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basis and being responsible for the machines' daily cleaning and storage were now delegated to the operator.

At about the six month period, a work order and central inventory system was re-created to put accountability on my technicians for the hours worked, repairs made, come-back prevention and accountability for parts used. A rebuilding program for accessories and main units was now also in place so rebuilt spares were available more frequently and down time was at a minimum.

A truth of nature came about because of the involvement of all concerned. Valued input by the technicians was utilized in the business plan appraisal, shared by all, then adopted or temporarily sent back to the drawing board. By not being run by a dictator who expects clones, but instead uses sound business and people

skills, the shop gets better all the time.

I expect each technician to do their job without being constantly watched over. I expect each technician to communicate with me at all times when any doubt arises pertaining to his work environment, machines, supplies, other employees or his benefits as an employee of Quail Ridge. I try to keep all promises whether they are promises of information, those requiring disciplinary action or promises to procure the necessary items to create and maintain a productive atmosphere.

The shop runs well because it must. The reels cut well and machines work as they should because of the teamwork that is the outcome of technicians knowing their job requirements, expecting quality and giving them the ability to do the best that they can. I educate with a

constant back-to-basics approach. Keep it simple, be safe and enjoy your day. The department heads have the opportunity to do what they need to do, and the superintendent can concentrate on growing grass and giving me an equipment needs list with the Height Of Cut requirements.

At budget time, I share with him my thoughts for replacement of certain equipment, and he shares his wish list with me. Last year we were able to convince the powers that be to put together a contingency fund for major rebuilds or special needs that could not be forecasted. This fund has worked well in protecting the allocated budget. This interaction has built trust and appreciation for each other's job requirements. In the end, it is a true win for each of us.

## Duties, Record Keeping and Training

BY MIKE SWINSON, CGCS

*Cypress Run G.C.*

### Operator Responsibilities

The equipment operator is responsible for checking all fluids — fuel, oil, coolant and water. These are the levels that are to be checked daily. Rear ends, differentials and some cooling levels are checked only by the mechanic at their scheduled intervals unless an operator suspects a leak. The equipment operator is also responsible for the greasing of all the rollers, pulleys, etc. that are to be greased on a daily basis. The mechanic must be informed immediately of any problems whatsoever of the machine. Good communication between the mechanic and the operator about the machine's performance is essential. They can prevent accidents before they happen. After completing their work assignments the equipment operator cleans his/her machine with an air hose, followed by a complete rinsing of the machine with water. The equipment is then returned to the shop clean — the way it left.

### Equipment Records

All of our equipment has an identification number. That number is on a master equipment inventory sheet that lists the date of purchase, equipment name, purchased new or used, and the supplier's name. This is useful for the depreciation of our equipment along with inventory control and cost of repairs. A copy of this list is supplied to the superintendent, head mechanic and secretary. Our procedure works as follows: The mechanic fills out a work order for repair parts that are needed. He dates the work order and puts the identification number for each part that is used for that particular machine. The work order goes to the secretary who calls the main office for a purchase order (P.O.) number. That number is then used for the mechanic's work order. After typing the P.O. and placing the order (blue copy), the superintendent then signs the order as the purchasing agent and turns it into the main office. The main office then types a gold P.O. which is an exact duplicate of the blue copy. The gold copy is then sent to the superintendent. After the parts arrive, the assistant superintendent checks all the packages against the packing slip and the original purchase order. If all is in, he dates and signs the packing list. The

packing list is then given to the secretary who attaches all the receipts behind the gold copy. Quantities and the date received are then written on the gold copy along with comparing the receipt price against the original purchase order price. The gold copy, along with any discrepancies, is turned over to the superintendent for final approval. After signature approval, the gold copy is turned in to the accountant.

The secretary keeps a log for each piece of equipment in our computer. Each repair part is then charged to a particular piece of equipment. This is very helpful when you are trying to get approval for new equipment; you can show what the repair cost is, not including labor, for any specific time frame. This also helps you with your budget preparation for the following year. Each year you have a record so that you can start a data base which will help you with the equipment's life expectancy. The head mechanic also has an hour meter log that will help in the data base.

### Operator Training

Equipment operators are educated with training videos about the correct operation of the machine. Operators are also required to read the owner's manual

# LASER

*Poa trivialis*

## IS PROVING ITSELF...

### Over

At Arnold Palmer's Bay Hill Club, Orlando, FL  
"I've been overseeding with 100% Laser since it was first introduced. Now I wouldn't use anything else. It really does an excellent job for us at Bay Hill." Dwight Kummer

### and Over

At Buck Creek Golf Plantation, No. Myrtle Beach, SC  
"Using Laser in conjunction with perennial ryegrass has enabled me to reduce the total poundage, counter the wear associated with heavy play, provide an ultra smooth transition in fall and spring, and provide our golfing guests with an outstanding putting surface. I've heard many comments such as, 'Best bent greens we've played here on the beach.'" John E. McWhite

### and Over

At Bonita Bay Club, Bonita Springs, FL  
"I have used Laser Poa trivialis for the last several seasons and I have been very pleased with its color, texture, establishment, spring transition and especially with its durability. It's definitely part of my future overseeding plans." Mark Black

