



modification and transfer system and allow trading of water rights between parties,

- Placing water companies under an enforceable duty to further water conservation,
- Giving the Environmental Agency powers to revoke an existing abstraction license without compensation if it has not been used for four years,

And most importantly:

- Giving the Environmental Agency powers to require abstractors (i.e. yourselves) to enter into water management arrangements and to use water in an efficient and effective manner

So, how will this affect the end user? Well, there is a pressing need for us all to become more 'accountable' and to demonstrate that we are using available water resources efficiently. This initially involves having a good working knowledge of soil water relations and the inter-relationship between simple soil science and plant botany.

An understanding of the relationship between gravitational water and field capacity. An awareness of the value of infiltration and percolation rates, and an accurate assessment of water availability within the root zone. These features alone can ensure good conservation practices and prevent water wastage by reducing over application, surface run-off, and inadvertent losses through the drainage water. Equally it is essential to know how much water is being applied through supplementary irrigation, not in 'so many minutes per station' but in millimetres per hour, as this can then be compared favourably or otherwise with the surface infiltration rate to maximise water use efficiency.

A working knowledge and understanding of the above will assist in the ability to manage available sources of water better, and more precisely to 'calculate' rather than 'guess' the potential irrigation demands of the turf. A water balance sheet 3 may further help in this provision. This involves not only monitoring the condition of the turf on a daily basis through such cultural skills as the observation of foot printing and the relative dryness of the core

when changing holes, but also balancing the water input (profits) to water loss from the turf. Water input is by natural precipitation, which is free, and by irrigation. Water loss from the turf is by transpiration through the leaves and evaporation from the soil combining to give evapo-transpiration (E/T). Figures, albeit average figures are available for E/T via the Met Office (MORECS data), and rainfall can easily be measured by a weather station rain gauge. All that remains to produce a simple 'profit and loss' account (water balance sheet), indicating not only the need for irrigation but the amounts required is the ability to maintain daily records and be aware of the precipitation rates from the irrigation sprinklers. Also working with the concept of an allowable water depletion, that is to say not returning the soil to field capacity, a buffer can exist to allow for dew or unexpected rainfall. By constantly returning the root zone to field capacity, or above, wastage of water can occur, the soil structure can be impaired, surface rooting will be encouraged and nutrients may be lost via gravitational water through drainage.

Modern technology can also play its part in improving our water use efficiency. Good area specific irrigation design with careful selection of sprinklers and their spacing to maximise distribution uniformity and scheduling coefficients, computerised irrigation control, variable frequency drive pumping systems and on-site weather stations can all help to build up a picture of irrigation water usage and a maintain a credible 'water audit'.

From an irrigation design point of view the objectives of an efficient irrigation system are to apply water:

- To the areas requiring irrigation uniformly
- At the optimum precipitation rate to allow penetration into the rootzone minimising run-off
- In quantities necessary to maintain soil moisture at the required level
- At the optimum time during the day or night

When backed up by digital aerial photography and GPS mapping to highlight the 'precise' areas considered necessary for irrigation, and meteorological data, this enables water to be applied effectively with a constant consideration for conservation.

Computerised irrigation control brings many advantages to irrigation which when combined with accurate evapo-transpiration and rainfall data obtained from a weather station provides the user with the ability once again to 'calculate' rather than 'guess' irrigation requirements, all of which will be essential in the future. Computerised controllers also use sophisticated 'hydraulic management' to minimise hydraulic stress within the system, reducing bursts and saving water. This will be particularly noticeable if your pump station uses variable frequency control whereby the pump flow matches the demands of the system. This saves electrical energy, further reduces hydraulic shock and provides better controllability by delivering only the amount of water required by the system at a particular moment in time.

An on site weather station to record meteorological data such as temperature, humidity, wind speed, solar radiation and of most importance to irrigation, rainfall and evapo-transpiration can help with our water use efficiency. Applying only that water which the soil-plant environment requires can save between 10-15% of water within a cycle, which for those of you who rely on mains potable water can result in a significant saving throughout a season.

It may also be prudent at the current time to look at water resourcing. One thing is for certain; water will become more expensive in the future. Check abstraction licences and monitor current daily and monthly usage, 2003 was a good year to start, as water usage was above average, however, now is never too late. The last time we had a summer even remotely similar to 2003 was eight years previously so statistics would show we are due a prolonged dry summer soon! If your water is mains only then research potential alternatives. If your predominant water is ground



water check your license agreements and ensure you know when it is due for renewal otherwise your license to abstract could be lost. In either case it may be necessary to consider the construction of some form of water storage facility, and both time and planning will be on your side if you start now. There has recently been a number of articles on the use of 'grey water' or 'waste water'⁴. This has to be a potential water source for the future especially where a golf club has a leisure facility attached. 'Waste water' has both advantages and disadvantages and maybe used to supplement other forms of irrigation water.

