace it with clean oil. As crankcase oil lubricates, seals, cools and cleans, it becomes contaminated with acids, dirt and abrasives. These contaminants stay in the oil and can damage the engine. Also, prolonged use depletes many oil additives, rendering them ineffective.

Grounds care equipment works extremely hard for each hour of operation, requiring frequent oil changes. For example, you probably will run an air-cooled commercial lawn mower at or near full throttle for long periods of time. After 100 hours of operation, the small quantity of oil in the crankcase can work the equivalent of an automobile engine traveling 5,000 hard miles. Also, consider that your automobile's engine runs in a relatively clean environment. A lawn mower's engine can be exposed to extremely dusty conditions, which further dirty the oil.

With the quality of today's engine oil, change the oil every 100 hours to provide adequate protection against premature engine wear. Make it a practice to log the hours of operation for equipment to determine proper maintenance intervals.

New engines are the one important exception to this recommendation. Newly machined surfaces moving against one another in a new engine produce abrasive powdered metal particles that will enter the engine's oil within the first few hours of use. To prolong engine life, change the engine oil after the first 20 hours of use on a new machine.

Which Oil to Use

In selecting an engine oil, two questions that typically arise relate to the viscosity and American Petroleum Institute (API) rating.

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Selecting the proper oil viscosity for an air-cooled lawn mower engine becomes especially important because ambient (surrounding) temperature greatly affects oil temperature. Most manufacturers have a chart in the operator's manual showing the recommended viscosity to use for certain ambient temperatures.

You want to use the thinnest oil that maintains sufficient film strength to keep engine parts from touching. The thinner the oil, the lower its internal friction and the better its ability to flow quickly when you first start the engine.

To decide the oil viscosity best suited for Honda Power Equipment engines, we tested numerous oils. These tests revealed the best oils had a low viscosity index, such as 10W-30. (Viscosity index refers to the rate of change in viscosity within a given temperature range.) Multi-grade oils with a high viscosity index, such as 10W-40 and 20W-50, do not work as well when exposed to higher temperatures associated with power equipment engines.

SG is the suggested API oil rating for use in Honda commercial lawn mowers. SG is currently the highest quality gasoline engine oil available. SG-classified oil provides improved control of engine deposits, which can be of special concern in lawn mowers. Lawn mower engines have closed crankcases, so crankcase vapors are recirculated back into the combustion chamber, forming oil deposits that can lead to ring and valve sticking. Honda Power Equipment found SG oils to be significantly better than SF oils in reducing these deposits.

How to Change the Oil

Below is a typical procedure for changing the oil in a lawn mower. Always consult the owner's manual of your particular model for any variation from the steps below.

- Start the mower and allow the engine to reach normal operating temperature. Shut off the mower and disconnect the spark plug before proceeding.
- Place a suitable container under the mower deck to catch the used oil. Check to make sure the drain hole in the mower deck is not clogged. Remove grass and debris, if necessary.
- Clean any dirt from around the oil filler cap/dipstick and remove the cap. The biggest enemy of a commercial lawn mower engine is dirt, and any dirt that falls through the filler opening will contribute to engine wear.
- Remove the oil drain bolt. The used oil will flow along the mower deck channel to the drain hole. Allow it to drain completely. Get as much of the old oil out of the engine as possible.
- Install the oil drain bolt and tighten it securely. Do not over-tighten.
- Fill with the recommended oil to the upper level on the dipstick. Do not overfill. An engine with too much oil will smoke, foul spark plugs and run poorly.
- Install the filler cap/dipstick.
- Wipe up any oil from the mower deck to reduce dirt and grass build up when you use the mower. Reconnect the spark plug wire.
- Dispose of the used engine oil in a way that is compatible with the environment. We suggest taking it in a sealed container to your local service station or recycling center for reclamation. If you have several pieces of equipment, start an oil-collection drum. Some recycling companies will drive to your site for pickup. Whichever method you choose, do not throw it in the trash or pour it on the ground.

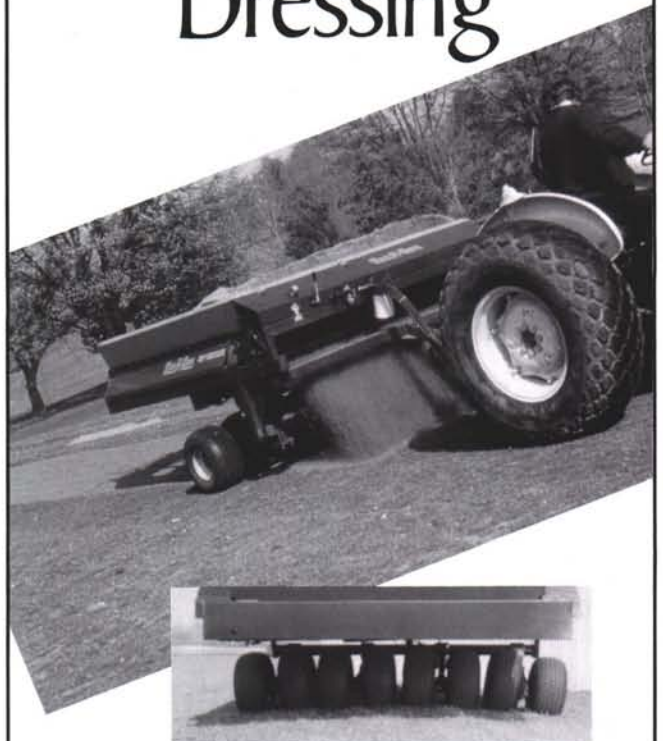
A routine oil change is also a good time to inspect the crankcase breather hose to be sure it is securely fastened and undamaged. A torn or disconnected breather hose will allow dirt to enter the engine, which will result in rapid engine wear.

