

flexible learning systems and, in particular, the development of work-based training.

In the old days, knowledge was passed from experienced Head Greenkeepers to new entrants. Work-based training is merely a formalisation of this process, with the achievement of a qualification (NVQ or SVQ) at the end, to show that the trainee now has the necessary skills to work as a greenkeeper in the case of level 2, or as a supervisor in the case of level 3. One of the major projects in this area for the committee, and for me in particular as Chief Editor, was the development of standard learning materials for NVQ levels 2 and 3. Working with authors from across the industry - expert in their own fields - each level took about a year to produce, level 2 being issued in 2003 and level 3 in 2004. This meant that for the first time the Colleges, or other training providers, were all training to the same syllabus. At present, the GTC is working closely with LANTRA to use the materials to create an on-line learning platform so that greenkeepers can have access to the learning materials, regardless of location.

A further result has been the closer collaboration between the GTC and BIGGA through the Technical Committee in several areas. The committee provides informal comment and guidance on new BIGGA training initiatives where appropriate, has provided financial support to the learning experience at Harrogate Week, and jointly funded the BIGGA careers' DVD. In the other direction, the BIGGA representatives on the committee have provided valuable support and experience to the GTC.

In addition to the above, the Technical Committee has overseen the production of a Health and Safety wall chart in use at many golf clubs showing the competency of staff to use different items of equipment. It has

initiated visits to Colleges to interview, staff and student, to monitor delivery of training. It has developed the in-house publication 'On Course' which is sent to all golf clubs to promote awareness of greenkeeper training and the GTC, and it has overseen the continued development of assessor and coaching training for senior greenkeepers.

It has been a great pleasure to work with the greenkeepers and other industry representatives on the committee, in serving the needs of greenkeepers training.

*I was thus introduced to greenkeepers training at an early stage. Even on the first training course I was struck by the greenkeepers' thirst for knowledge compared with some of the other course participants who had been "sent" by their (often Local Authority) employers.*

My reason for standing down is quite simply that all the organisations that make up the GTC, have mechanisms to ensure that Chairmen of committees do not go on too long and I feel that it is time to do so and I will continue with the editing and other consultancy work for the industry as required.

Present Technical Committee members include: Nick Bisset,

Educational Expert and Chairman Designate; David Leach MG, BIGGA; Tony Mears, GTC Internal Verifier and longest serving member; Dr Gordon McKillop, STRI Chief Executive; Ken Richardson, BIGGA Education Director and Deputy Chief Executive, and co-opted, Jeff Bates, NPTC External Verifier.

All of the above, as well as former members: Kerran Daly, John Davis, Paddy Holohan and Iain Ritchie, deserve my thanks for all the time and effort that they contributed during my time as Chairman. I am sure Nick Bisset will make a fine successor as Chairman and I wish him, David, the rest of the committee and the GTC, all the best for the future.



## NATIONAL MOWER

The World's Best Specialty Mowers

The **National 8400** offers high performance and a fine finish at an affordable price. Equipped with three 30" free floating cylinder units or the optional vertical cutting units, the 8400 leaves a better cut everytime. **To find out more or request a demonstration, contact us direct or one of the dealers listed below.**

**National dealers**  
A J Scambler • Bartram Mowers Ltd • Burrows (G.M) Ltd • Campey Turf Care Systems • Countrywest Trading Ltd • Drake & Fletcher • Ernest Doe & Sons Ltd • Geo Brown Implements Ltd • Gibsons Garden Machinery Ltd • Greenlay • Henry Armer & Sons • J M Raine Limited • Keith Morgan Mowers Ltd • K & M Mowers • Major R. Owen Ltd • Mitchell Industries Ltd • Rochford Garden Machinery • Scottish Grass Machinery • J & GM Thompson • Thistle Groundcare • T H White Limited

**IPU GROUP** Churchbridge, Oldbury  
West Midlands B69 2AS  
E: [ipu@ipu.co.uk](mailto:ipu@ipu.co.uk) W: [www.ipu.co.uk](http://www.ipu.co.uk)

# 0121 511 0400



Groundcare

# In the Shed

Greenkeeper International brings you 'In the Shed', a puzzle page to keep you entertained when the weather forces you in or for when times are slow.