### and Over

At Grayhawk Golf Club, Scottsdale, AZ  
"At Grayhawk Golf Club we use an 85/15 blend of Palmer II/Prelude III/Laser on our fairways, roughs, and tees. The high seed count of the Laser blend allows us to reduce our seeding rates and prep work while providing a superior playing surface compared to straight perennial rye." Mike Pock

### and Over

At Lake Nona, Orlando, FL  
"I normally utilize a 50/50 blend of bentgrass/Poa trivialis for my greens overseeding program. This year however, because our tournament schedule dictated a later overseeding window, I will use straight Laser Poa trivialis at a slightly higher rate. This will be the fourth year I've used Laser. During those years, we've experienced a variety of weather conditions and traffic challenges. Laser has consistently exhibited good color and the drought tolerance that is so important in achieving a smooth spring transition. That was the reason I tried Laser in the first place and it has performed very well." Ken Glover

### and Over Again

At Hunter's Creek Golf Course, Orlando, FL  
"For the past five years, we have overseeded our greens with straight Laser. Year after year, Laser has out-performed the other Poa trivialis varieties we've compared it against. It has consistently proven to have better color, quicker establishment, better disease resistance and better durability under high traffic. Laser produces an excellent putting surface. Our observations have convinced us that Laser is the superior choice of Poa trivialis." Craig A. Shelton



Tournament-quality greens are expected at **Arnold Palmer's Bay Hill Club**. Overseeding with 100% Laser every year helps Dwight Kummer meet those expectations.

*Arnold Palmer*  
BAY HILL CLUB

  
BUCK CREEK  
GOLF PLANTATION

**Bonita**  
Bay Club  
Bonita Bay Club

  
Grayhawk  
GOLF CLUB

  
LAKE NONA

  
HUNTER'S CREEK  
GOLF COURSE

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and

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present...



# Reelmaster® 6000 Series Fairway Mowers

*The first family of mid size mowers delivering exceptional power, agility, productivity and quality of cut. Everything you need for picturesque fairways and superb playability. Even under the toughest turf conditions.*



# The Toro Reelmaster® 6000 series are the first true mid size fairway mowers.

You want your golf course to be exceptionally beautiful and playable. So you may be using one mower for thick, warm season grasses. And another during cooler months. Now with either Toro's Reelmaster 6500-D or 6700-D your turf conditions can be handled

all year 'round. The 6000 series are true mid size fairway mowers offering breakthrough technology, a consistently superb quality of cut and up to 10 acres per hour productivity.



## Power Pack

Our 2 or 4 wheel drive Reelmaster 6500-D has a powerful 38 hp Peugeot diesel engine. It's ideal even for high altitude areas where most mowers lack reserve power.

The 6700-D comes with an extremely efficient 42 hp Peugeot diesel with standard 4 wheel drive. It generates energy that not only moves the machine but also drives its *seven* hydraulic cutting units. The 6 position joystick controls either 5, 6 or 7 cutting units for up to 11 feet of exceptional productivity.

Both models tackle heavy bermuda, zoysia, overseeded rye, bent and blue grass. Quietly. Measuring a super low 76 decibels at a distance of 25 feet.







## Heavy Duty Reels

Toro technology is cutting edge. Exemplified by the 6000 series heavy duty 5 or 11 blade reels. All reels are interchangeable. All can be quickly changed from steerable to non-steerable. All feature single point reel to bedknife adjustment. In addition, they come with an exclusive self centering system to ensure proper tracking when reels are lowered.

## Contoured Cutting

With the 6000 series you can count on a consistently fine quality of cut, due in large part to another Toro exclusive. Our L-I-N-K-S™

system. Its four bar floating linkage and individual lift arm dampers afford extraordinary contour following ability and reduces “bobbing” better than any other fairway mower. Another advantage



comes with Toro's Automated Control Electronics™ (ACE) system that automatically adjusts reel speed to mowing speed to maintain a consistent rate of clip. It can also be programmed to limit the maximum mowing speed.

## Sense-ational Hydraulics

The Reelmaster 6000 series hydraulic system is state of the art. Toro's exclusive TurfDefender™ electronic leak detection system “senses” and alerts the operator to damaging leaks and minimizes false alarms that plague conventional systems.