Oil is the lifeblood of your lawn mower's engine. You can help ensure long engine life and many hours of trouble-free operation by performing proper oil maintenance. □

This article was written by service engineers at Honda Power Equipment, Duluth, GA.

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CHEMICAL LOG

Ornamental Herbicide Update

By Dr. Tim R. Murphy

The number of herbicides for use in ornamental beds has increased in recent years. Grounds managers now have a wide array of herbicides to use in a variety of ornamental weed control situations.

As with all pesticides, read all label directions carefully before applying. Consult the manufacturer for a complete list of labeled plants. The following are either new products or changes in current herbicide labels.

BASF has introduced Vantage (sethoxydim) for weed control in broadleaf ornamentals. Sethoxydim was previously marketed for ornamentals under the trade name of Poast. BASF will concentrate their marketing efforts in ornamentals with sethoxydim under the trade name of Vantage.

There are several key differences between Vantage and Poast. Vantage is a 1.0 pound per gallon formulation of sethoxyim and contains a surfactant. It is not necessary to add additional surfactant to Vantage.

Poast is a 1.5 pound per gallon formu-

lation of sethoxydim and does not contain a surfactant. With Poast, it was necessary to add a crop oil concentrate to the final spray mixture.

Grounds managers now have a wide array of herbicides to use in a variety of ornamental weed control situations.

Similar to Poast, Vantage is labeled for use on a wide variety of ornamentals trees, shrubs, annual and perennial flowers, and ground covers. Vantage will control most emerged annual and perennial grasses. Vantage will not control broadleaf weeds, nutsedges or annual bluegrass.

Key factors to optimize the efficacy of Vantage are:

- Apply to actively growing (not drought stressed) grasses at the growth stage shown on the label.

- Do not apply Vantage if rainfall is expected within one hour of application.

- Do not cultivate beds five days before or seven days after application if you use mechanical cultivation equipment.

Most broadleaf ornamentals are tolerant to over-the-top applications of Vantage. However, at excessively high rates, 'Snow' azalea, *Potentilla* spp., Japanese privet, and Snow-in-the-Summer have been injured by Vantage. Refer to the Vantage label for a complete listing of labeled ornamental plants.

For years, yellow nutsedge has been a major problem in ornamental plantings. Historical options for control have been to kill all existing weeds prior to planting, using Eptam, Roundup, and more recently, Pennant. BASF has recently labeled bentazon under the trade name of Basagran T/O. However, Basagran T/O is not registered in California.

Bentazon has good to excellent post-emergence activity on annual sedges, yellow nutsedge, and many broadleaf weeds such as chickweed, cocklebur, wild mustard and jimsonweed. Bentazon is not effective for the control of purple nutsedge or annual and perennial grasses.

Basagran T/O is currently labeled for post-directed applications to 38 species of ornamental trees and 30 species of ornamental shrubs. A particularly attractive feature of Basagran T/O is that it is labeled as an over-the-top application to English ivy, liriopse and pachysandra. Refer to the label for a complete listing of labeled ornamental plants. Key factors to optimize the activity of Basagran T/O are:

- Add a crop oil concentrate to the spray mixture when treating certain weeds.

- Apply to actively growing weeds at the growth stages shown on the label.

- Do not apply if rainfall is expected within eight hours of application.

For many years, Surflan has been used to control annual grasses and certain broadleaf weeds in ornamental plantings.

In 1991, DowElanco introduced a

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Certain preemergent herbicides can control weeds around ornamental trees, shrubs, and groundcovers.

prepackaged mixture of the active ingredients in Surflan (oryzalin) and Gallery (isoxaben) for use in ornamentals. Snapshot 80 DF is dry flowable, sprayable formulation that contains 0.2 pounds isoxaben and 0.6 pounds of oryzalin per pound of formulated product. This preemergence herbicide will control a wide variety of annual grass and broadleaf weeds. Among the weeds controlled are crabgrass, annual bluegrass, fall panicum, spotted spurge, shepherdspurse, sowthistle, prickly sida and woodsorrel. Snapshot is strictly a pre-emergence herbicide and applications must be made prior to weed seed germination. It is not effective for the control of nutsedge or established weeds.

