

THE FUTURE OF TURF MANAGEMENT

In the first of a monthly series of articles to appear under the "Continue to Learn" banner Barry Beckett outlines his view of how the industry may progress over the next few years.

Imagine a world without mobile phones, the Internet, CDs, microwave ovens and satellite TV. It wasn't too long ago that any of these existed; yet now they're part of everyday life and not given a second thought.

Now think of a greenkeepers' world in which robot mowers controlled by GPS technology carry out cutting operations throughout the night when players are asleep in their beds – and not right up behind you as you do your early morning mowing!

Far fetched? Not at all, according to some. For this scenario might well prove to be one of many technological innovations that will come to revolutionise the way in which greenkeepers maintain their golf courses in the future.

The world moves on apace and leading turf maintenance equipment manufacturers like Toro have to be actively thinking about the future of golf in, say, 10 to 15 years down the road. Questions about what technology greenkeepers will need and how this should be developed and brought to market as commercially viable products that work in practice are a constant source of challenge.

What is certain is that things will change. And for the greenkeeping industry, one of the greatest changes around the corner is the emergence into the profession of a new generation of men and women born and brought up with computers, people who will insist on using the benefits of computer technology to its fullest extent in their work.

Some changes we shall immediately embrace, others we may resist – but changing how we do things, not necessarily what we do will be at the heart of our future.

Not all changes and technologies are matched to market conditions. Some are far too ahead of their time and fail miserably.

Remember the Sinclair C5, the little car, that's now a collector's item!

It's hard to imagine that in 1970 there were no cordless let alone mobile phones, no CD players, microwave ovens, video cassette recorders, smoke detectors or even TV remote controllers.

Alternatively, not everything we need is necessarily new. For example, battery/electric-powered products are widely talked about today as something for the future in all aspects of the 'vehicle' industry including the turf industry.

But battery-powered products have been used in the UK for many years. In fact in 1912 there were 34,000 electric vehicles (lorries, vans, buses) registered, which was 35 per cent of all vehicles. The milk float was one of the more lasting.

The lawnmower industry flirted early on with electric power on some contraptions. And ever willing to try something new, the industry has also employed steam to power lawnmowers!

Embracing change and being prepared to learn new ways will be fundamental to all of us – otherwise we shall be left behind.

Looking to the future, factors that drive the market will be increased: leisure time, disposable income, life expectancy, increased TV coverage, and higher player expectations. Golf is a game for life.

For greenkeepers, factors driving our needs will be led by environmental pressure by way of regulation, consumption of resources (water, fuel), and emissions (air, water, noise). Added to this will be the issue of labour – its cost, availability and quality.

Future power sources we might see as well as battery and electric power include hybrids (petrol/diesel plus electric), alcohol fuel distilled from corn, solar power/regeneration, and rechargeable energy cells.

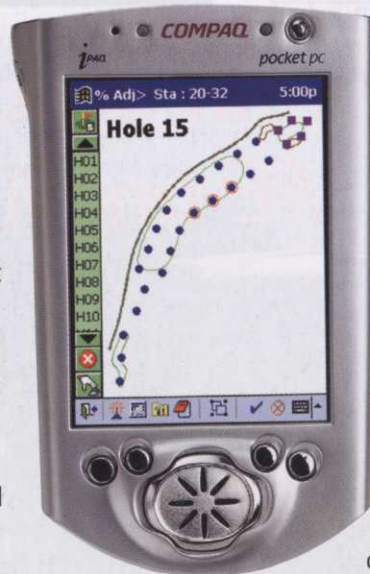
New materials used in the manufacture of products will bring benefits through new lighter weight, stronger plastics that also give fuel savings, ceramics for the hardest of mower blades, fibre optic cables, and recycled and recyclable compounds.

Grasses and fertilisers will both be part of this change process, with new grass hybrids that resist disease, heat and cold and can be cut shorter without stressing the plant. Grasses with a deeper natural green colour will be among other advances.

New fertilisers will include those that can be applied in micro-doses through irrigations systems.

Computers will revolutionise the greenkeeping industry and become part of everything a greenkeeper does. Some ways in which they will save time and money are:

- Linking irrigation systems to national weather centre computers to control watering.
- Measuring a machine's performance and self-diagnosing problems before they arise.
- Using bar coding as part of your spare parts usage, for automatically reordering replacements.



TORO Count on it.



Computers will also be at the heart of sophisticated tracking systems that have the ability to track and display the location of all essentials on the course. For example: equipment, players, staff, tournament officials and TV cameras.