# Reelmaster® 6500-D and 6700-D Specifications

	REELMASTER 6500-D MODEL 03800, 2-WD OR MODEL 03801, 4-WD	REELMASTER 6700-D MODEL 03802, 4-WD																					
<b>BRAKES</b>	Wet triple disc brakes on front planetary assemblies may be actuated individually for service brakes or locked together for transport or parking brakes. Dynamic braking through hydrostatic traction drive.																						
<b>STEERING</b>	Power steering with dedicated power source.																						
<b>CUTTING UNIT SUSPENSION</b>	Equal length lift arms with the L-I-N-K-S™ suspension system.																						
<b>SEAT</b>	Deluxe seat with adjustable suspension and fore-aft location. Optional Armrest Kit, Model 30707.																						
<b>ROPS</b>	A 4-post ROPS with canopy and seat belt; standard on Models 03801 and 03802, optional on Model 03800.																						
<b>OVERALL DIMENSIONS</b>	<table border="1"> <thead> <tr> <th></th> <th>Height</th> <th>Length</th> <th>Transport Width</th> <th>Operational Width</th> <th>Wheel Tread</th> <th>Wheelbase</th> </tr> </thead> <tbody> <tr> <td><b>Models 03800/ 03801:</b></td> <td>60" (152 cm) w/o ROPS 84" (213 cm) w/ROPS</td> <td>120" (305 cm)</td> <td>84" (213 cm)</td> <td>110" (279 cm)</td> <td>70.25" (178 cm) - front 41" (104 cm) - rear</td> <td>58" (147 cm)</td> </tr> <tr> <td><b>Model 03802:</b></td> <td>84" (213 cm) w/ROPS</td> <td>120" (305 cm)</td> <td>84" (213 cm)</td> <td>147" (374 cm)</td> <td>70.25" (178 cm) - front 41" (104 cm) - rear</td> <td>58" (147 cm)</td> </tr> </tbody> </table>		Height	Length	Transport Width	Operational Width	Wheel Tread	Wheelbase	<b>Models 03800/ 03801:</b>	60" (152 cm) w/o ROPS 84" (213 cm) w/ROPS	120" (305 cm)	84" (213 cm)	110" (279 cm)	70.25" (178 cm) - front 41" (104 cm) - rear	58" (147 cm)	<b>Model 03802:</b>	84" (213 cm) w/ROPS	120" (305 cm)	84" (213 cm)	147" (374 cm)	70.25" (178 cm) - front 41" (104 cm) - rear	58" (147 cm)	
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<b>NET WEIGHT WET</b>	<b>Model 03800:</b> 3,200 lbs. (1,451 kg) with 5 blade cutting units and full fluid levels. <b>Model 03801:</b> 3,300 lbs. (1,497 kg) with 5 blade cutting units and full fluid levels. <b>Model 03802:</b> 3,800 lbs. (1,723 kg) with 5 blade cutting units and full fluid levels.																						
<b>WARRANTY</b>	One year limited warranty. Refer to the appropriate Operator's Manual for further details.																						
<b>SOUND LEVEL</b>	82 dB(A) under normal operating conditions.																						
<b>CERTIFICATION</b>	The Reelmaster 6000 series complies with American National Standards Institute (ANSI B71.4-1990) and European Community (CE) specifications with required kits and ballast installed.																						
<b>HYDRAULIC SYSTEM</b>																							
<b>PUMP</b>	A three section gear pump provides hydraulic flow to power the cutting units, power steering and cutting unit lift.																						
<b>CONTROL BLOCKS</b>	All hydraulic functions are controlled by two integrated hydraulic control blocks utilizing cartridge type relief valves, solenoid controlled proportional valves and solenoid operated directional control valves.																						
<b>AUTOMATIC REEL SPEED CONTROL</b>	Reel drive circuit is split into front and rear independent circuits with separate pump and valve control of each circuit. A separate proportional cartridge bleed valve is provided for each circuit. The ECU measures reel speed of each circuit from a sensor on front center and left rear cutting unit, traction speed from a sensor on the wheel motor and detects the desired clip from a potentiometer located under the control panel. The ECU then determines what duty cycle of voltage to apply to the proportional cartridge valve to achieve the desired clip (i.e., reel speed).																						
<b>LIFT CYLINDERS</b>	The front right and left units and the rear two units are raised by individual cylinders in separate series circuits. The front center unit and outer rear units on Model 03802 are raised individually. All lift and lower sequences are controlled by the ECU.																						
<b>HYDRAULIC OIL RESERVOIR</b>	100% of oil from reservoir passes through a 100 mesh suction strainer before entering the reel drive circuit. 8.5 gallon (32 liter) capacity.																						
<b>HYDRAULIC OIL FILTER</b>	11 gram cap at 10 gallon (37 liter) per minute flow Ave Beta = 20 at 3 micron. Filter head has integral 50 psi (3.4 bars) bypass and a true differential pressure service indicator.																						
<b>5 AND 11 BLADE CUTTING UNITS</b>																							
<b>TYPE</b>	Five 22" (56 cm) width cutting units; fully interchangeable. Front or rear discharge selectable with movable shield.	Seven 22" (56 cm) width cutting units; fully interchangeable. Front or rear discharge selectable with movable shield.																					
<b>WIDTH OF CUT</b>	96" (244 cm) total.	96" (244 cm) with 5 cutting units, 114.5" (291 cm) with 6 cutting units, or 133" (338 cm) with all seven cutting units.																					
<b>HOC RANGE</b>	¾"-1 ¼" (9.5 mm-32 mm) height of cut range. Recommended use: 5 Blade—¾"-1 ¼" (19 mm-32 mm); 11 Blade—¾"-¾" (9.5 mm-19 mm). Achieve 1 ¼"-3 ¼" (29 mm-79 mm) with High Height of Cut Kit, Model 03880.																						
<b>REAR HOC ADJUSTMENT</b>	Quick height of cut adjustment mechanism in 1/8" (3.2 mm) increments with threaded micro adjust for finer adjustment.																						
<b>REEL CONSTRUCTION</b>	Fairway reels. All welded construction. 7" (17.8 cm) diameter reels.																						
<b>REEL DRIVE</b>	Reel motors feature quick disconnect for removal or installation onto cutting unit. Cutting units can be driven from either end.																						
<b>BEDKNIFE/BEDBAR</b>	Single point adjustment mechanism, .0005 in adjustment per click.																						
<b>CLIP FREQUENCY</b>	.375" - 1.25" (9.5 mm - 3.17 mm). Reel speed automatically adjusts to maintain proper clip. Reel speeds continuously calculated based on the current forward speed and the pre-set reel type and height of cut.																						
<b>ROLLERS</b>	Front roller: 3" (7.6 cm) diameter Wiehle roller standard. Rear roller: 2.5" (6.4 cm) diameter Full roller. All rollers use the same heavy duty ball bearings with two conventional single lip seals and Toro labyrinth seal to provide four sealing surfaces to protect the bearings. Optional 3" (7.6 cm) diameter Full roller, P/N 93-3040, is available for the front position.																						