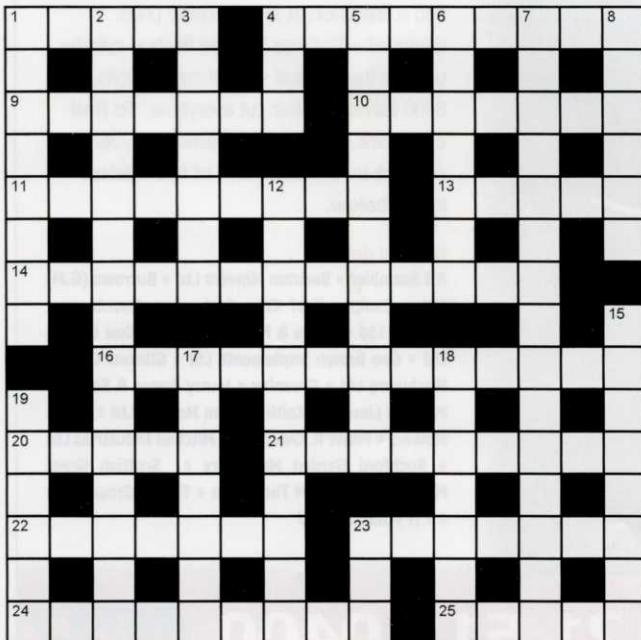
## CROSSWORD - Compiled by Anax

### ACROSS

- 1 Amusement, hilarity (5)
- 4 Any activity whose completion is very easy (4,5)
- 9 Force produced by differences in pressure (7)
- 10 Without invitation (7)
- 11 Weed with heads of small yellow flowers (9)
- 13 Golfer's favourite hole? Exactly! (2,3)
- 14 Batsman brought in tactically towards of close of play (5-8)
- 16 Related orally - in Latin, viva voce (2,4,2,5)
- 20 Centre; courage (5)
- 21 Name given to any inhabitant of the US & parts of Europe (9)
- 22 Type of easily peeled small orange (7)
- 23 Stone pillar, typically shaped as a dagger (7)
- 24 Person who takes on a professional role temporarily (9)
- 25 Type of mint herb (5)

### DOWN

- 1 Hatred of women (8)
- 2 Strategic UK colony on southern tip of Spain (4,2,9)
- 3 Meshed protection for locks? (4-3)
- 4 Family group (3)
- 5 Betray (6-5)
- 6 Large open-air building, usually for sports (7)
- 7 Factor whose importance is not obvious (7,8)
- 8 Make small, restless movements (6)
- 12 Bird also called kestrel (7,4)
- 15 American Indian people, also called Iroquois (8)
- 17 Diving attire (7)
- 18 US actress, name given to type of life jacket (3,4)
- 19 Purgative medicine, also old term for doctor (6)
- 23 Rowing implement (3)



## ANAGRAM

Identify these early entrants for the 2006 Open Championship.

**CHAPEL MILE LAMB      MORE COIL GEM IN TON**

## QUICK 'NINE HOLE' QUIZ

1. Which two teams competed in the final of the 2002 World Cup, and what was the score?
2. Paul Casey squandered a large lead in the final of the British Masters at The de Vere Belfry but who came through to win?
3. Who scored his team's second and decisive try in the Heineken Cup final at the Millennium Stadium?
4. The Scotland football team won some silverware for the first time in a while when they lifted the Kirin Cup last month. Name the other two teams in the competition.
5. Name the player signed by Chelsea from Bayern Munich on £130,000 per week.
6. Which horse won this year's Grand National?
7. Who won the last Open Championship to be held at Royal Liverpool GC?
8. Who is the Minister for Sport?
9. Can you name the three rowers who helped Steve Redgrave to his fifth Gold Medal in the coxless four, at Sydney in 2000?

## SUDOKU

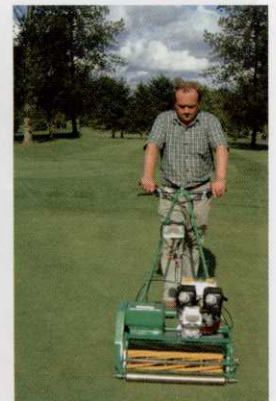
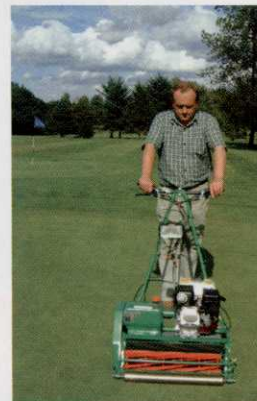
Fill in the grid so that every row, every column and every 3x3 box contains the numbers 1 to 9.

	3	6	2	8				9
5	9							
			6			3	7	
		1				5		7
	5			1			4	
8	9					1		
	1	7			2			
							2	4
3				9	4	7	1	

Supplied by [www.dailysudoku.com](http://www.dailysudoku.com)

## SPOT THE DIFFERENCE

Look closely at the pictures below and try and spot the difference between them. You should be able to spot six!



ANSWERS TO ALL THE PUZZLES ARE SHOWN ON PAGE 52

# Jack of all trades or master of none?

James de Havilland meets up with Head Greenkeeper Ian Upton, to look at how attachments can turn his brushcutter into a multi-use piece of equipment.