Systems already exist in the agricultural industry to track the progress of things like harvesting operations. Toro is among companies that are developing this technology, and is confident it will come about in greenkeeping in the not too distant future.

The system relies upon a remote or palm-held device rather like a PDA (personal data administrator), which is used to collect and plot data for storage and display on a computer. Tracking systems will have the ability to plot and display all areas and operations on the golf course. These include areas that have been cut or are uncut, where spraying has been carried out, what has been watered, and parts that are, say, under repair.

So simply by looking at a map on a computer screen greenkeepers will have a snapshot of pretty well everything they

need to know about what's going on around the course.

Another innovation set to herald big advances in the future of turf management is the use of spectroscopy. This is officially described as the science concerned with the investigation and measurement of spectra produced when matter interacts with or emits electromagnetic radiation. Think of the spectrum of colours in a rainbow representing the different parts of light.

Spectroscopy in our case is about using this light source to produce data about elements out on the course that cannot be seen by the naked eye or known how else. For example plant tissue and soil conditions.

Toro and others are working on this and the technology could be no more than five years or more away. In practice, current thinking is that a light source device will be used to collect data and load it on a computer. This would be a portable instrument, but developers are also looking at a much larger machine for 'real time' data gathering and volume analysis.



The data would be used to analyse plant tissue to show its composition, nutrient deficiencies, to custom-mix treatments, and, say, to establish the 'local needs' of an area of the course.

Information would be plotted on a computer for many purposes that would aid the greenkeeper. These start with, for example, for storage and reference, and go on to help with development of treatment programmes and compiling records. For even greater detail, this method could be combined with data from infrared aerial photography.

The biggest driver for change here is the need to better conserve and manage water. The increasing cost of water and tightening restrictions on its availability will drive technological advances in all systems aimed at eliminating its wastage. Out of excessive watering come other associated problems such as leaching of fertilisers and other chemicals used in turf treatments.

Spectroscopy technology will help here, too, as it will be used to target and control use of items such as fertilisers, herbicides and pesticides. Ultimately it will map your whole golf course.

The internet will completely change the way we communicate and run our businesses in a number of ways, including:

- Hand-held compact computers will give live access to libraries for reference information.
- video conference links will play a bigger part in training.
- all purchase orders will be placed via the internet.
- all manuals, videos, management programmes will be capable of being downloaded.
- archives/videos of case-studies, as well as presentations.

Among new methods that will evolve will be that future generations of greenkeepers will be totally computer literate and will demand the use of technology.

Work will no longer be just in 'daylight'. GPS systems will allow night mowing; repair work and maintenance will also be done at night.

Other new techniques, which combine many of the new technologies described here, will evolve. One example might be what is called Precision Turf Management. This is a combination of technologies using GIS (global information systems that map the Earth's layers, contours, features and soil types); GPS (global positioning system that accurately plots any location on the globe); sensors; and VRT (variable rate technology).

In broad terms Precision Turf Management is based upon two key principles, as follows:

- Soil conditions vary across large sections of land.
- If you can better manage the variability, then optimised economics and a cleaner environment will result.

Technologies are creating new opportunities to micro-manage inputs for production, as follows:

- Water, seed, nutrients, chemicals, soils.
- Manage smaller sections of land rather than average needs of a whole 'field'.

Information is the key. We would have access to much more data. The challenge would be creating 'information' from data.

Currently, greenkeepers essentially have only their eyes and experience to go on when it comes to turf management operations like, say, irrigation. Sprinklers are switched on and left to run for maybe a couple of hours – and that usually does the trick.

But with Precision Turf Management, where micro-management is being practiced, sensors under the turf hooked up to a computer would tell greenkeepers categorically whether the ground on any particular part of the course was wet, damp or dry and what watering if any was

needed. There would be no guesswork – and no wastage or unnecessary costs incurred.

The same devices as part of a micro-management system might also be used to measure sound, motion, heat, light and pressure. This would bring into play the management of other 'controllable' aspects of turf management such as compaction, mowing, pesticides, nutrients, hybrid grasses, thatching and fungicides.

Who knows how this may all evolve?

But we can be sure that technologies and systems such as those illustrated in this article will become widely used in our industry.

We shall still need people. The greenkeeper (you'll by now be glad to know) will not disappear. The function will however change from what we know it as today.

But while we speculate on 'what will be', manufacturers like us at Toro all still have to deal with real people and meet their needs for a product.



Barry Beckett is Senior Marketing Manager, International Division, for The Toro Company, based in Minneapolis, USA