## ACCESSORIES

Model No.	Description	Model No.	Description	Part No.	Description	Part No.	Description
03854	5 Blade Cutting Unit	30707	Armrest Kit	94-2836	Rear Weight Kit	93-2962	Rear Roller Scraper Kit
03856	11 Blade Cutting Unit	03880	High Height of Cut Kit	85-4750	Hand Held Diagnostic Tool	93-2967	Front Roller Scraper Kit
03870	Thatching Reel						

\* Specifications and design subject to change without notice. "Toro", "Reelmaster" and "Toro 4-Matic" are registered trademarks and "Automated Control Electronics", "ACE", "Data Log", "L-I-N-K-S" and "TurfDefender" are unregistered trademarks of The Toro Company, 8111 Lyndale Avenue South, Bloomington, Minnesota, 55420-1196. Products depicted in this brochure are for demonstration purposes only. Actual products offered for sale may vary in design, required attachments, and safety features.



COMMERCIAL PRODUCTS



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Helping You Put Quality Into Play®



## Operator Friendly

Operators like the Reelmaster 6000 series for its ease of control and tireless comfort. For its quiet operation. For its efficient ergonomic design with complete instrumentation package. For its single joystick control of all cutting units. Its

smooth hydrostatic transmission and a productive mowing speed of up to 7.5 mph. Up to 10 mph in transport. Cushioned, adjustable seating. Superb visibility. Seat belt safety and ROPS are standard with 4-wheel drive, optional with 2-wheel drive.



## Easy Maintenance

By easy, we mean fast, simple access to all components. No tools required. An oversized hydraulic cooler tilts out 90 degrees for a clean sweep. A proven planetary traction drive system increases reliability as does its large rear air draw. Hoses are frame mounted for minimal wear. Cutting units are interchangeable. And our Data Log™ system helps to diagnose intermittent electrical problems.

## Automated Controls

ACE™ (Automated Control Electronics) is yet another Toro exclusive that aids the mechanic in determining hydraulic versus electrical problems and quickly tests over 32 switches and circuits.

## Legendary Longevity

You see many Toro old timers still on the job at golf courses everywhere. Maybe your own. That's because we build Toro durability and reliability into every Toro product, including the 6000 series. That means you can expect a long, productive service life. Without early retirement.

### We're on Your Schedule

You bought the best equipment in the industry, so why not keep it that way. Using Toro original equipment parts is the only way you can be assured that your Reelmaster 6000 series will operate exactly as designed. You say you need your parts right away? Our parts are backed by the 24 Hour Fast Track delivery guarantee, or your parts are free\*. No one in the industry can match the availability and delivery capabilities better than Toro and your local Toro distributor. Ask your distributor for more details.



\*24 Hour Fast Track delivery is available in the 48 contiguous states and covers only parts supported by The Toro Company, Minneapolis, and does not include irrigation or certain engine parts. Program subject to carrier delivery restrictions.



