

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

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

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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.

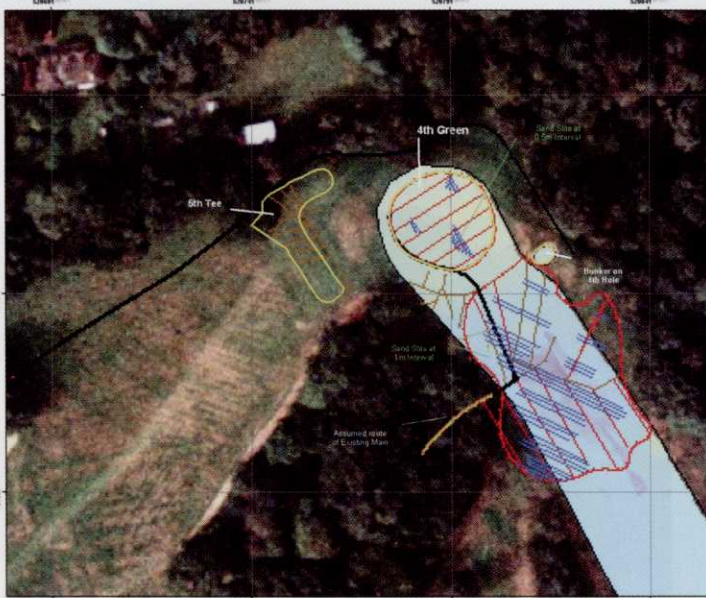
One way of addressing this is to use a "non-invasive, data-rich surrogate" to traditional soil samples procedures. In other words, to use a method of obtaining a lot of information about a large area of the course, which can be used to target more detailed, invasive investigations. TurfTrax have developed 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.



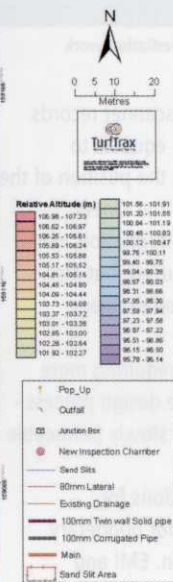
EMI scan



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.



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