Systems that use a brushcutter power unit to drive attachments, including a power pruner, hedge trimmer or sweeper brush are not new. Take up among professional operators, however, is not as strong as it could be, there are those who suggest 'systems' based tools are compromised. Here we see if that has any foundation in practice.



Ian Upton, Head Greenkeeper at Rye Hill Golf Club in Oxfordshire. An existing STIHL CombiSystem user, he suggests the available CombiTools work well and make full use of a single power unit. "Why buy a dedicated brushcutter when a CombiSystem is so much more versatile?"

Ian Upton, Head Greenkeeper at Rye Hill Golf Club in Oxfordshire, is an established STIHL CombiSystem user. Currently operating a 27cc two-stroke STIHL power unit with the company's CombiTool grass trimmer line/polycut blade head, power pruner and hedge trimmer attachments, he already appreciates the system's versatility. So, when it came to trying the latest CombiEngine power units and CombiTool attachments for Greenkeeper International, he was a natural choice.

STIHL submitted two power units for his appraisal, the established 2-stroke 0.95kW 25.4cc KM 85 R and the all-new 1.4kW 36.6cc 4-MIX KM 130 R.

For those not familiar with STIHL

power units, the 'R' element in the name indicates that a loop, as opposed to 'cow horn'/bike handle, is fitted. A loop handle is more versatile on a CombiSystem as it enables the power head to be operated with the full range of CombiTool attachments, such as a hedge trimmer or pruner, but 'cow horns' can be specified for use with a grass trimmer, metal blade or scrubcutter.

Of the two power units submitted for this appraisal, it is the new 4-MIX head that will arguably be of most interest. In simple terms, the engine is a four-stroke, that uses a standard 50:1 petrol/oil mix for lubrication. This does away with the need for an oil sump, allows the power unit to run at any angle, just like a 2-stroke and cuts out the need for sump oil level checks and changes.

As existing 4-stroke power unit operators know, a key advantage of a 4- over a 2-stroke is improved fuel economy. The main impact of this is not so much reduced

operating costs but the ability to make one tank of fuel last longer. Although those who welcome refuelling as a chance to have a break will no doubt see, this extended period between, fills as a two edged sword, the 4-MIX system is also said to offer other advantages, not least being noise levels.

Ian Upton picked out the supplied 4-MIX engine to put this to the test. In work, the 4-MIX KM 130 R certainly sounds very different to the 2-stroke KM 85 R - the high pitched buzz of the 2-stroke versus lower beating thrum of the 4-MIX. No, that is not an over helpful description, but Ian suggested the 4-MIX sound does not travel as aggressively as its 2-stroke sibling and it proved far less penetrating through his ear defenders too.

So point one on sound goes to the 4-MIX. But what about pick up and power? "I have to say that power-wise I would not really be able to notice much difference between the 4-MIX and the 2-stroke power units I am used to", says Ian. "The KM 130 R was certainly not wanting for power with any of the attachments tried, it did a good job with the line trimmer head, where a high line speed is important and it did not pass high levels of vibration back in use either."

In fact what impressed Ian most about the 4-MIX was its ability to behave pretty much like a 2-stroke, with the added bonus of less noxious fumes. But it does have one disadvantage. Compare the weights of the 2-stroke KM 85 R and 4-MIX KM 130 R and the latter does feel heavier, this is borne out by the specifications. A 4-MIX tends to be around 0.5kg heavier than its nearest equivalent 2-stroke alternative. But in this case, the KM 130 R is a more powerful power unit, so the extra weight is easy to excuse.

"I have to say it is difficult to separate the two power units in terms of actual operational advantage", added Ian.



A selection of the CombiTools, and two CombiEngines, were put through their paces at Rye Hill. The build quality of each item was first class, each item snapping into place quickly and easily

## Jack of all trades or master of none?

"Price wise, the 4-MIX motor is about £40 more expensive, but it has a higher displacement and develops more power. It is the power unit I would choose in a straight head to head comparison."

The CombiTool attachments are identical for every power unit, so the only other decision is which of the eleven to choose.

As an aside, STIHL has developed its range of 2-stroke oil formulations to include those that closely match the demands of 4-MIX units. In outline, the company continues to offer a standard 50:1 mix. Carrying a red marker dye, this formulation is recommended for all 2-stroke power units and will be OK to use with a 4-MIX. A new HP Super 50:1 alternative, however, has just been introduced with enhanced properties to suit the 4-MIX system.

Equally suitable for all 2-stroke engines, HP Super offers improved lubricity and is claimed to burn with even less combustion residue than the existing oil. It carries a green marker dye to distinguish it from the standard 50:1 oil. A further alternative is BioPlus, a bio-degradable version of the standard 2-stroke oil.

In the picture captions, Ian Upton gives his opinion of the latest CombiTools. He was unfamiliar with the scrub cutter and the adjustable long-reach hedge trimmer is a new design. The line mowing head tested also featured the latest easy feed system.

