

# Equipment Maintenance Programs: People and Their Machines

*Undeniably, people are the most important ingredient in a successful operation. Coming in a close second is the equipment these people use to groom a golf course. How we organize, house, purchase, operate, and care for the equipment also plays a crucial role in the overall success of our operations. I was hoping for more details on cutting-unit maintenance, but we'll visit that topic in more detail when we discuss mowing practices in coming issues. For your consideration in this issue, several superintendents and equipment managers have shared their thoughts and practices on organizing their overall programs.*

*Joel Jackson*

## Best Practices

BY JOE EAGLE

*Shop Manager, Quail Ridge C.C.*

Preview - I am basically new to the golf course business, although my background is in the equipment field as well as in teaching continuing education courses at Palm Beach Community College. This may sound like a strange mix. Stay with me.

I applied for the chief mechanic position at Quail Ridge Country Club in Boynton Beach in January 1995. During the initial interview I was told that they had combined the POA (Property Owners' Association) and Country Club maintenance operations, and it needed some help.

Step One - Assess the total layout and highlight inefficiencies to create a work flow. The operation was in desperate need of a complete overhaul. This is a practice that I do on a monthly basis now, just tweaking the system where needed. After developing a plan of action I spent time with the superintendent to get his views of the whole project. In addition, I welcomed input from other department heads of the POA. My plan seemed logical to me even though it appeared there were reservations on the part of most others. I wanted their thoughts, not their approval or disapproval.

Step Two - I created a business atmosphere in my office. I am there first as the shop manager — a leader for others — and last, a mechanic/technician.

Step Three - The employees of the maintenance department and I sat down

several times over the next two weeks to discuss past problems, including employees outside of the shop, department heads, spending constraints, equipment, responsibilities and my tentative plans for the future of the combined operation. Change does not come easily.

Step Four - I started putting my plans to work and kept a diary of positives and negatives for the first year. Questions and inquisitions would arise. The diary was a great source for helping department heads and employees see past situations and solutions. We moved on.

Step Five - Six months after these plans were enacted, my technicians and I had another roundtable discussion. We had worked very hard to get past attitude problems and work schedules and bring the equipment to a dependable and presentable level. All 437 pieces of it. No small task for myself and four others. We were now in a day-to-day routine that needed to move on. A PM schedule was finally hammered out and implemented. A PM schedule is simply a requirement of a good working atmosphere.

The figures justify the expenses in creating the atmosphere of fair workloads, operator comfort and eliminating over time requirements in all areas due to efficiently performing equipment. Most importantly, we got a true handle on expenses.

With the operators' needs now being taken care of at a rapid, pit stop fashion, we were able to shift a great deal of problem prevention back to the operators. Checking fluids on a per use basis, lubricating all fittings as needed on a per use

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

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-

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.

## 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.

### 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

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).

**GEORGIA CERTIFIED TIFDWARF SOD MAINTAINED AT 1/4 INCH**



*PRODUCERS OF GEORGIA CERTIFIED  
HYBRID BERMUDAGRASSES*

**Tifway**

**Tifgreen**

**Centipede**

**Tifway II**

**Tifdwarf**

**Meyer Zoysia**

*We specialize in golf course & athletic field turf installation*

**1-800-232-7453**

**PIKE CREEK TURF, INC.**

**ROUTE 2, BOX 376-A**

**ADEL, GA 31620**

The high-tech grease can be the same NLGI (National Lube and Gear Institute) extreme pressure rating of EP2.

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

## Environmental Waterway Management Continues to Grow!

Services now include

Lake Management

Wetlands Planting and Maintenance

Exotics Control

Industrial/Agricultural/Vegetation Management

Right-of-Way Vegetation Control

*We proudly announce new services and our new name...*



**Aquagenix**  
Land - Water Technologies

**1-800-832-5253**



*Serving Sunbelt States Since 1974*

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*