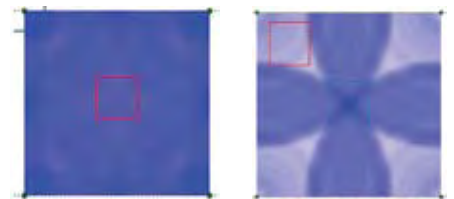
So where does the Water Bill leave us? I believe as the industry uses only 0.1% of all available water in the UK that if we show accountability by demonstrating a working knowledge of soil water relations, have a written water policy, maintain accurate usage records, have well designed, maintained and efficient irrigation system and effectively demonstrate conservation techniques with the aid of modern technology, we should be in a strong position to meet the demands of the future.

References -

- 1 DOWNING, T.E; et al. (2003). *CCDeW Climate Change and Demand for Water, Research Report, Stockholm Environmental Institute Oxford Office, Oxford.*
2. UNESCO. (2003). *World Water Crisis Worsening, AgraNet.*
- 3 MORTRAM, A; HUME R. (1999). *How Much to Apply and When. STRI International Turfgrass Bulletin, Issue 204. p. 14.*
- 4 MORTRAM, A. (2003). *The Effects of Irrigating Turfgrass with Wastewater. STRI International Turfgrass Bulletin, Issue 219. January, p. 30-32.*

Website - www.irrigationconsultants.co.uk

Note - this article was previously produced in the STRI Bulletin and Golf Club Secretaries magazine



(Above left) Excellent Sprinkler Densogram showing scheduling coefficient of 1.1 and distribution uniformity of 94%.

(Above right) Poor Sprinkler Densogram showing scheduling coefficient of 1.5 and distribution uniformity of 68%.



Author -

Adrian Mortram is managing director of Robin Hume Associates Ltd, an independent sportstuf and golf course irrigation consultancy based in Shrewsbury, Shropshire. His company are the appointed irrigation consultants to the St. Andrews Links Trust and associate consultants to the STRI (Sports Turf Research Institute) with whom they operate STRI Irrigation Consultancy Services. He contributes regularly with articles in the STRI Bulletin and has given both educational papers and presented workshops at the BIGGA Conference. In his spare moments he has a passion for mountaineering with recent visits to the Himalaya and Andes.



Whats your Number?

Name: Andrew Robinson

Company: Rigby Taylor Limited

Position: Managing Director

How long have you been in the industry?

"Since 1983."

How did you get into it?

"I joined May & Baker as their technical sales representative for Scotland and N. Ireland. My role was to support the company's five distributors and call on end users promoting a range fungicides and herbicides to golf courses, sports clubs and local authorities."

What other jobs have you done?

"I left school to become a Semi-Professional footballer with Kilmarnock FC. As this was part time I also had a job as an Estimator in the flooring industry. At the age of 19 joined a company called Borax Consolidated selling hand cleaners and industrial herbicides."

What do you like about your current job?

"I get to travel to some of the top sporting venues across the UK and sometimes Europe and enjoy the challenges of trying to help groundsmen and greenkeepers improve their playing surfaces. I also have some great colleagues who are a joy to work with."

What changes have you seen during your time in the industry?

"Much more research is going into product development than in the past and this led to some exciting new product introductions. Sustainable



Golf is now really taking off with the emphasis on root development and plant health rather than just top growth. Greenkeepers are reducing their Nitrogen inputs and replacing these with bio-stimulants and other plant health products, an area where I am pleased to say Rigby Taylor is leading from the front."

What do you like to do in your spare time?

"I like to relax playing tennis and also golf. I am a member of Kilmarnock Barassie Golf Club and working hard to reduce my handicap down from 18. I am also a season ticket holder at Kilmarnock FC and enjoy family meals out with my wife, Linda, our two sons and their partners."

Where do you see yourself in 10 years time?

"Continuing to play an important managerial role in consolidating the position of Rigby Taylor as the number one supplier to that sector of industry we serve."

Who do you consider to be your best friends in the industry?

"Having been in the Industry for so long I have made good friendships with key customers and forged great relationships with some colleagues with whom I have worked with for so long."

What do you consider to be your lucky number?

"3. As I was born on the 3rd day of the Month."