### STIHL CombiSystem Technical Specification:

STIHL CombiEngine	KM 85 R	KM 130 R
Engine type:	STIHL two-stroke	STIHL 4-MIX
Displacement:	25.4cc	36.6 cc
Power Output:	0.95 kW / 1.3 HP	1.4kW / 1.9 HP
Weight:	4.0 kg *	4.6 kg *
Handle design:	Loop **	Loop **
Standard equipment:	Carrying harness Protective glasses	Carrying harness Protective glasses
Length to coupling sleeve:	89cm	92cm
Price £ ex VAT (RRP):	331.91	370.21

\*Weight without fuel

\*\*Bike/'cow horn' handle model also available

STIHL CombiTools	Price £ (Ex VAT)
AC-KM AutoCut line head	109.79
MB-KM Metal Blade	97.87
BF-KM Pick tine cultivator	127.66
FCS-KM Edge trimmer (straight shaft)	177.88
KW-KM Power sweeper	262.98
KB-KM Bristle brush	161.70
HL-KM 135o adjustable hedge cutter	203.40
FH-KM Scrubcutter	191.49
HT-KM Pole pruner	148.94
HT-KM Pole pruner extension	67.23

STIHL website: [www.stihl.co.uk](http://www.stihl.co.uk)  
Freephone: 0800 137574 quoting GKI

### STIHL CombiSystem - a product of evolution

STIHL introduced the concept of an outdoor multi-tool almost fifty years ago, adding a choice of attachments to fit one of its forestry chainsaws. This enabled one power unit to drive a range of outdoor tools. The concept evolved further in the late nineties with the introduction of a clearing saw series where the head could be replaced with a hedge trimmer, pruner or light cultivator. The idea was further developed to produce the 'splitting shaft' concept of the CombiSystem in 2000. The various attachments connect without the need for tools and the system now includes a choice of eleven CombiTools.

The CombiSystem is available with four different CombiEngines and the eleven CombiTools. These include a choice of hedge trimmers, a pruner, cultivator and lawn edger, a grass trimmer, brushcutter, scrubcutter, powered sweeper and bristle brush.

### Top Tip:

#### Extend the life of nylon cutting line and thermoplastic blades

Soak nylon line and 'plastic' blades in water for 48 hours before use. This will help restore them to factory fresh suppleness, which in turn will reduce sudden breakage in service.



Fitting new line into the AC-KM Mowing head is an absolute doddle. Cut off a length of new line, and feed each end into the line outlets on the head. Wind in the line via the knurled base winder, cutting it either with a knife or letting the guard mounted line shear do the job for you



The 4-MIX KM130 R CombiEngine produces a different noise to its 2-stroke alternatives, the sound tending not to travel as far. Fumes appear to be less noxious too. The only penalty is the unit is a bit heavier, but there is nothing wrong with power and torque



FH-KM Scrub cutter is both shorter and stronger than the hedge trimmer, but boasts the same adjustment system. A metal base-plate makes it suitable for trimming growth at ground-level without the 'scatter' of a grass trimmer and the wide blade spacing allows coarse material to be trimmed. "I think this tool would be useful for clearing material, such as reeds, from around ponds and lakes. This also could be used to edge bunkers. It looks pretty tough too"



The rubber paddles of the KW-KM Power sweep have the advantage of not getting blocked when working with wet material. "The sweeping power of this unit, and the brush, is good and the tools are easy to operate"

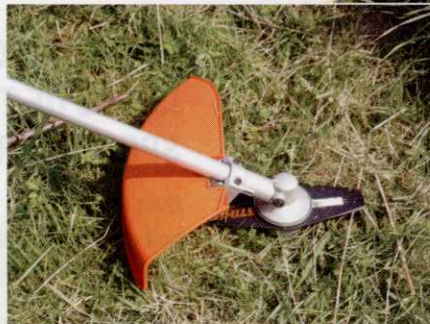


A green marker dye distinguishes the HP Super 50:1 ratio 4-MIX optimised oil from the standard red marked alternative. BioPlus variant is bio-degradable



The latest HL-KM adjustable twin-blade Hedge trimmer has several advantages over the earlier design. Adjustable through an expanded 135°, it can be adjusted to trim the top of a hedge, and can be operated in a range of positions. It also stores 'folded'. "A really useful tool. It makes trimming the top of hedges and bushes quick and easy. The range of adjustment is a real plus"

