



Having installed a state of the art Rainbird irrigation system not long after he started, which he designed with Roger Davey of Irritech, this has enabled Neil to monitor the local weather and balance the irrigation to suit the course needs. This has enabled Neil to read the ET rates and keep the course alive throughout the summer months, without losing any of the Links qualities.

Neil is pleased that, in conjunction with Nick Gammon, he has licence to look after the golf course as he sees fit and feels that Course Managers at many members' clubs suffered for a lack of flexibility imposed by the members.

"Season wise our winters are changing and we are now getting germination up to December. However, a lot of people are still working to their original yearly programmes and can't change because jobs have been booked into specific times of year and can't be moved because of club fixture lists. We have got to be able to look at how the seasons and changing and adapt to the times."

Neil and the team are hoping that when the Brabazon Trophy arrives at the Club – it is being played in May which Neil believes is when the course is looking and playing its best – it will act as a springboard to other major events and his dream is to one day host a Walker Cup at Trevoise along Open Qualifiers.

"I'm so proud to have got the Brabazon and to have achieved what we have here and getting a top amateur event is a credit to the course as they are given to club's on merit. I want us to be known as a great golf course being kept in a traditional manner and we are being rewarded for it."



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Although pictured installed in a golf cart, the battery packs on Yamaha U-MAX utility vehicles can also incorporate a self-leveling battery top up system. This makes adding distilled water to the battery pack both easier and more accurate. Features like this are well worth specifying. This installation also incorporates an on-board charger. This allows charging from any mains outlet, a useful feature that allows 'opportunistic' charging

All Charged and Ready to Go

Electric utility vehicles are gaining popularity, but they are still regarded as inferior to petrol or diesel power on many courses. Are the latest models now able to offer the capacity and stamina to cope with every need? James de Havilland discusses...

Put a five or even 10 year old electric powered utility vehicle next to one fresh from the factory and play spot the difference. Styling apart, it would be fair to say there will only be only subtle visible differences in the battery pack and drive motor. Although it could be argued that would apply to most other items of kit, great things have been expected of electric vehicles. Yet the 'big breakthrough' still seems a long way off.

This is actually quite a handy argument for those who have a dislike of electric utility vehicles. Having to go out and rescue a stranded unit that has decided to die on its way back from the 18th or having a machine that struggles to scale modest slopes once the batteries are past their first flush of youth are a couple of reasons given to outline electric power is not acceptable. But why is it that when golf carts suffer in the same way, they tend to be cursed but forgiven? Utilities that repeat the 'failure in service' trick are not so lucky.

Those less than impressed following experiences of older electric models, however, do need to give more recent models another chance. Improved batteries are one important development, but there have also been subtle changes to battery chargers, motors, regenerative braking systems and even tyres. All have helped improve stamina and duty cycles between charges. Well cared for modern batteries have longer lives as well. But what remains is the need to understand how these machines operate.

Many problems relate not so much with the vehicles themselves but the way in which they are firstly marketed and secondly operated. On the promotion front, a given manufacturer or, more accurately the dealer selling the unit, can only sell from the range of machines they offer. Although 'misleading selling' it is less likely to arise with a reputable supplier, it is not unknown for a machine to be recommended that frankly is not up to the job.

This comes back to the opening paragraph. Compare any current electric utility vehicles side by side and they seem pretty much the same. The reality is that they differ in terms of not just load capacity but battery capacity too. Unless you choose a machine with the battery power and load capacity to cope with what is going to be demanded of it, it will not do the job.

At this point it can be all too easy to scan the spec sheets and look for some help. Well be prepared for a let down. A typical specification example will merely list the units operating power. This may well be 48 volts provided by six 8 volt batteries and 20 amps output. That is about it on what you will get. How long it takes to fully charge and discharge those batteries will be harder to find, but as a guide most manufacturers will suggest a 12 hour overnight charge will be enough for a days work.

Frankly, this broad outline is not a great deal of help. For a start it gives no

clear idea of actually how long a given vehicle can be expected to run between charging and, of equal importance, how 'powerful' the machine is. It is only when trying two different vehicles side-by-side that differences can be picked up despite pretty much the same specification on paper.