## Reelmaster® 6500-D and 6700-D Specifications\*

	REELMASTER 6500-D MODEL 03800, 2-WD OR MODEL 03801, 4-WD	REELMASTER 6700-D MODEL 03802, 4-WD
<b>ENGINE</b>	Peugeot, 4 cylinder, 4 cycle, overhead cam, 116 cu. in. (1.9 liter) displacement, liquid cooled diesel engine. <b>Model 03800/03801:</b> 38 hp (28 kW) @ 2300 rpm; governed to 2500 rpm. <b>Model 03802:</b> 42 hp (37 kW) @ 2550 rpm; governed to 2750 rpm. 23.5:1 compression ratio, 3.27" (83 mm) bore x 3.46" (88 mm) stroke. Automatic glow plug controller. Heavy duty, 2 stage, remote air cleaner. Oil capacity is 5.3 quarts (5 liters) with filter. Optional Spark Arrestor Muffler, P/N 94-2849.	
<b>RADIATOR</b>	Rear mounted, cross-flow agricultural type radiator; 5 row, 7 fins per inch. Remote mounted, 1 quart (.94 liter), degassing/expansion tank. Cooling system capacity is 3.5 gallons (13.2 liters). Air to oil cooler with 2 rows, 6 fins per inch, mounted in front of radiator tips outward for cleaning. Removable oil cooler/radiator screen.	
<b>ELECTRICAL FEATURES</b>	12 volt, 650 cold cranking amperes at 0°F (-18°C), 105 minute reserve capacity at 80°F (27°C), maintenance free battery. 1.4 kW electric starter. 55 amp alternator with I.C. regulator/rectifier. Automotive type electrical system. Seat switch, reel and traction interlock switches.	
<b>FUEL SYSTEM</b>	Rotary fuel injection pump with integral energized-to-run (ETR) fuel flow solenoid. Replaceable spin-on fuel filter/water separator with water sensor. Fuel capacity: 15 gallon (64 liter).	
<b>CONTROLS</b>	Foot operated traction and brake pedals. Hand operated throttle, traction speed limiter, parking brake latch, ignition switch with automatic preheat cycle, single joystick control for cutting unit on/off and lift/lower. Cutting unit backlap switch located under operator's seat. Reel speed input located under control panel. HOC selector knob for setting corresponding HOC setting of machine per decal under seat frame.	
<b>GAUGES</b>	Hour meter, speedometer, fuel gauge, engine coolant gauge, and warning light cluster: engine oil pressure, high engine temperature, charge indicator, glow plug, water in fuel indicator, low water indicator. Reel control lamp that lights to indicate the reels are not providing desired clip.	
<b>DIAGNOSTICS</b>	The Automatic Control Electronics, ACE™ system allows precision timing and control of machine functions for maximum reliability. Standard diagnostic display connects to an electronic control unit to pinpoint any electrical problems quickly and easily. Available DATA LOG™ system allows mechanic to find intermittent problems. Diagnostic test ports are provided for front and rear cutting unit drive, cutting unit lift, steering, and hydrostatic transmission charge pressure.	
<b>TRACTION DRIVE</b>	Power to the front drive wheel is via servo-controlled hydrostatic pump operating individual fixed displacement axial piston wheel motors that operate a planetary gear assembly. Foot pedal control of forward/reverse ground speed. <b>Toro 4-Matic® 4-Wheel Drive System only:</b> couples rear drive axle to hydrostatic transmission via overrunning clutch for full time on-demand 4 wheel drive. A Roll Over Protection Structure (ROPS) and seat belt are standard.	
<b>GROUND SPEED</b>	0-10 mph (0-16.1 km/hr) forward; 0-4 mph (0-6.4 km/hr) reverse.	
<b>TIRES/WHEELS/PRESSURE</b>	Two rear steering tires: 20 x 10.00-10, tubeless, 6-ply rating. Two front traction drive tires: 29 x 12.00-15, tubeless, 6-ply rating. Recommended tire pressure: 10-15 psi (69-103 kPa).	
<b>MAIN FRAME</b>	All welded steel frame includes tie-down loops.	

on each piece of equipment before they operate it. The head mechanic is responsible for training the equipment operator to properly check all oil and fluid levels, along with the correct starting and

transporting procedures. The assistant superintendent is then responsible for teaching the safe operation of the machine out on the course. He is with the equipment hands-on to ensure that the

job is done correctly. He then follows the equipment operator out onto the course to show him/her the correct mowing procedure.

## Is It Maintenance Or Repair?

BY ROY WILSHIRE, CGCS

*Grasslands Golf and Country Club*

Most of our budgets have a line item called M&R Equipment. The question is, which of those two letters do we rely upon the most — M or R? At the Grasslands, we are trying to use the M for maintenance more than R for repair. We are accomplishing this only after more than three years of adjusting schedules and simplifying our equipment purchases to best match the equipment that is already here. In simplifying our equipment, we are purchasing more items with the same engines, similar hydraulic sys-

tems and equipment that has proven itself in the field. In utilizing this system, we are reducing the need for unnecessary parts inventory, which is time consuming to count and reorder when needed, thus putting the labor time in the shop versus out of the shop. We are also finding that there are less in-the-field repairs now than in previous years.

This system is working because the shop foreman and his assistant are more able to schedule their work, rather than take the next one in line. And if something does go down repairs are more easily taken care of. Let's not fool ourselves! We still have our days when it's, "Take the next number, and we'll be with you in a minute." In addition to operating under less stress, it allows the em-

ployee in the shop more time to educate himself by reading the articles in the trade magazine and attending seminars. I'm very fortunate in having a very skilled shop foreman with a good background (thanks, Bobby Ellis.). His persistence, my willingness to allow him to establish the programs and utilize a computer program for equipment are paying great dividends for us at the Grasslands.

So, do you replace the grease zerk or the bearing? Change belts in the shop when they're cracked or after their broken in the field? These are just a couple of examples of how maintenance versus repair can assist you in being more productive and cost effective. And once it's in effect, you'll find that it's much easier to use the M rather than the R.

## Non-Stop Mechanics - Better than an apple a day!

BY CHUCK GAST, CGCS

*Superintendent*

AND BILL ELLMAN

*Chief Mechanic  
Jupiter Hills C.C.*

Key components of a successful golf course operation involve careful coordination of a myriad of programs relating to cultivation, fertilization, irrigation, regulation and all other sorts of "-ations." However, even with all these aspects in their proper place, basic, yet technical turfgrass mowing operations are the core of a sound golf course maintenance operation for quality playing conditions.