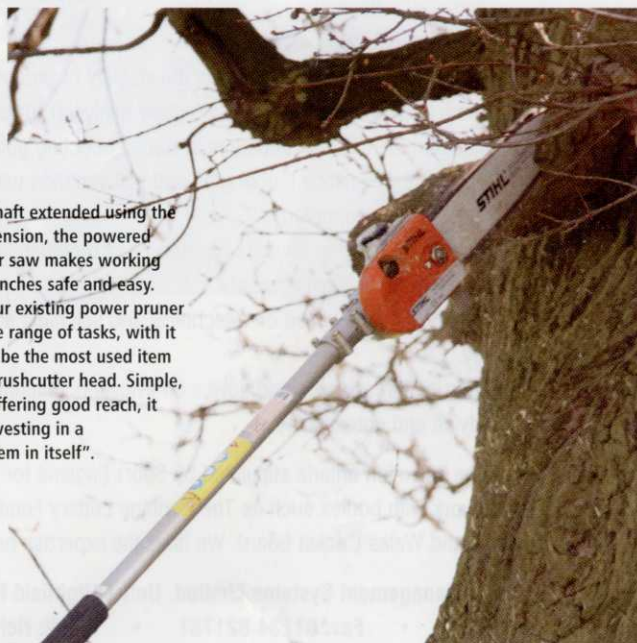
Fitted with easy to refill AutoCut C line head, the AC-KM Mowing unit boasts a small guard. This makes it easy to see the area that is being cut and the head could be fitted with 3 pivoting thermoplastic 'polycut' blades if preferred. It's every bit as good as a dedicated unit. "What I really liked was the easy system to feed in new line. Winding line into a conventional head now seems a real chore!"



Grass cutting head, MB-KM, is the tool to select when using a brushcutter blade. STIHL offers a range of blade designs, including the twin blade pictured. In work, this left a clean cut, the cleared material appearing fair less mulched. "Normally we would use a star pattern blade, but the twin blade worked really well in long grass, leaving material that would be easier to rake up. Good guard"



Designed predominantly as a Lawn edger, the FCB-KM unit was put to the task of trimming a bunker edge. It did a good job where the sand and grass were nearly level, but the Scrub cutter, or indeed manual edging shears, would be better for deep edges. "The jury is out on the value of this tool for bunker edging. I think it needs a bit of experience to get the best from too"



With the shaft extended using the HT-KM extension, the powered Pole pruner saw makes working on low branches safe and easy. "We use our existing power pruner for a whole range of tasks, with it proving to be the most used item after the brushcutter head. Simple, safe and offering good reach, it justifies investing in a CombiSystem in itself".

## fastMAP™ Greenkeeper Golf Course Management Software

- ▶ Survey of your Golf Course by KOREC
- ▶ Visual Display of Golf Course Plan
- ▶ Central Database of all Features
- ▶ Capture location of buried pipes
- ▶ Accurate Playing Surfaces Area Report
- ▶ Print Reports and Scaled Drawings
- ▶ Maintain Golf Course Plan with GPS
- ▶ Precise Golf Hole Measurement
- ▶ For further information go to:  
[www.korecgroup.com/greenkeeper](http://www.korecgroup.com/greenkeeper)



Area Report	The	The	The	The	The	The	The	The	The	The	The	The	The	The	The	The	The	The	The	The	
Number	Length	Area	Perim	Volume	Label	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	
1001	100	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000



Measured Solutions  
Construction | Surveying | Mapping

fastMAP  
mapping software

Trimble  
Authorized Dealer

**KOREC**

34-44 Mersey View,  
Liverpool, L22 6QB  
Tel: 00 (44) 151 931 3161



# HOOFMARK

UK LTD

## DELTAOK® PATENTED GREEN "GABION" SYSTEM

Offering permanent structural strength and erosion control for retaining walls, earth retention, river bank and motorway embankment stabilisation with the added advantage of noise absorption. Deltalok® can be built to any height, will support a wide range of vegetation, and does not involve the use of concrete, quarried stone, wire mesh or steel reinforcement. Hoofmark (UK) Ltd have been appointed sole UK distributor for Deltalok®. The Deltalok® patented fixing system can be used to secure geogrids in made up ground. Technical advice and design service available

Other SUDS compliant products  
include D-Raintank® & D-Rainclean®

**HOOFMARK (UK) LTD**  
1st Floor, Unit 24, Philadelphia Complex,  
Houghton le Spring, Tyne & Wear DH4 4UG  
Tel: 0191 5845566 • Fax: 0191 5845577  
E-mail [info@hoofmark.co.uk](mailto:info@hoofmark.co.uk) • [www.hoofmark.co.uk](http://www.hoofmark.co.uk)



# TurfTrax

Ground Management Systems

## TURFTRAX GROUND MANAGEMENT SYSTEMS LIMITED IS ONE OF THE COUNTRIES LEADING INDEPENDENT SPORTSTURF CONSULTANCY SPECIALISTS.

Over the last eight years, our scientists have developed and refined a number of unique golf course construction and remediation technologies as well as providing the most detailed soil surveys available anywhere in the industry.

TurfTrax offers a wide range of services to support golf and sports clubs and local authorities, including the design and supervision of construction or remediation projects.