The only way to find out if a given unit is up to the job is to try it. By try, however, it is not a case of just using the machine for a couple of days but more working it over at least a week. New batteries take a while to reach their peak condition. Then there is the matter of charging disciplines. As soon as an electric vehicle is unplugged from its charger, the batteries start to discharge. Although the rate of discharge is slow, expecting a machine to perform as well as it could following a couple of days off-charge will see its performance suffer. A good dealer should allow time for the vehicle to prove itself and help ensure it is worked properly.

So if one type of utility vehicle proves not up to the job, will another make and model also fail? This is where it gets difficult to give a clear answer. Some manufactures claim the systems they employ are better than others. Features



No, the Cushman Turf-Truckster is not electrically powered, but it helps define why diesel and petrol powered utility vehicles remain so popular. A well-proven golf course workhorse, it can be fitted with a range of attachments, such as a Turfco WideSpin top dresser. This sort of application is currently not as easily done with an electric vehicle, but the future may well see electric models with more power and capacity to take on this role

All Charged and Ready to Go

like regenerative braking, which helps to recharge the batteries as the vehicle slows or goes downhill, help increase battery life, but not by a significant amount.

In truth, the basics between most models are pretty similar. It is in the details that there are subtle tweaks that can make one model a better bet as a long term buy. On a short demonstration, however, these details are unlikely to come to the fore. So if a utility from one of the key players proves to be inadequate there is every chance an alternative make and model will also have the same limitations.

Another point to consider is temperature. All the battery designs rely on pretty simple chemistry to store electric power. As temperatures drop, all batteries tend to become less efficient. This can mean a utility vehicle that would do a days work on a single charge in summer will struggle to do half a day in really cold weather. It is in these conditions where remembering to plug the machine in for a charge at every opportunity comes into play.

COST OF OPERATION

Electric utility vehicles can be less expensive to operate, although this point is often over exaggerated. A key cost, often missed out of the equation, is that of renewing the batteries. Although a well cared for set may well last five years, it is best to assume they will need replacing perhaps at three. Getting into the dangerous waters of mentioning replacement battery costs, eight 6 volt Trojan T105 batteries will not leave much change from £800 at current retail prices.



Fair enough, the style police may have something to say about the looks of a Yamaha U-MAX when fitted with a weather break style of cab. Keeping weight down, however, is critical not just for ground bearing pressures but also for battery range. When looking at electric utility vehicles, check the options on offer. It does vary between makes and models

So on top of the cost of charging the vehicle, which will be from a conservative 25p per night, the annual cost of the batteries needs also to be considered. Add in the need for a day time top up charge, and the daily electricity bill may be around 30p. For the sake of argument, say the vehicle takes a charge for a conservative 300 days. That is a low £90 annual charge cost. Factor in the batteries, however, and the annual costs are nearer £356 per annum.

A diesel utility consuming three litres of rebated fuel a day at 45p/litre will, over 300 days, get through £405 worth of fuel. On top of that, the cost of an engine service should be added, say around £45 to bring the total up to £450. A simple set of figures, but ones that are all too easy to dispute. For a start, how many clubs know how much fuel they put into a utility vehicle a year? How can you determine exactly how much it costs to charge up a set of eight 6 volt batteries?

The truth of the matter is that electric vehicles either work for a given set of end users or they fail if they are not embraced with enthusiasm. Most clubs could justify using at least one electric utility, even if this means having other diesel or petrol powered alternatives available. But one point is clear. Those that have stuck with electric power would miss it if it were suddenly to become unavailable.



With a top speed of 15.5mph, the John Deere TE Gator should be nippy enough for most applications. It can tow up to 272kg and has a total payload capacity of 408kg. A control is fitted to slow the vehicle to a stop before changing direction. This is claimed to put less stress on the drivetrain and produce smoother operation

COMPARING MAKES AND MODELS

It is fair to say that all the electric utility vehicles on offer from the key players are soundly engineered and well proven. But that is not to say they are all the same. Each design will have its own plus and minus points. It is really important to give a range of models a decent try, preferably in colder weather. Some will come with battery packs that are better able to hold a charge when the weather turns chilly. There are other points to bear in mind too.