Just as important as having the appropriate equipment to complete specific turfgrass mowing operations, proper equipment maintenance on a routine

basis is essential to maintain desired mowing quality with optimum efficiency. To help us in achieving this goal at the 36-hole Jupiter Hills Club our staff has worked to establish a mechanics program with specific duties and responsibilities to each of three mechanics. We have incorporated rotational scheduling to ensure a mechanic is on duty no less than eight hours a day, seven days a week.

The mechanics staff at Jupiter Hills consists of a chief mechanic and two assistant mechanics, each with specific areas of responsibility. The chief mechanic oversees all operations in the shop area including maintaining parts inventory and prioritizing specific equipment maintenance relative to scheduled golf course operations. Correcting emergency breakdowns and general troubleshooting of less-than-cooperative equipment is also the responsibility of the chief mechanic. Primarily the chief mechanic maintains a work schedule of Monday through Friday, 6:00 a.m. to 3:00 p.m., while also

filling in on weekends depending on workload and assistant mechanics' scheduling.

As for the two assistant mechanics, one is primarily responsible for routine daily maintenance that involves a thorough check of all greens mowers following each mowing operation. Roller performance, motor and clutch operation, and reel-to-bedknife adjustments are maintained on all greens mowers on a daily basis. Attention to tires, batteries, fluid levels and servicing of air filters, as well as other aspects of daily maintenance of various other equipment is also handled by this assistant mechanic.

The workweek of this mechanic is generally Monday through Friday, 7:00 a.m. to 4:00 p.m. With the majority of the maintenance crew clocking out daily at 3:00 p.m., the extra hour at the end of the day allows this mechanic the opportunity to check out all equipment and perform all necessary set-up procedures for the following day as necessary.

Scheduled long-term preventative maintenance-type activities are performed by the other assistant mechanic. Areas of responsibility include lapping and grinding of reels, fluid changes, tune-ups, lubrication and other aspects of equipment maintenance performed on a routine once a month or every 100-hour service program. All pieces of equipment are addressed on a rotating basis with frequency determined by use rate. A workweek of Wednesday through Sunday, 6:00 a.m. to approximately 3:00 p.m. for this mechanic rounds out the attendance program in the shop to provide continuous full-time mechanic expertise on site. With complete access to all equip-

## Golf superintendent hits a grand slam Using high technology lubricants

BY KEITH VANMETER

Professional golfers have grand slam tournaments, anyone may have a grand slam breakfast, and professional baseball players hit grand slam home runs. Golf superintendents can also hit grand slams with operational and productivity enhancement programs using better performing lubrications. Like runs scored on bases achieved with ballplayers, the bases may be occupied by designated teammates below:

1st Base: Higher productivity

2nd Base: Lower maintenance costs

3rd Base: Oil resources extension by usage

At Bat: The environmental steward

Runs scored by not fouling the environment with hydrocarbons and improving operations.

Going to bat with these engineered organic high tech lubrications will dramatically lower the superintendents confrontation with that old victory grabbing nemesis....DOWNTIME. The four-base, grand slam homer can indeed be hit by the superintendent.

ment for most of the day on Saturday and Sunday, the weekend is an extremely valuable period to concentrate on maintenance of high-use equipment.

An additional benefit that greatly improves the entire operation through effective equipment training and troubleshooting between operators and the mechanics is the bilingual capabilities of one of the assistant mechanics. Without question, effective communication on a daily basis is a truly valuable step toward the proper use and safe operation of all equipment.

On a final note, while it is clearly evident that routinely scheduled equipment maintenance is essential to maxi-

mize equipment life and minimize down time, it is imperative to also maintain an effective and timely equipment replacement program. Continually channeling valuable mechanic attention to "over worked" equipment is not only very expensive in the long run but also inevitably results in a reduction in quality, efficiency and morale in daily procedures throughout the entire operation. Not to mention the fact of the potential snowballing problems that no doubt will occur if critical preventative maintenance programs are consistently shoved to the back burner. Take care of your equipment, or it most definitely will take the care out of you.

### The big pitcher

First, let us take a look at the field of play — Lubrications.

The large oil company was "the engine that could" industrialize the world from an agrarian world culture. This was a great accomplishment for mankind. Large petroleum industries jump-started global industry, rule the world in some peoples minds, and still greatly affect what happens for many economies.

Without oil, we would be mowing with hand power and the sickle. We might be fertilizing with animal byproducts, not the sophisticated chemical compounds in use today. In fact, Golf as we know it today would not exist.

### America's game

The USA is the world's largest exporter of grease and oil. It is so because the USA has the cleanest of the world's oil supply. The least contaminated drilled oil, produced by Mother Nature, lies under the mid-continent of America.

The most oil drilled and the dirtiest oil comes from that world hot spot, the Middle Eastern. Because this crude oil is high with sulfurs and tars, it is primarily manufactured to be fuel products for consumption.

