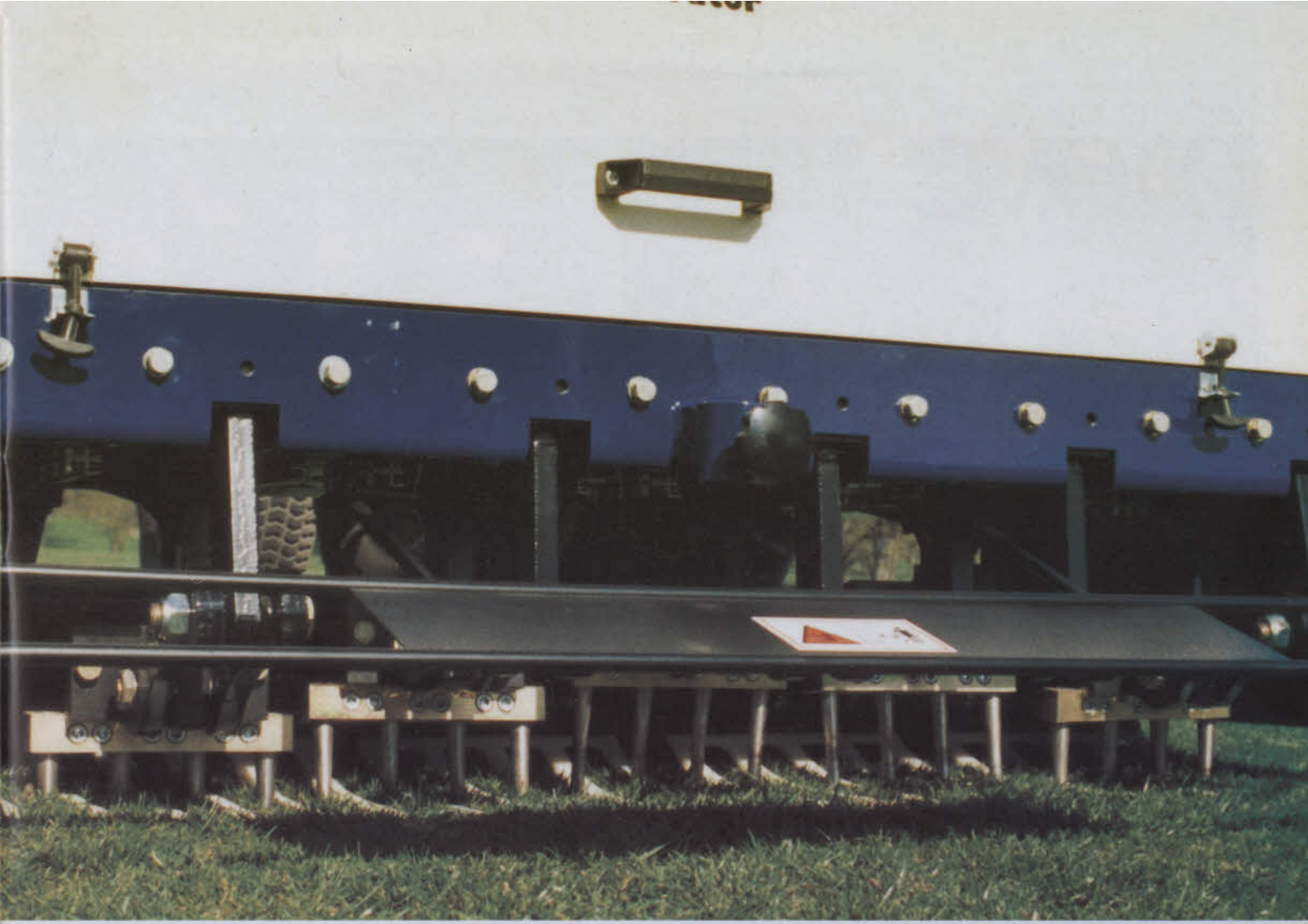

Roland Taylor takes a look at aeration and the developments which have made it such a technically advanced operation...

Making the earth move

Aeration – the dictionary defines this as "to supply or impregnate the soil with air", but traditionally this is not what is actually done by most equipment that carries the title of 'aerator'. What in fact is carried out, is the opening up of the soil to allow for the passage of vital elements to create healthy growth.

Soil basically only provides a support and anchor for plants, the important part in its structure is the gap between each particle. This determines how much water, air and nutrient reaches the roots and thus controls their development. Tightly packed particles restrict growth, cause drainage problems and minimise the amount of air and nutrients that reach the plant.

Making the earth move

The result is poor turf that is highly susceptible to disease and which cannot sustain heavy traffic.

