

# Get Your Water Away

James de Havilland inspects the equipment currently on the market to aid in house drainage work.

Even the best courses can have problems with drainage. To help, there are several items of kit that can help produce effective DIY solutions. It is all too easy to get tripped up when writing about golf course drainage. The way in which courses have evolved, and more recent developments in how they are constructed, means there is no definitive 'right way to do it' drainage blueprint. Then there are issues to consider that will include soil types, slopes, run off areas, collection points, irrigation systems, water tables, lakes, ponds, water courses, effluent control, underground services, disruption of play, budgets, available labour; the list can be endless.

So first things first. The aim of this article is not to give a potted history of golf course drainage. Nor is it going to attempt to suggest the right and wrong way to deal with problems on an otherwise well drained course. The idea is to outline some of the equipment that is available to help a club tackle some of its drainage problems in house, with an overview of how they operate.

Starting with the basics, any drainage system will only work if water is able to reach the drains. This is pretty obvious, but it is all too easy to blame drainage when it is in fact compaction that is the cause of the problem. If water is puddling in areas that where once free draining, the first job is to find out why. All fairly obvious, but it is all too easy to overlook the impact year round mowing can have on a course that was once left pretty much mower free from October to March. Year round play does not help either.

Digging a neat small hole with a spade can help identify if there is a compaction layer and its depth. Regular spike tests can also help spot when a problem is building. It follows that knowing how the soil profile is altering is a key to understanding what work will be needed. Assuming compaction controls and aeration measures are all up to snuff, the next issue is ensuring any permanent drainage system is running freely. Again, pretty basic stuff, but it is surprising how blocked and collapsed drains can be missed when seeking to remedy a problem. Drain jetting seems to have gone out of fashion, but it can be an effective in both curing a problem and pinpointing where a drainage pipe is blocked or damaged.

With the basics in place, supplementing an existing system with additional drainage need not be difficult or costly. All a drain does is control the height of the water table to prevent the top layer of soil remaining saturated in wet conditions. Any water above the level of the water table established by an existing drainage system needs to be able to drain away via a medium that can be a slit or trench backfilled with sand, gravel or purpose developed material such as Lytag.

The simplest tools that can be used to create backfilled drainage slits are sand/gravel band drainers. These include the AFT Sandbander, this unit comprising a 1.0cu.m stainless steel hopper and hydraulically powered

vibrating single filling blade that can create a 25mm wide slit to a depth of 250mm. Twin leg variants also being available. AFT recommend the use of sand for this type of work, the unit consolidating the infill to prevent voids and to leave a firm, level finish. Shelton also offer a single leg slitter and hopper unit, but describe it as a gravel band drainer. Again, the tool produces a slit, which can be 25mm wide, and will deposit a band of kiln dried sand, gravel or Lytag at depths adjustable from 100mm to 350mm.



A basic pedestrian trencher, such as a unit from Barreto Trenchers, will be priced from £5,500, with a four-wheel drive model costing near £9,000. This type of machine is ideal for work that can include installing irrigation pipe, pedestrian control going away with the need to tie up a tractor.

For either type of blade slitter to work effectively, ground conditions need to be just right; too wet and there is a risk of damaging the turf and smearing the soil; in clay this can lead to lateral compaction. If the soil is too dry, the slits can be difficult to produce cleanly and the ground may be too hard for the blade to ease through the soil. It is for this reason the powered slitters are often seen as a more versatile alternative. As an aside, BLEC can fit its Groundbreaker slit aerators with a Sandhopper to produce four or more filled slits per pass. These units are claimed to be able to work in dry conditions.





Chain trenchers can produce a clean, narrow slot. This can be backfilled or used to install a drainage pipe. When spoil needs removal, think carefully about the trailers used to do the job. On the wrong tyres and liable to overload, a trailer can do tremendous damage.

Next up are machines like the Shelton System 25. In the place of a slitting leg is a powered trenching wheel. Again, this will produce a 25 to 95mm slit, with a working depth adjustable between 200mm to 400mm. A vibrating backfilling hopper is fitted, this allowing the slit to be filled with a drainage medium that can again include gravel or Lytag.

Unlike vibrating leg slitters, those with a powered trenching wheel can work in dry conditions, but are not recommended for use in soils that are anything more than moderately moist. In other words all types of 'light' surface 'micro' slit drainage needs carrying out at exactly the right time, but when the job has been completed there will be little surface damage, even to a green, with a good operator, and so play will suffer minimal disruption.

