

Terrain Aeration

COMPRESSED AIR PROBES

A method of deep aeration that has been used by a number of clubs over recent months uses a hollow probe which is hydraulically driven into the soil to a depth of one metre. The process is then repeated at two metre intervals in a grid pattern. Once the probe is at the correct depth compressed air is introduced. This creates a network of lateral fissures in the soil structure. Slow release nutrients can also be injected by the same method.

The suppliers of this equipment say there is very little surface disturbance and that drainage is improved by filling the holes with an aggregate.

WATER AERATION

When a droplet of water is virtually fired into the soil its velocity makes it behave similar to a bullet, shattering virtually anything in its path. This is another method of aeration that has become popular in recent years. One of the benefits is said to be that there is virtually no surface disturbance and therefore no hold up in play.

SUB AIR

This system was the brainchild of a Marsh Benson, a Golf Course Superintendent. It uses the green's drainage system. A blower creates an airflow which permeates the gravel layer, passes into the rootzone and is then finally released into the atmosphere via the turf. The airflow provides oxygen to the roots and transfers moisture vapour from the water table to where it is going to be of most benefit. The gravel layer is said to be at a constant temperature and as the air passes through it travelling upwards it adjusts the levels in the rootzone and turf above. This process is claimed to be highly beneficial when the air temperature over the greens is high. Likewise when the rootzone cools down in winter it can be warmed from the gravel layer.

Change the sub air unit to suction and the airflow draws excessive water down from the surface. Trapped gases and any build up of salts in the soil can also be removed.

Because the soil is constantly aerated, it has been found that this system controls the build-up of black layer, which forms as a result of low oxygen levels, the presence of organic material and anaerobic microbes.

The greens need to be USGA specification and have a suitable drainage system in place.

As was stated, early aeration is a very important part of the turf management programme and there is equipment available for virtually every situation.

In a month's time SALTEX will be held at Windsor. It is also the time of the year when most aeration is carried out. This exhibition provides an ideal opportunity to talk to companies, who supply the type of equipment mentioned in this feature, about your specific requirements and problems.

Getting aeration right is a major factor in growing strong, healthy, hard wearing turf.

See the Buyers Guide on page 64 for more aeration companies.



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The team conquer the famous Himalaya bunker on the Sunday evening



The team awaits its briefing at the University of Kent

A TRIUMPH!

Ben Curtis wasn't the only winner at this year's Open Championship

The Open at Royal St George's was a triumph. Not just for Ben Curtis, who produced what must rank as the greatest shock in the Championship's history - he had never played in a Major Championship before; had never claimed a top 10 finish on the US Tour was a 500-1 shot before the start and even 80-1 on the Sunday morning - but for the course; Neil Metcalf and his team and the BIGGA Greenkeeping Support Team.

The course and its condition received universal praise and while the weather leading up to the Championship made fast, brown, running conditions possible Neil, his Deputy, Graham Royden, and the team made the most of those favourable conditions to produce a perfect test of links golf. The fact that one under-par won proved that a quality golf course in testing conditions can be the equal of the modern technology.

This year the BIGGA Greenkeeping Support Team was more involved than ever as, in addition to its regular duties, it was given the responsibility of raking all the bunkers before the start of play each day. Now, as the light goes earlier in the south of the country it meant an earlier than usual start of play and with the R&A wanting the two hour job completed half an hour before the start a team of 14 had to leave for the course at 3.15 am. The next bus left at 5am with the remainder following on a short time after. The last bus didn't return home until around 10.30pm.

The advance party on each of the four days was led by George Barr and Ian Semple and the R&A were delighted that the pre-play job was carried out in such a professional manner.

As usual members of the Support Team were rewarded by the players with souvenirs in the shape of balls, gloves and hats which will become treasured mementos for years to come.

News titbits: as supplied by the BIGGA Greenkeeping Support Team

- Although Hennie Otto was the first day leader coming from the first group on the course on Thursday it was his playing partner, Christopher Smith, who was actually the first player to find a fairway during the round - on the 5th hole! - Information supplied by BIGGA Greenkeeping Support Team Member, Steve Smith, of Gillingham GC.