Pick a number

"Number 3."

Andrew has picked The Edward Brothers from Inturf

FEATURE

The new DT Series. Designed for the highs and lows of rough and fairway.



Introducing the DT35 and DT55, with full- and part-circle functions and the DT34 and DT54, full-circle function models - Toro's new dual trajectory sprinklers.

The new range features a special 'selectable trajectory' that gives a choice of 15° or 25°, allowing the jet to be adjusted to suit varying wind conditions and to avoid obstacles. A simple hand adjustment of the main nozzle is all it takes to switch trajectory for optimum performance.

Improved nozzle design ensures uniform coverage and the arc can be adjusted between 40° and 330°. We've also added a full-circle capability for the most cost-effective deployment.

What's more, there's a removable rock screen and stainless-steel valve seat included among the innovative features of the DT Series, already dubbed the most advanced of its type on the market.

For full details please call 01480 226858

TORO Commercial, Irrigation and Consumer Products are distributed by Lely (UK) Limited
St Neots, Cambridgeshire PE19 1QH. Tel: 01480 226800 Email: irrigation.uk@lely.com

TORO Commercial and Irrigation Products are distributed by Lely Ireland Limited, Kilboggin
Nurney, Co. Kildare. Tel: 00 353 (0)45 526170 Email: irrigation.ie@lely.com www.toro.com



Count on it.

*North Berwick (main image) uses Toro Irrigation, but currently operates no DT Series sprinklers.



SGCTM
Senior Golf Construction



“SGC’s quality of work and professionalism is exceptional, they achieve perfect results every time. I would have no hesitation in recommending SGC for all your tee renovations”

Craig Gilholm, Course Manager, Royal Liverpool

“SGC are very professional - the finish achieved was beyond our expectations ”

Gareth Roberts, Course Manager, Hankley Common

Laser Tee Renovation

Our state-of-the-art laser grading technology is the most advanced system in the UK; the advanced grading system lets us achieve perfect surfaces for tees. Projects can range in size and complexity; from laser grading your existing soil-based tees to full USGA construction.

- Saves thousands on construction of new tees
- Eliminates the guess-work with levelling tees
- Laser levelling allows 100% use of the tee surface
- Special rates for multiple bookings

Big Roll Turf Installation

Our state of the art big roll turf installation equipment has been imported from the USA and is unique to this country. It allows us to use rolls of up to 35 square metres, which measure 1.2 metres in width by 29 metres in length.

- Fewer joins means quicker establishment
- Superior finish compared with small roll
- Ideal for laser graded tees

	Timescale	MATERIALS USED	ACCURACY OF FINISH
LEVEL BY HAND	2-4 WEEKS	60 – 100 TONS	+/- 50mm
SGC LASER TEE RENOVATION	½ - 1 DAY	5- 10 TONS	+/-5mm

Contact: Stephen Senior, Tel: 07752989863
Email: stephen@seniorgolfconstruction.com

www.seniorgolfconstruction.com



DIARY OF A GOLF COURSE: IT NEVER RAINS

As seeding of the first nine holes gets underway at Clandon Park Golf Club, attention switches to the Growing In of the new course, and Peter Jones looks at the pros and cons that a wet spring and summer have brought to the project, and helps to co-ordinate the handover of the course to Dale Hand – Head Greenkeeper, who will be responsible for managing the first phase of the course through to opening in 2009.

At the time of writing the article in early July, the weather over much of the UK remained unsettled with frequent showers and intermittent bouts of heavier rain, somewhat reminiscent of July 2007, and not at all the summer weather that we all wish for. But fortunately, this pattern of weather had been almost ideal for growing in newly seeded areas and maintaining healthy grass on un-irrigated surfaces, and the seeded fairway areas on the first four holes were already being mown with a rotary deck mower.

The worst aspect of the frequent rainfall was slowing down the rate at which the topsoil heaps dried out, making it difficult pass through the stone screener, as this material was required for placing around the green surrounds and approaches, and for mixing with sand on the tees.

Moist soil is also more susceptible to compaction, which on one hand is useful when wanting to pack the soil in place on slopes around bunkers and prevent erosion from wind and rain, but not so good when it comes to creating a friable seed beds with rakes.

Timing of operations to make best use of the weather was therefore the key to making good progress, with the fairway areas becoming ready

for seeding well ahead of the greens, tees and bunker complexes. As a result the completion of the course took on the image of a partly completed jigsaw puzzle, with sporadic areas of bright green grass already being mown, and other areas of bare white chalk, glaring in the sun.