'Microband' drainage using sand, gravel or other infill medium will typically comprise slits of between 250 to 300mm in depth, with spacing at 400, 600 or 800mm centres. Buying a system will cost upwards of £8,500. Hiring in the equipment is possible, as is using an operator to do the job with their own slitter; Shelton suggest a green can be 'drained' by one of its operators using a powered slitter for around £650 with support from club staff.

Although the operation of these tools sounds pretty simple, getting it right takes

practice and good timing. A compact tractor of 20hp plus will be needed to power these tools, with wide, low inflation pressure tyres helping reduce the impact the tractor has on the playing surface.

Taking powered slitters one step further, Shelton and AFT also offer larger trenching units that can be fitted with soil removal elevators. AFT 'conventional' digging chain trenchers, such as its tractor mounted AFT 45 model, can be fitted with a choice of chain types or a Slitting Wheel alternative. There are also pedestrian powered chain trenchers available. These include machines from Barreto, Case, BT Trac Systems and Ditch Witch.

Trenching machines can do a great deal more than produce a 'slot' into which a drainage medium can be backfilled. They can be used to lay drainage or irrigation pipe as well as be used to install under ground services including water and electric cables. Although it is tempting to compare this type of kit with 'microband' drainage tools, the way in which trenchers can be used is different. For a start, a chain



Ian Marshall, Head Greenkeeper at Wellingborough Golf Club, has carried out in house drainage and irrigation pipe installation on the course at Harrowden Hall using an AF Trencher, AF45, fitted with a Slitting Wheel. A job quoted out at £50,000 was carried out using the pictured combination for around £15,000.





Tools such as the Shelton 'Microband' single leg gravel band drainer produce a slit between 6 and 25mm wide. Kiln dried sand, gravel or Lytag can be deposited in the slit, the depth of which can be varied from 100mm to 350mm. Soil conditions need to be right for this type of non-powered unit to operate correctly, ruling their operation out in dry conditions.

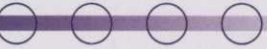
trencher such as the AFT 45 can produce an opening that ranges in width from 40 to 200mm and can be up to 1.20m deep.

The sheer volume of removed material that even a modest trencher can produce can mean there is a need for a secondary tractor and trailer to cart it away. This adds to the need to plan how and when to start using the equipment, with most courses using trenchers finding they are confined to winter project work.

Tractor mounted trenchers are not as easy to price up as all-in-one slit drainage systems simply because the list price will relate to the type of chain fitted and whether a soil removal elevator is also specified. As a guide, a basic AFT 45 frame is priced from £3,730 to which a digging chain, boom and crumbler assembly will need adding. These will be priced upwards of £2,400. Dedicated self-propelled trenchers, such as a 13hp Barreto Hydraulic Trencher, will be priced from upwards of £5,500. These units will dig down to 910mm and produce a trench from 100 to 150mm in width.



Carrying out any drainage related work needs careful consideration not only of the equipment, but the conditions as well. Note the large tyres fitted to the tractor. If the tractor wheels mark the turf, it follows that any work done to alleviate drainage problems will be compromised.



## DRAINAGE CONTACTS

**A.F.T. TRENCHERS**  
16-17 Addison Road  
Chilton Industrial Estate  
Sudbury  
Suffolk CO10 2YW  
T: 01787 311811

**BARRETO TRENCHERS**  
The Hire Supply Company (UK) Ltd  
Building No. 2  
Sheet Stores Industrial Estate  
Off Fields Farm Road  
Long Eaton  
Nottingham NG10 1AU  
T: 0845 309 0707

**BLEC LANDSCAPING EQUIPMENT**  
Company Ltd  
Global Centre  
Spalding Road  
Deeping St James  
Lincolnshire  
England PE6 8SD  
T: 01778 346222

**B-TRAC EQUIPMENT LTD**  
45 - 51 Rixon Road  
Wellingborough  
Northants NN8 4BA  
T: 01933 274400

**CASE TRENCHERS**  
L D Bourgein Oxford Ltd  
South Hinksey  
Oxford OX1 5AZ  
T: 01865 735420

**DITCH WITCH**  
Phoenix Way  
Garngoch Industrial Estate  
Gorseinon  
Swansea SA4 9WF  
T: 01792 895906

**LAND DRAINAGE CONTRACTORS**  
**ASSOCIATION**  
NAC Stoneleigh Park  
Stoneleigh  
Kenilworth  
Warwickshire CV8 2LG  
T: 01327 263264

**SHELTON SPORTSTURF DRAINAGE**  
**SOLUTIONS**  
Baumber House  
Baumber  
Horncastle  
Lincolnshire LN9 5NF  
T: 01507 578288



# Drain or Drown

David Shelton grabs his umbrella as he looks at the advances in drainage techniques.