The Staff team with BIGGA starter Ian Holoran.
From left, Tony Cocker, Brad Anderson,
John Pemberton, Scott MacCallum and Peter Boyd



Ronan McKeown strides out

- Former Champion David Duval endured a torrid time during his first round and his patience was not helped when he was forced to wait for a butterfly shaped balloon which flew down the middle of the 16th fairway - Information supplied by BIGGA Greenkeeping Support Team Member, George Barr, of Ham Manor GC.
- Jerry Kelly's opening round got off to a dreadful start with his 11 down the 1st but he didn't lose his sense of humour, punching the air when he made a 4 down the 2nd - Information supplied by BIGGA Greenkeeping Support Team Member - Stuart Hogg, of Fortrose & Rosemarkie GC.
- Sergio Garcia was forced to wait on the 18th tee for a weasel which wouldn't vacate the tee - Information supplied by BIGGA Greenkeeping Support Team Member, Kevin Hodges, of Weston Park GC.
- Vijay Singh and Rich Been got their timings all wrong playing the 17th. They both played at exactly the same time and the two balls collided landing short of the green - Information supplied by BIGGA Greenkeeping Support Team Member, Ian Semple, of Old Fold Manor GC.
- Former Champion Paul Lawrie was obviously a little unprepared when he got to the 1st tee having to ask Ivor Robson if he had any spare spikes in his box - Information supplied by BIGGA Greenkeeping Support Team Member, Richard Saunders, of St Neots GC.
- US Amateur Ricky Barnes topped his drive off the 9th tee, knocking it 20 yards. He then hit it 40 yards further left into long rough and eventually made 7 - Information supplied by BIGGA Greenkeeping Support Team Member, Mark Ellis, of Stocks Hotel G & CC.
- Such were the weather conditions on Thursday, the flag blew off the 9th pin while players were approaching the green. It was replaced by a marshal - Information supplied by BIGGA Greenkeeping Support Team Member, Richard Barker.
- Souvenir hunting reached new heights in one of the last matches out when the young scoreboard carrier picked up a ball which had been played by the match following. He was called back from the next fairway to replace it - Information supplied by BIGGA Greenkeeping Support Team Member, Tony Woolley, of Piltdown GC.
- Royal St George's Deputy, Graham Royden took his 10 year old son, Louis, to the Championship on the Wednesday.

"The only golfers Louis knew was Tiger and Ernie and I had the chance to bring him on to the putting green on the Wednesday to watch Tiger putting for a while. I spoke with Tiger's manager and he said he'd introduced us to Tiger. We met in the R&A compound and we spoke about the course which he thought was in great condition but very tough he'd hit some straight shots which were penalised but he knew that that was links golf. He said it was fantastic and congratulated me on it," said Graham.



Philip Hales takes time out to pose during the final round



Graham Royden, St George's Deputy, chats to Andrew Miller



Iain Gunn chats to a scoreboard carrier



Gavin Robson. Followed by a film crew!

LAKE LINERS

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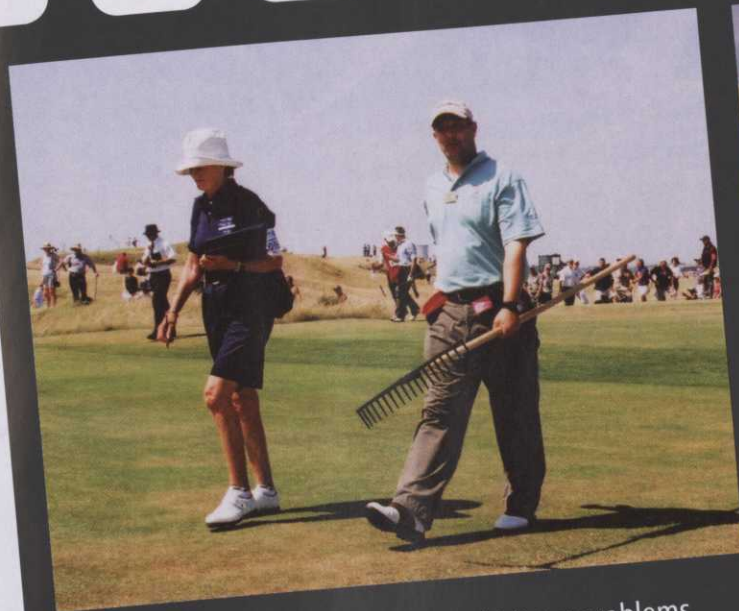
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Stuart Hogg before he encountered blister problems



Neil Burchett, John Keenaghan and Alan Magee watch how it's done before they set off!

He then took time out to speak to Louis, signed his programme and autograph book.

"When he left he said goodbye to Louis, who was still in a daze, so I told him that Tiger was saying goodbye. He turned round and Tiger gave him a little wave and said "Bye Louis". He was absolutely stunned and couldn't wait to get back to school to tell his pals. He'll remember the moment forever, and so will I," said Graham.

- The 2001 Champion, David Duval, was watching St George's Assistant Andrew Howarth, hand watering the 11th tee on Tuesday afternoon.

"It was late and the green wasn't clear and he was waiting so I asked if I could pose for a picture with him. I took off my sunglasses and said I knew he never took his off but he whipped them off and went 'Da! da!' We took the picture and he then asked if he could operate hose. He was very good, had a good arc but asked what would happen if he put too much on. I told him he'd be playing it."