Of course, delays caused by weather are a natural occurrence in the greenkeeping industry, and therefore easy to adjust to. Not so, the delays caused by local government officials in their Mafia-style approach to their work, resulting in frustration and more grey hair for mere mortal men, such as I.

The construction of the 8th green (see top picture) was delayed by several weeks, with this whole area having only been released by the Archaeologists at the end of June following a mind-boggling list of restrictions (or should I say 'demands'), not to mention the added expense incurred by the client. I feel it would have been fitting to bury a horse's head under this particular green as a tribute, and it would have at least provided something vaguely interesting for the future archaeologists to dig up.

It is planned that all of the greens, tees and approaches will be sown at the same time in late July following the commissioning of the irrigation system, thus making it easier for the greenkeeping staff to treat all the greens exactly the same.

The part-time greenkeeping staff will be headed up by Dale Hand - Head Greenkeeper at the 18 hole sister course at Aylesbury Park GC who anticipates that autumn 2008 to be a very busy period for him and his team as they cover the maintenance on both courses. Full time staff will be taken on next year.



Peter Jones, Geoffrey Legoux and Dale Hand discussing the proposed maintenance regime for the greens.

To keep initial building costs as low as possible, the maintenance operation will be run from a securely fenced compound with machinery housed in steel containers.

The sympathetic design of the course and the choice of grasses has been created with 'ease of maintenance' in mind, ultimately enabling all areas to be mown with ride-on equipment to improve maintenance efficiency.

Dale's proposed choice of machinery includes:

- John Deere 2500B Greens mower
- John Deere 8700 Fairway mower
- John Deere 2653b Tee's mower
- John Deere 7400 Rotary
- John Deere 220c Hand mowers
- 2 x John Deere 3720 (44 hp) Tractors
- John Deere 1200a Bunker rake
- John Deere Aercore
- Lastec 11' Articulator rotary

It is planned that Phase 2 of the project (the back nine holes) will commence next spring, seeing the 18 holes, clubhouse and maintenance facilities fully constructed for autumn 2009.

ROYAL BIRKDALE 2008 ...WHAT A WEEK!

FEATURE



Our BIGGA Open Greenkeeping Support Team once again provided this year's Open venue greenstaff with some amazing, much needed help.

Travelling from as far a field as Hawaii, Australia, the Netherlands, Sweden and Portugal, the Support Team consisted of 60 greenkeepers, who spent the

week assisting Royal Birkdale Course Manager, Chris Whittle and his team with course preparations before and after play and bunker raking during the Championship.

As any member of the Open Support Team will tell you, it's a long week but a great one. This year our volunteers had heavy downpours and

gusty winds to contend with but that didn't stop them from smiling.

"The Open Championship was a fantastic opportunity for greenkeepers up and down the country to experience the greatest players in the world battle it out for the famous Claret Jug.

"It was hard work sometimes, with long days and



early mornings, but as greenkeepers we should've been used to that by now," said Jonathon Evans, Head Greenkeeper at Carden Park Golf Club.

Asa English, greenkeeper at Charnwood Forest Golf Club, Leicestershire, was the fortunate greenkeeper picked at random to work with the last game of the Championship, alongside this

year's winner, Padraig Harrington, and old favourite, Greg Norman:

"To be included in the Open Support Team was a privilege. To work inside the ropes gives you a great buzz and to get so close to the play allows you to see the true skill of the players. It is a hard, demanding week but the whole experience

is second to none. There was a great team spirit within the camp!"

Despite the wind and rain in Southport, attendance figures for the Championship were up compared to when the prestigious event was last played at Royal Birkdale in 1998 and the practice days in particular seemed to draw in spectators.

BIGGA MERCHANDISE

BIGGA RECENTLY ANNOUNCED A NEW DEAL WITH CORPORATE WORKWEAR DIRECT TO SUPPLY A NEW COMPREHENSIVE RANGE OF WORKWEAR GARMENTS AND PERSONAL PROTECTIVE EQUIPMENT THROUGH THEIR NEW IMPROVED WEBSITE.



THE RANGE WILL NOW INCLUDE POLO SHIRTS, FLEECEs, SAFETY FOOTWEAR, GLOVES AND HIGH-VISIBILITY GARMENTS AS WELL AS AN IMPROVED RANGE OF TOP QUALITY WATERPROOF SUITS.

Save time and money by ordering direct from BIGGA HQ, Aldwark, Alne, York YO61 1UF. Tel: 01347 833800.