What about towing performance? Can the model be specified with a safety frame, partial or even full cab? How are the batteries kept topped up with distilled water? What tyres are fitted? Can the load platform be fitted so it tips? How high is the load platform from the ground? Can the machine scale a steep slope fully laden? These are all points that need to be assessed during a demonstration.



Aixam Mega Ltd imports MultiTrucks from France. Primarily aimed at the urban utility and delivery market, these fully road legal electric models can top nearly 30mph and will do 12,000 miles on a claimed £180 worth of electricity. Add the fact that they do not need road tax, and they look attractive buys at under £8,000. The company is looking to fit tyres suitable for off-road use by the end of the year, hence their inclusion

KEEP THEM CHARGED

Leave a lead-acid battery discharged for an extended period, and it will be less able to hold a full charge when next topped up. Allowing the batteries to go completely flat repeatedly can see them 'destroyed' within 18 months.

It is important to charge batteries correctly to optimise both performance and longevity. When new, batteries will need an uninterrupted charge of at least 12 hours, and as a guide allow perhaps four hours more charging time than when the batteries have started to reach their peak condition.

Check that the machine is supplied with the right type of charger for a deep cycle battery. Although the supplying dealer should ensure this is the case, it is not unusual to find an existing vehicle charger is pressed into service to charge a new machine. This can be a mistake. More recent chargers have intelligent features that prevent over charging and work pretty much automatically. This allows then to condition charge batteries on vehicles that may be inactive for extended periods.



An external charger, such as supplied with the JD TE Gator, will plug into a standard single phase mains 240V ac, 60Hz wall socket. The charger senses when the charge cycle is complete and shuts down automatically. Vehicle regeneration is a common feature on modern electric vehicles, Deere suggesting the system on the TG Gator puts between three to five per cent of the full electrical charge back into the battery during a typical day's work. A single charge should last the average user a day

To optimise battery life, a recharge is necessary when they are only 20% discharged; this is when the specific gravity of the electrolyte drops to 1.233 and the power of a 48 volt pack falls to 37.38 volts. Hands up those who will go to that level of detail? Perhaps it is more important to avoid over discharging the batteries.

Although most vehicles will alert the user when charging is needed, the key issue to avoid is draining below 80% discharged of to a specific gravity of 1.148 and a 48 volt pack reading down to 35.94 volts. Deep discharge significantly reduces battery life. When not in use, vehicle batteries should not be allowed to drop much below a specific gravity of 1.240. The rate of self-discharge varies directly with temperature.

Specific gravity is determined by using a hydrometer; this is arguably the most reliable way of establishing the health of a battery but needs carrying out with care. If in doubt, seek advice.



Toro, as with the other major players in the electric vehicle market, has seen steady sales of its e2050 Workman. The rear platform has a capacity of 385kg, this load being well within the machines ability over less forgiving terrain. A key to getting the best from this type of machine is to keep them charged and to not let the batteries fully discharge



The Ransomes Jacobsen E-Z-GO MPT 1000 Electric models feature a single point battery filling system as standard. This identifies individual cells low on electrolyte and tops them up automatically. This helps reduce maintenance and equally importantly keep the batteries in tip-top condition. Also fitted with an onboard charger, the MPT 1000E can be recharged using any 13amp mains socket



The optional Mega MultiTruck tipping body lifts to reveal a useful load area over the sealed battery compartment. Gel batteries, as opposed to conventional lead acid, are used to save space and add range. But they will be more expensive when it comes to replacing them. Payload will depend upon specification, but it is around 435kg with a tipping body

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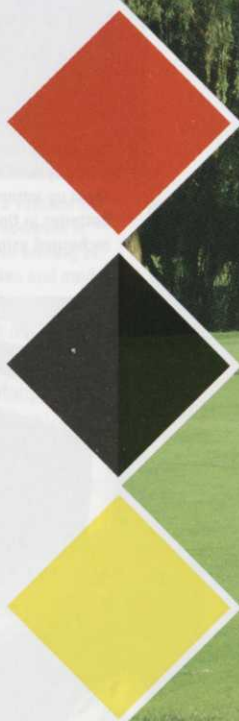


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The Open Aftermath

By Melissa Toombs

Thursday, July 20 2006. It's hot. Oh dear god it's hot. The 135th Open Championship has just got underway and thousands of sweaty golf fans are traipsing around Royal Liverpool Golf Course donning straw hats and caps, wishing they had remembered the sun cream, hoping to catch a glimpse of Tiger in action.