In the good old U.S. of A, crankcase, gear box, hydraulic and transmission oils are "Made in America" with America's high-paraffinic based oil resources.

Synthetics are oils that are synthesized. These topnotch oils are great for some applications. — long-hauler trucking companies for one of many. Use in golf operations is overkill.

Mineral-based, high technology oil is best for the golf course unless otherwise indicated. As it is not as expensive as synthetic oil, it will offer unexpected high performance.

Why pay the extra costs of synthetics above the mineral-based products and spend more than you can justify? Today, synthetics are not cost effective.

### The best ballplayers

Manmade machines emulate the human machine. As blood is to our human body, oil is to the mowing machine. Blood acts as oil in that it helps cool our body engine, taking away wastes and heat.

Without healthy blood, we trudge down and are inefficient as fully functioning, living machines. Ditto with a not-living machine, pump or other mechanism.

The key to an efficient mechanism is getting the heat and wastes down to within operational limits, even in the most extreme working environments.

Make no mistake about it: golf operations are Extreme Working Environments and courses aren't level playing fields.

Operations require the lowest levels of downtime possible to be efficient and

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productive. All the signs exist for consideration and use of high technology lubrications.

Spending \$40,000.00 for a machine is not uncommon today. That machine and others in the assets mix must be productive. Having backups help, but this can be brutal on the budgets. Over the decades, superintendents have implemented many innovative programs to combat downtime; they can and do work.

**Homer power**

One of the most overlooked tools to lower downtime has been the improvement of machine operations with lubrications knowledge.

The job historically has been left to the technician, providing he stays within budget allowed. More often than not, the technician perceives the budget as a constraint. Consequently, he doesn't look for better results and continues the archaic ways of doing.

He may not understand what high-tech lubes can do for the operation or doesn't know the proper way to explain to the superintendent their cost effectiveness. Sometimes the superintendent may not understand the positives offered, as he may be screened away from the true high tech representative.

The company representing the technology may not understand the full user implications. This is a real problem existing today.

**Team player**

In a nutshell, the manufacturing of mineral-based, high-technology lubrications is taking the large oil company's refined oil and beefing it up for desired high performance.

The high tech oil company pays extra for the cleanest base stock. In fact, this cleanest base stock must be certified by the refiner. If the refiner fails to provide this quality, the base stock goes back.

These additional manufacturing steps are taken to lower the contaminants that naturally reside in all petroleum. Sulfur is the main contaminant to lower and also the main culprit to breaking the manufactured oil's effectiveness.

Let's go back to high school chemistry to illustrate what sulfur does. Recall your chemistry teacher's inquiry: What do you get when you mix sulfur, water and air? The answer is sulfuric acid, the number one cause for oil breakdown.

Lower the sulfur levels and you have a great oil to start with.

Residual tars and paraffins are next, with other steps following.

After all of these extra manufacturing steps, the high-tech company adds to the premier-based, refined mineral oil with all-encompassing, design-engineered chemical manipulations.

These additives offer stability, translated to longlasting, high-performance oil.

Additives used in high-tech oil manufacturing are meant to optimize the oil's performances under extreme conditions. They consist of seal swellers, corrosion inhibitors, oxidation inhibitors, anti-foaming agents, water/chemicals resistance ingredients, optimum heat transfer agents, viscosity improvers, anti-shear improvers and other additions.

Manufacturing high-technology lubes is an expensive process. There are many who say they produce high-tech lubes, but only a few who do.

**Rattled at the plate**

There has been much confusion and frustration over high-technology lubrications. A very important point to remember: the high-tech oil products have the same S.A.E. oil ratings as 10W40 multigrade or S.A.E. 30 weight, standard engine oils.

The gear box oils have the same gear lube rating as 90 weight, 140 weight or 85W140 multigrades, commonly used on courses.

The hydraulic oils/fluids have the same ISO/S.A.E. ratings as in I.S.O (International Standards Organization) 32, 46, 68 or 10W, 20W, 30W or 10W40 S.A.E. (Society of Automotive Engineers).

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No magic here; no smoke and mirrors.

All use the same test methods and standards as any oil company. You should make lubrication decisions on these classifications as recommended by the equipment manufacturer.

The high-tech oils do not cause warranty problems when used in compliance with manufacturer's guidelines.

The high-tech stuff just works better, making your machines more productive.

It is true that the user will get the best bang for the buck when the warranty period (usually one year) is over. That is because the user can make the best use of the technology as the operation adjusts the preventive maintenance program to take advantage of the longer life cycles of the high-tech oils, or as the equipment matures and gets more cantankerous.

Some technicians may be unaware of simple oil analysis guide of usage rates. An operation can measure the differences in performance of oils as comparing parts and labor costs with usage, downtime lowered, equipment life cycles extension, etc..

### Too hot to play

After sulfur, the second-most naturally offensive assault on manufactured oil is poor heat transfer, which causes thermal decomposition, breaking the oil's effectiveness.

More prominent in the superintendent's mind may be hydraulic oil in the summer. Have you ever wondered why your technician complains so much about the hydraulic-driven machine trudging down in the late morning? The technician claims the blasted thing won't go over a berm in the afternoon or stops altogether.