- Alan Halfyear raked for Ben Curtis in the third round and learned before it became known in the Media Centre that he was using John Bickerton's caddy who'd called IMG when Bickerton had failed to qualify and asked if they knew of anyone looking for a caddy.
- Ben Curtis' father, Bob, is Superintendent at Mill Creek Golf Club, in Ohio. Ben's parents weren't at the Championship but were looking forward to watching the final stages on satellite until it broke down. They listened to their son clinching The Open on radio!

- Andrew Acorn, of Acorn Equipment, got closer to the action even than the Greenkeeping Support Team. He caddied for Tony Sproston, a qualifier, who was out in the final game on the Thursday and as a result was one of those who had to return early on Friday to complete the final two holes. Tony missed the cut but gave Andrew the thrill of a lifetime particularly as they were partnered by one of the up and coming stars of the game, Australian Matt Goggins, who finished fairly high in the field.

Andrew also managed to pick up a new nickname while in Sandwich when the other caddies christened him The Squirrel.

Ping sponsored the Great BIGGA Bunker Competition this year for the first time offering a wonderful wedge system to the press person and Support Team Member who was closest in his or her prediction as to how many bunkers were found during the course of the Championship.

The winner of the press prize was Sue Montgomery, of the Independent on Sunday with Paul Jenkins claiming the BIGGA prize.

Paul was only two out with his estimate of 2125 but spare a thought for Gavin Kyle who was also only two out with his guess of 2121 - a margin of error of less than 0.25 only to lose out on a card play-off when the daily estimates for the first three days was taken into account.

Daily prizes of whisky were won by Gideon Brooks, of the Daily Express, who won the first two and was equal first on the third day but the Editor decided to give the third day prize to Philip Reid, of the Irish Times to preserve Gideon's liver.

The Support team whisky was won by George Pitts and Bert Cross, on the first day (tied); Bert Cross on the second and Mark Lewthwaite on the third.

Our thanks go to Ping for the generous sponsorship of this well established Open competition.



Head Greenkeeper, Neil Metcalf, demonstrates how he wants the bunkers raked during the Wednesday evening meeting



The Home team

BUNKER HISTORY

Year	95	96	97	98	99	00	01	02	03
	St A's	Ly'm	Troon	B'dale	C'stie	St A's	Ly'm	Muirfield	St G's
Bunkers	112	185	84	117	115	112	197	148	106
Rd 1	214	501	344	355	539	148	557	359	388
Rd 2	201	577	272	406	468	164	547	372	405
Rd 3	130	269	107	226	202	65	224	175	149
Rd 4	156	271	136	153	265	71	257	169	181
Total	701	1618	859	1140	1474	448	1585	1078	1123

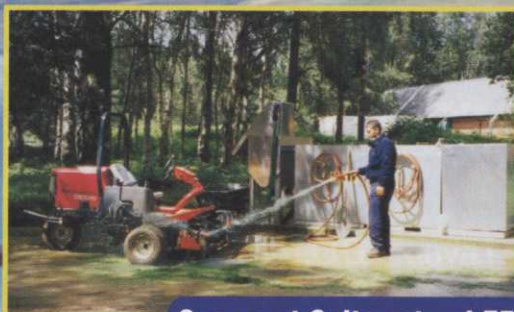
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Where Does the Wash-Water Go?

By Dave Moore Clerk of Works at STRI

Groundwater Regulations have been introduced recently in the UK in response to the EC Groundwater Directive. The legislation is directed at controlling pollution of groundwater, with special emphasis on drinking water. The impact of this new legislation will be far reaching as, for example, it places a limit on Pesticide contamination of one part pesticide to 10,000,000,000 parts water. The Environment Agency advise that just 250 grams of pesticide could be enough to exceed the permitted limit in the whole of London's water supply. With water consumption projected to increase at 2-3% per annum over the next decade it is essential that we preserve this fundamental resource to conserve it and avoid polluting it.

In the past decade the quality of our rivers and coastal waters has been transformed by major investment in wastewater treatment, but increasing knowledge is highlighting new threats. There are concerns that the quality of water in the natural environment is declining. Pollution, depletion of water resources, climate change and bad planning decisions are all contributing to a deteriorating water environment. Nitrate and pesticide levels in many British waters, both ground and surface waters, are increasing. This pollution means that as well as harming the water environment, water companies have to clean pesticides and nutrients from drinking water before supplying to consumers.