With the soaring heat in mind, conversations at the Championship quickly turned from the game itself to the links on which it was being played. The sandy, parched, desert like appearance of the course shocked many and became a hot topic at this year's sizzling Open.

Despite spectators expecting lush green pastures, Links Manager Craig Gilholm, received a warm tribute at the Open prize giving as well as the press showering him with compliments, for providing a magnificently presented course.

It's been nearly three months since the star-studded event and the long days of drought, has the course recovered from hosting several thousand spectators? Assistant Editor, Melissa Toombs, talks to man of the moment, Craig Gilholm, and asks "Just how do you go about restoring Hoylake to its magnificent pre-Open standards?"



Name: Craig Gilholm
Position: Links Manager
Age: 34

A keen golfer at Harburn GC, Craig started his career as a YTS trainee. He moved down to East Lothian after seven months and was lucky enough to get a summer job at Muirfield golf course. Consequently, Craig was kept on as an apprentice and completed three years training at Oatridge College.

After eight years working at Muirfield, Craig was promoted to Assistant Course Manager and remained there until he left in June 2005 to become Links Manager at Royal Liverpool GC.

The links had been called "obsolete" and "a thing of the past" before this year's competition but judging by this year's Open the course is set to remain an important part of the future of the Championship. Just how much preparation went into ensuring the course was in tip top condition for the Championship and was it worth the effort?



The Open Aftermath



"Lots of preparation had been done, large and small scale, for the past five years and overtime for my staff increased from 12 hour days to 20 hour days for the final preparations for the Open, I would do it again next year without a doubt."

So, how do you go about restoring a golf course after the Open?

"After all the infrastructure has been removed, all holes and ruts are filled with soil and seed, also lots of aeration will be required and lots of help from the weather."

How long do you anticipate it will take for the course to return to its pre-Open standard then?

"After such a hot dry Open the course playing surfaces will be back to normal by the end of this summer and with a mild wet winter and spring everything else should recover for next season."

How much over seeding is necessary and whereabouts on the course?

"The only overseeding that will be done is on my spectator cross-overs and on my main practice area."

What variety of seed will be used and how much?

"The seed which will be used is Johnson's j fescue and the quantity will be in the region of 1000 kgs of seed."



Will any fertiliser be applied to aid recovery?

"A light fertiliser will be applied to the practice area for recovery and seed germination, the quantity at the moment is not known."

What aeration work will take place?

"All practice areas and cross-overs will be verti-drained along with spectator paths."

There has been much controversy over your greens not being green. The golfing public has a tendency to think green is best, however, the course looked burnt and bleached but received wonderful praise from the professionals. What are your thoughts on this and what is your secret to such a successful links course?

"I do not understand the controversy as The Open is the only links tournament played at the height of summer and when you have practice days with temperatures reaching 100 degrees and when you need to produce a hard firm bouncing course, the last thing I could do is over water."

The condition of the course has been a hot topic on our bulletin boards; many greenkeepers feel that the hot weather helped contribute to the course playing like a true links should. What are your thoughts on this?

"The hot weather had a lot to do with the course playing like a true links but also through choice not a lot of irrigation was used pre Open, in case of heavy rain the week of the tournament."

Our Open Support Team said they have never been worked so hard at an Open. Is this because you are a perfectionist?

"I think most Head Greenkeepers are perfectionists. The Open Support Team had a tough job this year with the bunker raking being changed from normal tooth raking to flat raking and with damp weather this caused problems, but a little hard work has not harmed anyone and a big thank you goes out to Scott and the troops for a job well done."