Snapshot is labeled on a wide variety of ornamental trees, shrubs and groundcovers. It is not recommended for use in bedding plants. Research is being conducted at various locations in the United States to identify bedding plants that are tolerant to Snapshot. It may be used in established or newly transplanted ornamentals. On new transplants, delay the application of Snapshot until the soil has been settled by rainfall or irrigation, and no cracks in the soil are present. Refer to the label for a complete listing of labeled ornamental plants.

Snapshot is now available in a granular formulation as Snapshot 2.5 TG. This formulation contains 2.0 percent trifluralin and 0.5 percent isoxaben. It is labeled for control of 86 broadleaf and annual grassy weeds, and for use on a wide variety of landscape ornamentals and ground covers. Check the label for specific plants. Apply the herbicide using a properly calibrated drop

or rotary spreader. You can apply it directly over the top of established labeled plants.

The liquid herbicide Pennant has been approved for numerous nursery and landscape plants for several years. Recently, the Environmental Protection Agency (EPA) approved several improvements to Pennant's label. The new label adds more than 50 desirable plants to the list of landscape plants on which you can use the herbicide. Additionally, Ciba-Geigy has a 5.0-percent granular formulation of Pennant for use on turf and ornamentals.

The preemergence herbicide will control a wide variety of weeds, including yellow nutsedge. Apply before weed germination or remove all weeds before spraying.

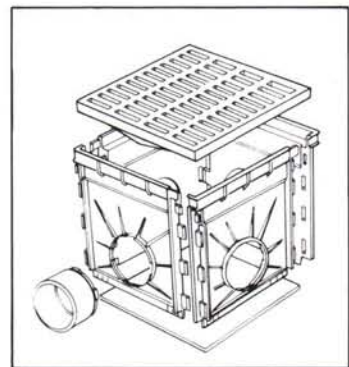
For 1992, Ciba-Geigy has introduced Derby, a granular herbicide that combines the active ingredients in Pennant (metolachlor) and Princep (simazine) to control many annual grasses, selected broadleaf weeds, and yellow nutsedge. Derby is a granular product that is labeled for a broad spectrum of ornamentals and other landscape plants. Refer to the label for a complete list of the labeled plants.

Princep is a liquid preemergence herbicide that is now being packaged and marketed specifically for turf and ornamentals. It controls a wide variety of annual broadleaf and grassy weeds when used at selective rates on ornamentals. Refer to the Princep label for a complete list of labeled ornamental plants. □

Tim R. Murphy is the extension agronomist-weed science for The University of Georgia, Athens, GA.

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Chris Tilghman Sets His Own Course

By Matthew Trulio



Gator Hole Golf Course is situated on a wooded site in North Myrtle Beach, SC, just a few blocks from the ocean.

It's a warm evening at Gator Hole Golf Course and Chris Tilghman's dogs, a black labrador and an English setter, are running wild on the third fairway. The golfers are gone, the pro shop is closed, and Tilghman is walking the course, inspecting each green and fairway, looking for areas that need water.

The dogs are fairly out of control with excitement, as they are whenever Tilghman takes them on his inspection rounds of the 6,000-yard, 18-hole course in North Myrtle Beach, SC. It's a ritual that Tilghman performs at least once a week.

Such are the benefits of being a course superintendent, and co-owner.

"From the positive standpoint, I suppose I am my own boss," Tilghman admits. "My brother Phil and I discuss everything we may do to the course, but ultimately the decision is left to me. I don't have a lot of owners or a greens committee breathing down my neck,

but being an owner has its own set of responsibilities. In a sense, I'm looking after my own money, so I'm not going to go hog wild doing nutty stuff."

Planting The Seed

Golf has been a part of 36-year-old Tilghman's life since he started playing it as a boy. He grew up playing the courses in North Myrtle Beach, and dreamed of golfing professionally. "But I realized at a very young age that I could never play competitively," he admits.

The Tilghman family owned several tracts of land in the area, and Chris' father, Charles, was a local developer and avid golfer. He opened Surf Golf Club, an 18-hole course, with a group of local businessmen in 1960, on a parcel of the family's land. Chris played the course as a boy. As a high school student, he worked there as a helper in the summers.

Tilghman became "hooked," on the work, he recalls. After high school he

enrolled at Clemson University in South Carolina to study turfgrass management.

"I did my share of fooling around," he laughs. "But when it came to getting serious, I got serious."

He returned to North Myrtle Beach after graduating from Clemson in 1977. The Tilghmans had sold or developed all but one of their parcels of land, and Charles wanted to keep the remaining parcel in the family. He gave the land to Chris and Phil, with the stipulation that they couldn't sell it. The brothers spent many hours talking about what to do with it, and how to best use their respective talents. A golf course was a natural choice.

Phil put together the financing. That secured, Chris and Phil selected Reese Jones to design the course. From the first day of construction, Chris was on the course, which includes a 14-acre natural lake and is lined with various hard-