The free movement of water is vital. Where soil has become compacted the flow is drastically reduced and in severe cases water runs off the surface and is completely wasted. In these situations the plants quickly become starved. Alternatively, saturation occurs leaving the plants standing in stagnant water which is far from conducive to healthy growth.

In an ideal world, the answer would be a friable soil structure that allows the root systems to develop freely and has a constant supply of all the plants' requirements. In addition, it needs to contain plenty of micro-organisms to deal with the rotting down process of organic material.

Unfortunately, there are many outside influences that affect this balance, a major one being compaction. To help alleviate this problem, engineers have devised a wide range of machinery that is now readily available.

Somewhere at some time a greenkeeper discovered that by periodically sinking a fork into a green there was an improvement in the turf - aerating had been discovered to be beneficial.

Throughout their development and use the one underlying factor is the amount of disruption they cause to the golfer and no doubt over the years some heated discussions have taken place between golfers and greenkeepers.

Needless to say, manufacturers have addressed this problem and introduced machines to minimise the affects on the playing surface. This has led to some interesting developments in recent years, more of which later.

Tines

There are basically three types of tines: solid, hollow and chisel. It is their depth of penetration and how they are propelled introduced into the ground that will vary between each piece of aerating equipment. These machines also fall into three categories: pedestrian, tractor-

mounted and self-propelled units.

Initially, and still on many models today the penetration is achieved simply by weight, but during the '70s a new concept was launched. This consisted of tines mounted on a series of arms that were power-driven by a crankshaft. It was found that it worked on hard compacted soil, which had previously been virtually impenetrable.

Hollow tines

These are mainly used where it is necessary to change the soil composition or to help with the removal of thatch. The frequency of treatment has to be carefully monitored as soft playing surfaces can result from excessive use. Mini tines are available for dealing with thatch and also re-seeding.

The biggest problem when using hollow tines is clearing up the resulting cores, although there are machines available to speed up this operation.

Dig deep

When hand digging the earth is lifted before being turned over. This process effectively opens up the soil and was the principle used in the development of the Verti-Drain. The system had some distinct advantages over what had previously been available. Using a heave and lift action meant minimum surface disturbance and it worked down to a maximum depth of 40cm. This machine continues to play an important role in modern turf management practices.

Air Pressure

Getting closer to the true definition of aeration is the use of compressed air. This is best suited to selected problem areas such as wet or dry spots. Air under pressure creates a mini earthquake loosening the soil and opening up fissures and cracks. Small polystyrene beads can be injected into the soil to provide support to aeration and the help the percolation of water, oxygen and fertiliser. The probes can be used at any depth down to 1 metre, although above 250mm there is a possibility of surface damage. This type of unit is fairly specialised so is usually hired complete with operator. There are, however, some pedestrian models available which may be worth considering if one has this type of persistent problem.

Water Pressure

In recent years we have seen the introduction of high-velocity water injection systems. The water droplets travel like minute bullets into the soil and fan out to maximise their affect. The units operate to a depth of 10cm to 15cm and down beyond 51cm if required. They leave virtually no mark on the surface, so play is not interrupted. Chemicals can also be introduced into the root area using this method.

Making the earth move

For more information about aeration and aeration products contact:

Risboro Turf: 01844 274127
C+P Soilcare: 01449 741012
Multi-Core: 01937 843281
Greensward: 0113 267 6000
Sisis: 01625 503030
Twose of Tiverton: 01536 511243
Turf Care Purchasing: 01903 203242
Charterhouse: 01428 661222
Lely: 01480 476971

Surface break-up

Especially during long dry spells a hard crust forms beneath the turf and stops the ingress of water, air, fertiliser and top dressing. This can be kept open by regular use of a spiked roller to gently break up the surface.

These are available for use behind a tractor or as a pedestrian model for greens.

Suck or blow

A system that may be the way forward for many courses uses the existing drainage system to either blow air into the root zone, or suck water and air down from the surface. Developed by a Course Superintendent at Augusta National, this greens management system could have distinct advantages.

One drawback is that not all greens have a suitable drainage system and it also has to be borne in mind that, while it may help with the compaction problem, it is still necessary to use other equipment to alleviate it.

Conclusion

The advent of more people taking up golf plus, in many cases the commercial aspect (minimal loss of green fees) has placed increasing pressure on both the playing surfaces and greenkeepers.

For many, compaction is a major problem that will not go away and regular aerating is necessary as part of a turf management programme if it is to be kept in check. In recent years there have been some significant changes (suck or blow) in the approach to the problem which may prove to be the answer for some courses. The quest to find the ultimate answer continues.

In the meantime greenkeepers will find plenty of equipment available that will help them to have some control over the situation and benefit the turf.