A few unexpected incidents happened on the 18th green on the final day of the Open. What are your thoughts on the duck eggs filled with purple paint that were hurled onto the green and also the male streaker that managed to get onto the green?

"These things happen in life and the damage was small on the scale of what could have happened, the streaker was a bit of fun and will have put a smile on some golfing widows' faces."

After the Open the greens are mowed each season. The purpose of this is to ensure that the amount of grass is maintained and to ensure the



What was the reaction of Hoylake members to the course after it was all over?

"The members were all delighted that it was such a success."

Have they grumbled about the mess that was left from the Championship and when were they able to start playing again - uninterrupted by trucks and cranes etc?

"Nobody really complained too much and they were able to get playing on the following Monday without too much disruption."

When were you and the team finally able to have a break, or at least a return to normality?

"Things are getting back to normal and myself and the lads are getting through our days off."

And finally, are you keen for the championship to return to Hoylake?

"I can only use one word to answer this question, yes!"

Craig has no idea, as yet, how much the restoration of the course will cost.



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Soil Physical Properties Monitoring Oxygen for Success

By Dean Piller

During my 20 years as a superintendent, I have faithfully taken soil tests to monitor the chemical and nutritional values of soil on greens, tees and fairways. While this information is critical in making sound management decisions on fertility programs, I recently learned I was overlooking the most important factor in developing management programs for promoting strong, healthy turf.

A couple of years ago, I attended a seminar by Dave Doherty from the International Sports Turf Research Center (ISTRC) on soil physical properties. He discussed several concepts that will forever change the way I manage greens. Doherty emphasized how important gas exchange and oxygen are in the profile, and by monitoring the physical properties of soil profiles with regular testing, I would be able to make informed decisions when developing management programs. In a nutshell, through Doherty's observations at hundreds of golf courses across North America, he was able to identify the soil physical properties common in the greens that are easy to maintain, as well as those that fail or are very difficult to manage.

START WITH BENCHMARK TESTING: THE FIRST REPORT CARD

The ISTRC lab, based in Olathe, Kan, provides two sets of data. The first set consists of physical evaluation, the evaluation of the root systems and the measurement of the organic matter in each 25.4-mm (1-in.) increment to a depth of 101.6 mm (4 in.). The second set of data contains the textural and particle-size analysis. The combination of this data provides information on the greens' infiltration rate in millimetres per hour (inches per hour), subsurface air capacity (non-capillary porosity), water porosity (capillary), bulk density and percentage of organic matter. The data this testing provides will help monitor the aging process of the putting surface rootzones, while also evaluating the effectiveness of current cultural practices. A well-built green is designed to provide a profile with 60 per cent solids, 20 per cent air-pore space and 20 per cent water-pore space. These values can provide the correct environment for a strong rootzone and healthy turf. As greens age, these values tend to shift dramatically if cultural programs are not designed to maintain original conditions through

the removal of organic matter and the addition of sand topdressing to dilute the organic matter produced by the plant's life cycle.

I have found the information provided by the physical property soil tests to be invaluable when making informed management decisions regarding the necessary cultural programs for upcoming seasons. As superintendents, the data provided can also help illustrate to our employers that we have developed our cultural programs based on sound facts. And, such scheduled procedures are necessary for the long-term benefits of the course's putting surfaces.

SELECTING TINE SIZE AND SPACING

Once the physical properties of your existing greens have been tested and determined, the necessary aeration schedule can be easily outlined. To help identify ideal physical properties, the International Sports Turf Research Center (ISTRC) established the following values for superintendents to work toward:

For example, the results of our first set of tests for green #1 back in January 2005 were:

Infiltration rate:	173 mm (6.81 in.)
Subsurface air capacity:	9.83 per cent
Water porosity:	41.63 per cent
Organic content:	
0 to 25.4 mm (0 to 1 in.)	3.94 per cent
25.4 to 50.8 mm (1 to 2 in.)	3.18 per cent
50.8 to 76.2 mm (2 to 3 in.)	2.26 per cent
76.2 to 101.6 mm (3 to 4 in.)	1.82 per cent