Specifically, TurfTrax offers:

- Research and feasibility studies to examine the viability of proposed projects.
- Diagnostic services (soil scanning and laboratory analysis) for existing installations to determine drainage status and identify the fundamental issues affecting golf course playing surface performance.
- Detailed assessment of surface topography and soil variation using TurfTrax's unique state-of-the-art scanning and RTK GPS technology.
- Remediation plans for existing courses based on a comprehensive understanding of factors influencing the condition of each individual course.
- Design of new installations based on a technical and scientific analysis of topography, indigenous soils and hydrology.
- The design of irrigation systems and advice on irrigation scheduling.
- Agronomy advice and consultancy.



TurfTrax meets the selection criteria stipulated by Sport England for appointment as Soils and Turfgrass Consultant Engineers. TurfTrax are also recognized and work with bodies such as The Heritage Lottery Fund, The Football Foundation, The Football Association, The Sports Council for Wales and The England and Wales Cricket Board. We have the expertise necessary in order to achieve the requisite Performance Quality Standards (PQS).

**TurfTrax Ground Management Systems Limited, Unit 1 Highfield Parc, Highfield Road, Oakley, Bedfordshire MK43 7TA**  
Tel: 01234 821750 • Fax: 01234 821751 • Email: [richard.earl@turftrax.com](mailto:richard.earl@turftrax.com) • [www.turftraxgms.com](http://www.turftraxgms.com)

# Serious About Surveying

Peter Lloyd outlines the advances being made by Korec, in golf course surveying.

Having supplied Land Surveying equipment for golf course surveys, for over 20 years, Korec, have seen a significant increase in the demand for golf course surveying equipment. This has coincided with the advancement in technology and productivity of the latest surveying instrumentation and GPS.

To explain why there has been an increase, we must first understand the reasons why a golf course would need a survey and what they would do with the data afterwards.

The most obvious need for a survey is when major alterations are planned and the golf course architect requires survey information, to undertake the design work in CAD. Until recently, a Surveyor and a Survey Assistant, using a Total Station, would have carried out this labour intensive task, of comprehensive topographical surveys. Typically 500 points for each hole would be surveyed to produce a detailed contoured plan of the course.

A much simpler and less detailed survey is required for smaller design projects, like drainage and irrigation improvements; a new course planner; or simply to measure all the play areas to provide accurate area measurements, for calculating fertilizer and pesticide application rates - minimising the usage of these expensive products.

The introduction of Robotic Total Stations and GPS Receivers (Global Positioning System) over recent years, have revolutionised how golf course surveys are carried out. Both these types of equipment can be operated by one person, which significantly increases the efficiency of the surveyor, while maintaining the same survey accuracy.

Robotic Total Stations, offer the benefits of traditional surveying equipment but provide the option for one person operation, either at the detail pole - where the surveyor can clearly identify different features - or at the instrument - when taking reflectorless measurements to remote features - for example: the far side of a lake.

The new Trimble® S6 Total Station, is the third generation of Robotic Total Station from Trimble and offers fantastic features ideal for golf course surveying including: one person operation; MagDrive technology for breathtaking speed; reflectorless measurements to 300m and a graphical data capture system.

Professional RTK GPS receivers, work to an accuracy of 10mm and can measure several points per second - providing the surveyor with unprecedented performance. GPS is used by one person - at the detail pole, or mounted on a buggy - for a rapid collection of data.

The new Trimble® R8 GNSS System, is an integrated GPS receiver and antenna in a small rugged housing, which also offers fantastic features ideal for golf course surveying including: one person operation; Trimble R-Track technology to support all GPS signals; pole or buggy mounted and a graphical data capture system.

Both the Robotic Total Station and RTK GPS technologies, can be used in construction for setting out and checking the new golf course design, directly from the architects CAD drawings into the graphical survey system - this significantly increases the speed and accuracy of the setting out process.

Using this new technology, will not only significantly reduce the time required to survey the golf course but also reduce to a minimum, any disruption to golf play during the survey process.

For large construction and earth moving projects - like building a new golf course - Machine Control systems, can be used on heavy earthmoving plant, for example: dozers and graders. Using extremely rugged GPS receivers, these systems can automatically move the blade of the machine as it is driven to form the 3 dimensional surface of the new golf course design, without the need for pegging out.



fastMAP Greenkeeper Handheld GPS

The new Trimble® GCS900 Grade Control System, is an automatic control system for dozers, that puts design surfaces and grades inside the cab, using GPS technology. The user is then able to follow simple light bar instructions on the graphical display and the need to set out the new surface is eliminated - speeding up the construction process.

After the existing topographical survey or the new construction work has been completed, the new golf course plan will be used by Course Managers and Greenkeepers but will become quickly out of date, as small changes and improvements to the golf course will continue.