Email: enquiries@bigga.co.uk

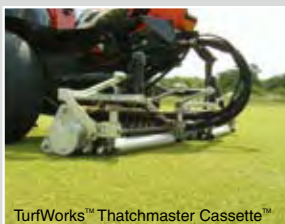


VISIT US ON STAND C20 AT SALTEX

Greens Triplex Brush from TurfWorks™



TurfWorks™ Vibro Roller



TurfWorks™ Thatchmaster Cassette™



Smooth operator

The **Greens Triplex Brush** from **TurfWorks™** has many advantages. Regular brushing increases smoothness for a true ball roll. When used daily, the Greens Triplex Brush reduces grain and the frequency of verticutting. 'Lock position' allows normal triplex use without removing the fully adjustable brush head. Fits most Toro, Jacobsen and John Deere Triplex models.



The Future of Greenkeeping

Call now for a free demonstration on +44 (0)1260 224 467
info@turfworksint.com • www.turfworksint.com



THE GREAT BIGGA BUNKER COMPETITION

The British and International Golf Greenkeepers Association (BIGGA) has provided support at the Open Championship since 1984.

Since 1995 the team has collected data on

the bunkers raked during the Championship and has now collated bunker related information for the last 14 Opens. During that time the team has raked all 15,470 bunkers that players have found, and established which courses provided the greatest bunker threat on the Open rota.

Each year the media is invited to estimate

how many bunkers will be found each day and the overall winner this year, Paul Trow from Pro Shop Europe, received a golf bag supplied by Ransomes Jacobsen. The Support Team and staff also take part in the competition, winning a bottle of whisky. This year's overall Support Team winner was Ian Gould from Chapel-en-le-Frith Golf Club.

1995 St. A's	1996 Lym	1997 Troon	1998 B'dale	1999 C'stie	2000 St. A's	2001 Lym	2002 M'field	2003 St.G's	2004 Troon	2005 St. A's	2006 H'lake	2007 C'stie	2008 Royal Birkdale
112	185	84	117	115	112	197	148	106	93	112	96	113	123
214	501	344	355	539	148	557	359	388	393	252	352	442	472
201	577	272	406	468	164	547	372	405	371	203	353	482	379
130	269	107	226	202	65	224	175	149	148	100	183	189	219
156	271	136	153	265	71	257	169	181	185	121	204	198	198
701	1618	859	1140	1474	448	1585	1078	1123	1097	676	1092	1311	1268

(Below) Alan Magee, from Remedy Oak GC



(Below) John Maree, from Bolton Old Links GC





(Above, central) John Keenaghan from Chipping Sodbury GC

Golden Nuggets supplied by BIGGA Support Team

Thursday....

Jeff Quinney broke his driver in anger, smashing it on the floor on the 17th tee after tee shot. He then went on to have a birdie on the same hole. Information supplied by Open Support Team Member, James Blacklock from Ellesmere GC.

Despite concerns about fading light and finishing at 945pm, Yoshinobu Tsukada played wearing his sunglasses all the way round. Information supplied by Open Support Team Member, John Berry from Dunheved GC, Australia.

On the 10th Paul Waring's 2nd shot went wide, right off the green landing and was found inside a spectator's umbrella. Information supplied by Open Support Team Member, Asa English from Charnwood Forest GC.

Friday...

On the 8th hole, as Colin Montgomerie arrived on the green, the crowd shouted 'give us a smile Monty', he gladly obliged after sinking a 20' footer for a birdie 3 – a smile bigger than a Cheshire cat. Information supplied by Open Support Team Member, Anthony Davies from Prestbury GC.

On the 12th, Lucas Glover's tee shot landed straight in a spectator's pocket. Information supplied by Open Support Team Member, Andrew Williamson from Delamere Forest GC.

Saturday...

A bunker on the 10th had to be raked due to Kevin Sadler's caddie's cap blowing into it. Information supplied by Open Support Team Member, Frederik Seeger from Kuamby GC, Sweden.

Due to windy conditions, a kind marshal fell over trying to stop Scott Verplank's scorecard from blowing away. Information supplied by Open Support Team Member, Jon Evans from Carden Park GC.

Sunday...

On the 16th Ernie Els asked the ref: 'Have these greens been cut? Can you find out.' Information supplied by Open Support Team Member, Jeremy Hughes from Vale of Llangollen GC.



Past chairman, Billy McMillan with board member, Tony Smith



Greenkeeper at Charnwood Forest Golf Club, Asa English, among the media at the last game of the championship



James Blacklock from Ellesmere GC, with a signed Pdraig Aarrington ball