Heat transfer is the problem.

Poor heat transfer will blow hoses and cause the ever-threatening oil spill with high costs.

John Gallagher, golf course superintendent, and Don Lanning Sr., equipment manager, of Boca Woods CC in Boca Raton offers interesting insight.

Boca Woods CC, a pristine 36-hole private community had this kind of dilemma. They were ready to scrap machines, thinking they would make good artificial reefs. They now use the high-tech hydraulic oil with the machines running full out all day, every day. Their fairway units climb whatever berm without work stoppage.

If you were a machine and you lowered your operating temperatures, your arms (hoses) wouldn't tire of work or pull a muscle (blow a hose). They would stay strong and flexible allowing for those joint angles (hose curves) that add pressure due to design restrictions.

Lower the pressures on the hoses, couplings, and connectors by using better

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oils and you lower blown hose frequencies. But if you have the inevitable hose break. I have seen a unique product offered by Aqua-Aid, Inc. of White Marsh, Md.. The system will bioremediate the hydrocarbon contaminants and immediately promote turf renewal without turf replacement, which creates uneven playing levels from the replacement of soil and turf. An added bonus is not paying the high cartage fees for hazardous materials. Aqua-Aid, Inc. is a longtime GCSSA member.

Hydraulic oil rated at least 4000 hours on the ASTM D-943 oxidation test is best to use. It must be blended with the stable and sophisticated additive packages to be most effective.

The biodegradable hydraulic oils should be carefully evaluated before use. The products' ability to stand up to the heat and pressures of Florida are under great suspicion. Be wary of the claims of "biodegradability."

Being a pioneer can get arrows in the back. Biodegradation of hydrocarbons test standards are based on water and its toxicity to fish and aquatic life, not the turf or soil.

The "environmentally friendly" higher technology oils are just that... friendly. They are not biodegradable, but they do eliminate the most frequent of spills: the hydraulic oil leak of less than five gallons on your valuable turf.

An overlooked benefit of high-tech oils is extension our oil resource through extended life of the product. If you do use the new stuff, expect the unexpected from your equipment, especially in the summertime.

The current practices in engine manufacturing reflect the need for high-tech crankcase oils and should be investigated as soon as possible. Several engine manufacturers are now recommending better oil because of the importance of improved heat transfer.

The ever-growing use of composites and the thinner engine cylinder walls demand improved heat transfer. With the additives used by high tech companies, I have witnessed engine oil being used on the course equipment and reaching 500 hours before it breaks.

Now can you see how this can translate to lower costs, even with the higher prices of the higher technology. Price to the end user can be three times the cost of the large oil company. As the lubricant performs three to six times better, you are way ahead with costs savings and highest productivity.

### **The manager's headache**

High tech grease should be used throughout the assets mix, even at high cost. Greens committees don't like oil lube streaks on the turf. The superintendent and head technician who adopt a truly high-tech grease will be happy.

It really makes that turf-streak headache go away.

The grease must stand up to 500 degrees F., have a minimum Timken load rate of 60,000 p.s.i. and be rated excellent around water. This will prevent the grease from melting and running to the turf or being squeezed out due to topography undulations.

***Using high-tech lubes...  
consumes less of our  
precious resource and  
generates less hazardous  
waste... oil is a limited  
resource and is classified  
hazardous upon use.***

For golf, an important grease function is not turning to soap in contact with afternoon power washdowns. High-tech grease stays where you put it. This high-tech grease doesn't take the place of regular greasing but it does prolong the bearings' life and eliminate melting to the turf.

Don Lanning of Boca Woods will confirm that the use of higher tech greases and gear-box oils have eliminated 85 percent of bearing loss and associated downtime. The shade-tree mechanic will tell you what works on your car chassis will work for your equipment.

Emphatically, not so! Don't buy that; the loads put on your equipment far outweigh the worst car environments.

### **Unexpected runs batted in**

Using high-tech lubes gives other unexpected benefits. The user consumes less of our precious resource and generates less hazardous waste. We now are fully aware that oil is a limited resource and is classified hazardous upon use.

The pressures we are all under from the environmentalists and regulators, coupled with government's ever-growing encroachment of our workplaces, demand closer scrutiny of the products used. Golf operations managers are fine environmental stewards. We have proven this over and over again. Alas, we will have to continue to demonstrate this to the public and the regulator. We continue to lead.

### **The umpire**

The EPA has now been given a new budget for the rest of 1996 as part of an omnibus bill of \$6.5 billion, an increase of \$818 million. Enforcement also received \$40 million more than last year, pulling in \$490 million.

Federal EPA Administrator Carol Browner heralded the passage of the budget with phrasing amounting to a challenge to us all.

"As a result of this budget agreement, vital public health and environmental protections will remain in place and will be enforced. The budget provided needed funding for safe, clean air, the cleanup of toxic waste sites and the strong enforcement of our nation's environmental laws."

Just in case you missed it, the operative words were "strong enforcement."

*A petroleum operations consultant, Keith VanMeter is president of The Protector Mfg. Company, Inc. based in Boca Raton, Florida, which specializes in lubrications analysis and applications problem solving. Copyright © 1996*