The very mention of installing drainage on golf courses conjures up for many pictures of upheaval and disruption lasting weeks or even months. It was not that many years ago but drainage technology and equipment have made rapid strides in recent times. Disruption is too strong a word to use, inconvenience would be more appropriate and is now measured in days.



A Supertrrencher installing a 80mm diameter piped drain. There need be no disruption. The trailer has to spread the weight and the 4 wheels in line protect the turf

As with so many facets of modern living, technological developments have reduced costs overall rather than increased them. The approach to installing drainage has to change too. Beloved by the senior member of the Green Committee the herringbone layout, which he remembers from his younger days, has no place on today's fairways. He would frown on small diameter pipes, not realising that they may be more effective than pipes two sizes bigger.

As an example let us consider the drainage of a fairway and green that has many wet places during the six months of winter. The grass is noticeably poorer in the very wet areas and on the greens, such much so that a temporary green is generally in use. The members are not happy and the greenkeepers complain of equipment getting bogged down. The consensus of opinion is that the very wet patches must be drained.

It's decision time! Is it to be an overall scheme or just in selected areas? Time and time again I hear stories of how one wet area was successfully drained only to find another wet area appeared a little distance away. So

frequent are these happenings the only way to please everybody one has to be by formulating an overall drainage scheme.

As a general rule, the lateral drains will need to be a maximum of 10 metres apart across the fairway. They will probably be 60mm diameter land drainage pipes, installed snugly in the trench which has been dug 78mm wide. The depth may be of the order of 500-650mm. No permeable fill is placed under the pipe but will be placed over the pipe and brought close to the surface.

These pipe trenches may be topped with free draining sand, or a free draining loam based compost, which is then seeded. Better still is to turf over these 60mm wide scars with matching turf. If there is no natural fall across the fairway then the laser-guided trencher will ensure that the pipes are laid on a suitable gradient. These laterals in turn will flow into a main drain sited off the closely mown area. In this way the connecting sites, which cause the biggest scars, are less conspicuous. Nowadays drainage water is too valuable a product to waste, so the designer should consider where and how best it could be stored.



Fastflow 3 tonne capacity gravel backfiller places permeable fills at fast walking pace; no spills, no wastage



Depending on the annual rainfall, the pattern of that rainfall and the soil types, pipe spacing of 10 metres may not suffice. The spacing can be reduced to seven metres or even five metres but the budget may not allow this. Hence it is commonplace to superimpose a secondary drainage system over the piped system in those areas that are particularly wet. To spread expenditure this may be done at a later date.

Of the several secondary systems from which to choose lets concentrate on three. Slit trench drainage, synonymous with sand slitting, consists of 50mm wide trenches 250mm deep and spaced two or three metres apart. Running at approximately 90 degrees to the drainage pipes they are backfilled with gravel and topped with sand. They are effective but have drawbacks in that they leave noticeable scars down the fairway. They may need topping-up once, twice or even three times, which not only adds to the cost but also more importantly delays the rehabilitation process.

Should one purchase the specialist equipment and do it yourself or should one use a specialist contractor? What about hiring in the specialist equipment or hiring with skilled operator? Every drainage scheme is different and the various alternatives should be considered at the planning stage. One route that finds favour with those on a tight budget is to engage a contractor to install the pipes and hire or purchase equipment for the secondary drainage.

Do not underestimate the amount of materials that have to be handled. In digging a trench 200 metres long, 110mm wide and 600mm deep, 13.2 cubic metres of soil are extracted. In the loose that is approximately 20 cubic metres. In weight terms, of the order of 20 tonnes, this has to be handled and carted away in less than an hour. This trench has to be backfilled with permeable fills totalling a similar gross weight. If the trencher is laying pipe while it digs then 40 tonnes may be handled in under 60 minutes.



Gravel Band Drainage - equally effective on a green as on a fairway



25mm land drainage pipes fits into a trench narrower than a golf ball



Carrying out drainage operations in the winter months and using trailers with unsuitable wheels and tyres can easily rut fairways and surrounding areas. Undertake drainage in the drier months.

Now that waiting lists and joining fees are, for the majority, a thing of the past the golfing fraternity naturally move to the better drained courses. To remain viable golf courses on the heavier soils have to make good drainage a priority. With today's low rates of interest taking out a loan for such improvements can be a cost effective option. So what are you waiting for?

David Shelton heads Shelton Sportsturf Drainage Solutions. The company can be contacted on 01507 578288.