Korec have recently launched fastMAP™ Greenkeeper, a new software and handheld GPS system, which allows greenkeeping staff to take ownership of their own golf course data, by measuring and updating the golf course plan themselves.

fastMAP™ Greenkeeper, provides the benefit of up to date and accurate area measurements, identifying the locations of buried drainage and irrigation pipes and recording the positions of any defects or problems on the course. It also allows others to relocate them later. fastMAP™ Greenkeeper, manages the storage of all other kinds of data on the plan, including: safety information; maintenance records; pin positions and hole measurements.

*Korec offer a complete range of surveying and measurement solutions, for Golf Course Surveys, Construction and Maintenance. Further information is available from them, by calling: 0151 931 3161; faxing: 0151 931 5559 or visiting their website: [www.korecgroup.com](http://www.korecgroup.com)*

## John Oldfield shows just what can be achieved by a modern golf course survey.

Greenkeeping has always been a science, as well as an art - even in the 19th Century, when Old Tom Morris was advocating "saund, saund and mere saund!"

Today, the art still exists - knowing when and where to apply top dressing to optimise the condition of the greens; "tuning" the course to its optimum playability, just in time for the most important event of the year; planning winter activities to maximise future impact, while minimising day-to-day disruptions to the play of the course. Great greenkeepers have always instinctively known how to manage towards these goals.

Managing the advances in the science, however, have proved more difficult for many greenkeepers. As with the rest of the world, information overload has been hard to get to grips with, including, for greenkeeping, such matters as:

- The integration of numerous databases, for example: irrigation; drainage; pest control; mowing and rolling; restoration; budgeting and their seamless linkage to an accurate map of the course
- The ability to ensure that these databases can be updated, in an integrated manner, as quickly and efficiently as possible.
- The use of these databases to help with day-to-day problems as well as long term planning.

Answers to these problems are now emerging.

The latest state-of-the-art system, is based on the creation of a highly accurate (1-2 centimetre) three-dimensional model of the terrain and features of a golf course. This model then serves as a template, over or under which can be laid additional information, both historic (e.g. drainage systems) and future (e.g. annual course maintenance programmes).

### MANAGE YOUR MOST VALUABLE ASSET PROPERLY

Information is the key to managing anything well and the golf course is no exception. In this regard, there is no such thing as "too much information".

Using the three D digital terrain model - which can be contoured at anything from ten centimetres to a meter or more - combined with the high resolution imagery, the management system can enable all course measurements to be undertaken, without the Head Greenkeeper leaving his desk. The model is accurate in three dimensions to +/-5cm. The amount of time this could save is immeasurable. (By measurement, we mean instant access to any linear measurement and area measurements such as: imperial, metric hectares, acres and even chains and furlongs if someone really wants it!).

### OTHER PRACTICAL APPLICATIONS

Records need to be acquired and maintained, not just about the topography of the course but also a history of activity and its associated costs.

Therefore the Greenkeeper will require a range of applications including:

- Health and safety records of underground and over ground services
- Budgeting control and recording of key inputs (labour, materials, etc.)



- Management of daily and periodic tasks
- Environmental management
- Change planning and control
- Pin positioning systems
- Tournament / Event planning
- Course re-design proposals

In addition, the process allows for the creation of ancillary products and services of benefit to other departments of the club.

Amongst these are:

- High quality course guides, which can be easily updated
- Stunning aerial images of the course
- Hole x Hole tour for the clubs website
- Cards, placemats, t-shirts, etc. using images of the course
- Books of the club and course using our "Experience" brand
- Hand held PDA with GPS showing all distances to every feature and permits accurate shot recording.

### WHAT ARE THE BENEFITS?

#### Case 1

Hamish works for a Green Convener who is obsessed with bunkers. Two years ago he was sure he could save money, by eliminating 20% of those least in play, thus eliminating daily raking and annual maintenance. Last year he was convinced that new technology had made his course "obsolete" and he made Hamish build new bunkers at about 280 yards, at the corners of holes 2, 8 and 13. This year, his passion is depth. The bunker projects of the past two years, actually made the course play easier and several of the good club players and regular visitors made it known that they did not like the recent changes. The Convener wants to deepen several bunkers to make them more challenging but a growing segment of the membership wants to bring the course back to where it was in 2003.



**Case 2**

Mary has been working at Royal Prestige for 10 years. After working hard and graduating at the top of her class at Elmwood, she was promoted to Assistant Greenkeeper in 2005. In early 2006 her boss, Nigel, was killed in a tragic accident and Mary has taken on the role of Acting Course Manager. Her instructions seem to her to be "preserve the status quo" but Mary knows that RPGC has fallen behind the times and also that the Committee is actively recruiting for a higher profile replacement for Nigel. In her first week at the new job, Mary finds that RPGC's records are non-existent (Nigel kept them all in his head) the status of the course is declining (the County Association is dropping it this year from its rota), and three pieces of heavy equipment seem to have gone "missing."