The Joint Agency Groundwater Directive Advisory Group (JAGDAG) has been established to consider whether substances fall into any of the generic groups of substances in Lists I and II and also to consider whether the toxicity of specific substances in List I meet the criteria for low toxicity to enable them to be considered in List II. List I substances must be prevented from entering groundwater, and List II substances must be controlled to prevent pollution of groundwater. Oil, grease, petrol and diesel are classed as hydrocarbons and all fall into List I. All pesticides are classed as either organohalogen or CMT (carcinogenic, mutagenic or teratogenic) and are also categorised under List I. Ammonia, nitrites, nitrates, and biocides are categorised under List II. To ensure that the environment is protected, there is a European Commission proposal to make polluters pay for remedying the damage they cause. This means you, and your employer could be held liable for all the environmental damage caused.

We are all responsible for our environment in ensuring that the risk of pollution is minimised. One of the concerns that should be ringing alarm bells with anyone who uses grounds maintenance equipment is the effluent produced when washing off after use. The responsible person should have carried out a risk assessment, identified what is potentially in the washings, where the washings go, and evaluated the potential risk to the environment. Wash-off water from the daily cleaning of equipment contains contaminants such as oil, grease, diesel, petrol, detergents, top dressing, traces of chemicals and fertiliser, as well as the large collection of grass clippings, which are nutrient-rich containing around 5% nitrogen.

This wash-off effluent enters either sewers or sumps, ultimately ending up in watercourses and rivers. But how many greenkeepers are aware of where the drain goes which carries all the machinery wash off? Is it a foul-water or surface-water drain? It is illegal to discharge anything but clean water down a surface water drain, as you get from a downspout from the gutters of your buildings. Furthermore you must have a licence to discharge wash off water down the foul-water drain. It has also been noted that some use another illegal dumping area for foul water, by having



A stream contaminated with oils and clippings from a wash off pad
(Courtesy of Tim Earley Waste2Water Europe Ltd)

a wash off pad that slopes away so that effluent eventually reaches a surface waterway. The aim of wastewater treatment is to discharge treated wastewater with minimal impact on the receiving watercourse.

Guidelines are clearly defined by the Environment Agency in their Pollution Prevention Guidelines (PPG's). The guidelines are an introduction to both pollution prevention and are produced by the Environment Agency for England & Wales, the Scottish Environment Protection Agency (SEPA) and the Environment and Heritage Service in Northern Ireland.

Equipment available for pre-treating wastewater on the scale required on a sports facility includes sealed septic tanks, oil-water separators, evaporators, and biological treatment plants.

A Septic tank is a multi-chambered system, which retains sewage from a property for sufficient time to allow the solids to form into sludge at the base of the tank, where it is partially broken down. The remaining liquid in the tank then drains from the tank and is usually disposed of by soakage into the ground, provided that the disposal does not generate a pollution risk to surface waters or groundwater resources (underground water). Environment Agency consent may be required for a discharge to a soakaway. Areas of heavy clay, steeply sloping sites or sites where the water table is less than one metre below the bottom of the soakaway are not suitable sites. Clean, uncontaminated roof or surface water must be excluded from the septic tank as this effectively reduces the tank's capacity and can cause solids to be flushed out of the tank, contravening the Agency's consent and impairing the efficiency of the soakaway. Septic tanks must be desludged and serviced every few months to ensure their effective operation. This work is expensive, and must be carried out by an operator registered by the Environment Agency for the handling and

Where Does the Wash-Water Go?



disposal of such waste. The main problem with septic tanks is that they fill very quickly when washing off equipment with copious amounts of water. Further information can be obtained from The Environment Agency's PPG 4 (Disposal of sewage where no mains drainage is available) <http://www.sepa.org.uk/guidance/ppg/pdfs/ppg04.pdf>

Oil-water solids separators generally used a coalescing medium, which encourages the oil to float to the top of the water where it is skimmed off into an oil decanter. This is then ready for safe disposal with your waste oils and lubricants. The system has been available in the UK for a number of years now, and is well suited to washing down garage service areas, lorries, and heavy earthmoving equipment, but is not designed to be used for treating pesticide rinsings, or remove nutrient-rich grass clippings. Even if you use an oil/water separator, where both basic and enhanced oil separators are designed for the settling of heavy solids and separation of free hydrocarbons, it does not have the technology to deal with:

- Chemical contaminants such as, pesticides, fungicides, herbicides etc.
- Emulsified hydrocarbons (resulting from the addition of detergents or any water miscible compound, including heavy metals and totally dissolved solids (TDS).
- Biochemical Oxygen Demand (BOD). The amount of oxygen needed to degrade the organic matter contained in effluent biologically. The BOD is determined by the level of organic matter in the discharge into a watercourse. If the nutrient level is too high, the bacteria and other micro-organisms expand rapidly. In turn this uses up the available oxygen supply causing fish and other aquatic organisms to suffocate.

Evaporators are designed to heat large metal drums in an insulated chamber, thus evaporating off the water and allowing further contaminated wash-water to be added. Eventually the drum becomes full of a solid dried material that you would then seal and dispose of through a registered waste trader.

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