**These problems could be solved if...**

**In Case 1, Hamish had:**

- A computer graphics tool to show the Greens Convenor and the entire Committee what the effect would be of any changes to bunkering or any other feature of the golf course - in terms of aesthetics, costs and playability.
- High-resolution graphics - which would show how the new deeper bunkers would actually look and play.

**In Case 2, Mary had:**

- Access to the data that Nigel had "kept in his head".
- A tool to compare how the course looks now, to how it looked in the past and might look in the future.
- Records of who had access to what equipment and when?

Managing a golf course is as much an art, as a science. However, if the science is neglected, the art can never blossom. OptimizeGolf is dedicated to providing the information to help courses blossom.

OptimizeGolf 2024 2024/02/27

OptimizeGolf 2024 2024/02/27

**Richard Earl explains why the role of scanning for planning remediation, works for golf courses.**

Routinely wet and sometimes unplayable areas, coupled with ineffective drainage installations, are a common scenario at many golf courses. This often results in a downward spiral of accelerated degeneration of turf condition and lost playing days, as greenkeepers are prevented from carrying out essential maintenance operations at the right time and under the right conditions.

An essential starting point to reversing this situation is to develop a thorough understanding of the underlying cause(s) of the problem. However, soil type and condition across a golf course can vary considerably. The traditional method for assessing this variability involves invasive removal and assessment of soil samples, at regular intervals across the course. This is destructive, time-consuming and expensive and so corners are often cut during the investigative process which can result in inappropriate remediation practices being specified and carried out.

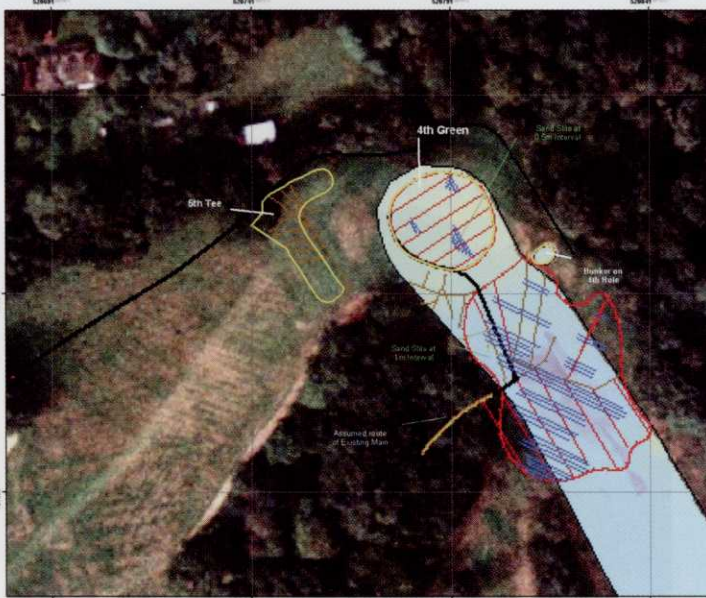
One way of addressing this is to use a "non-invasive, data-rich surrogate" to traditional soil samples procedures. In other words, to use a method of obtaining a lot of information about a large area of the course, which can be used to target more detailed, invasive investigations. TurfTrax have developed procedures for doing this, using Electro-magnetic induction (EMI). EMI of soil (measured in deciSiemens per metre) is predominately affected by clay content and water content.



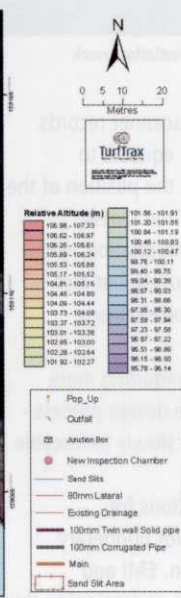
EMI scan



Topographical survey



Drainage design





Standing water on fairway



ATV towing the EMI scanner



Remediation work

A scanning device is towed behind a small ATV. The scanner records EMI at two depths (8" and 4') 5 times per second which equates to approximately 10,000 readings per hectare. In addition, the position of the vehicle is monitored using an accurate (+/- 1 cm) Real Time Kinetic Differential Global Positioning System (RTKDGPS). This information, not only enables accurate maps of soil variability to be produced, but also topography (slope), which is an essential element of good drainage design.

The EMI scans can be used to identify specific areas requiring more detailed investigation - to identify factors and inform the design process - for example: the presence of a water table; compaction; slowly permeable soil; nutrient status and pH.

The production of effective and sustainable specifications for remediation works, with the associated indicative costs for budgetary purposes, can only be derived using accurate information. EMI and topographic surveys can therefore, play an import role in underpinning this process, to ensure that investment is optimised.



Completed green