

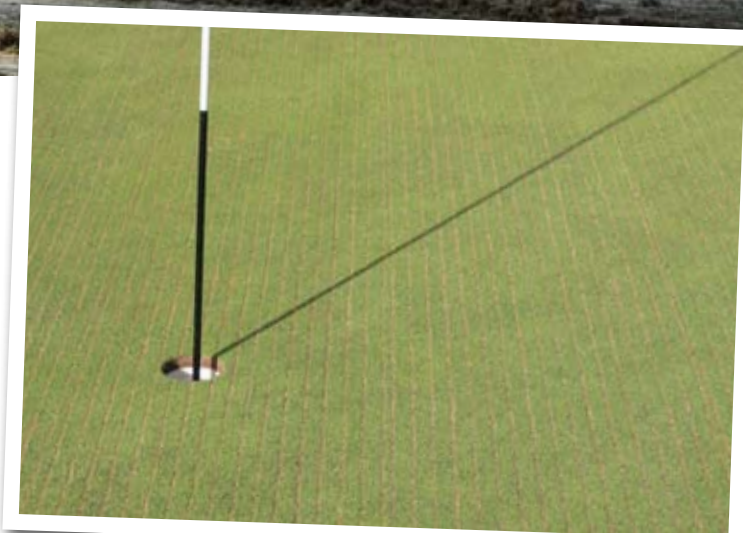
James de Havilland takes a closer look at the intricacies of current machinery

The anatomy of...



Graden Contour Sand Injection

The modern game, be it golf, bowls or even croquet, has seen players become accustomed to faster and more consistent playing surfaces. Among the techniques that can help 'firm up' a green is sand injection. Here we take a look at the pedestrian operated Graden Contour Sand Injection unit.



There is nothing complicated about the Graden Contour Sand Injection. In simple outline, think scarifying blades, sand and seed hoppers and a nominal half-metre working width.

The blades cut a 3mm groove of up to 40mm in depth, while simultaneously filling it to the top with sand and, if desired, grass seed from the seeder attachment.

The seed flows through tubes to land in the sand and is claimed to provide the ideal growth medium. The process is not difficult to understand in other words.

As is so often the case of course, the thinking behind the Graden is the result of a great deal of development work, the system taking several years to evolve into the units now on offer.

In outline, the machine traces its roots back to the original pedestrian Graden GS04, the sand injection element having been developed around six years ago, with the availability of the Seeder Attachment following on some five years later.



On a golf course a bulk load of kiln dried sand will be less expensive but must be kept under cover and dry. A typical golf green will consume between 1 to 2.5 tonnes of sand depending on depth, all delivered through the 'small' 75kg hopper

As the Graden Sand Injection has evolved, so too has understanding of how to get the best from what it has to offer. Training is needed in order to operate the machine to the best of its ability. Good logistics and team work are also essential throughout the operation.

In outline, there needs to be a means of bringing the kiln dried sand to the Graden. For a bowling green it is probably easier to buy sand in bags and have them stacked near the green to enable the Graden to be topped up as required. On a golf course a bulk load of kiln dried sand will be less expensive but must be kept under cover and dry at all times. A typical golf green will consume between 1 to 2.5 tonnes of sand depending on depth, all delivered through the 'small' 75kg hopper.

The sand used for this operation must be kiln dried sand as any other type will not fill the grooves in thoroughly and this is vital. Any 'hole' left in the surface of a green by any machine will result in a further

build up of organic matter in that area. By using kiln dried sand, the grooves are more likely to be completely filled, which is key to the success of the process.

The next point is 'cleaning up' behind the machine. The removed organic matter from the scarifying process needs to be carted off, either manually or using a core collector. The Sand Injection operation can then be followed by using a smooth roller to iron the surface of the green which puts it back into play immediately.

So why look at the Graden in this way as opposed to running through its mechanical elements in the normal way of these articles? The answer is that it is all too easy to look at the Sand Injector as a tool and not delve into the process itself and, of even greater importance, what it can achieve. The latter is covered in a separate box, but the key point is that this method of removing organic matter and firming up playing surfaces has evolved.

User experience

Kim Blake, Course Manager at Fulford Heath Golf Club, Warwickshire, has been using a Graden Contour Sand Injection for three years. Prior to having a demonstration of the machine Kim admits that he was not impressed by the reports he had read on the machine. Now he is a convert, suggesting one pass with the Graden firms the greens as much as three hollow core passes.

"To be honest, I did once say I would never use a Graden," said Kim.

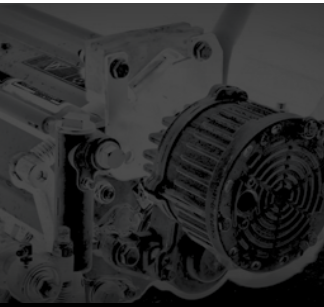
"Getting approx two tonnes of sand into a green using a pedestrian Graden with a 75kg sand hopper calls for a lot of work. Now, with five of us on the job, we can treat a green and have it back in play in 45 minutes. The system has firmed up our greens and works well."

STRI Trial Results – Organic Matter Control 2010*

Dr Ruth Mann BSc (Hons), MSc, PhD, MBPR of the STRI conducted Organic Matter Control Trials throughout 2009 and 2010. These were conducted over 90 replica trial plots upon which all forms of aeration were carried out to include hollow tining, micro tining and the use of the Graden Contour Sand Injection. The results showed the Graden Sand Injection system reduced the organic matter in the top 25mm of the test plot turf by 60%.

As part of the trial, the STRI also monitored the effect of various systems on a number of golf courses. In the case of the Graden, the selected courses were Sand Injected both at the beginning and the end of the year. A 30% reduction in organic matter in the top 25mm was recorded, suggesting the Sand Injection system reduced organic matter by at least 15% in one pass.

*Data supplied by R and K Kensett according to STRI trials



**Step-by
-step
Analysis**
Graden
Contour
Sand
Injection



The Graden sand hopper holds 75kg of kiln dried sand. A typical golf green will consume between one to two tonnes per treatment depending on depth, a good team perhaps completing a green in under an hour.



Available in 1mm, 2mm and 3mm widths, the 17 tungsten tipped 210mm blades are spaced at 30mm to give a working width of 510mm. The organic matter removed by the blades needs to be cleared away - a point to consider when working out how long it will take to complete the operation.



Powered by a 20hp Honda V-twin, the Graden Contour Sand Injection can be fitted with a Seeder Attachment. This allows seed to be sown while sand injecting. On a typical golf green, sole Graden Importers R and K Kensett suggest users are sowing bent seed at rates of 5g/m² when using the process in optimum conditions.



A simple screen is used to filter material entering the Graden sand hopper which requires a dry, free flowing in-fill material. This can include soil amendments such as Zeolite, porous ceramics (Profile etc) and Diatomaceous earth (Axis). Users suggest forcing clumps through the screen can cause blockages, the best approach being to allow anything that rests on the screen to either fall through on its own or be discarded.

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The working depth is determined by using the Height Adjustment Pivot Bar, the blades working down to a maximum of 40mm. Sand Injection with the Graden is designed to compliment hollow coring and not replace it.



The Seeder Attachment is designed to cope with small grass seeds, including bent varieties. To get the best establishment, soil temperatures of 100 plus typically promote strong germination and seedling growth.

When Sand Injection may help...

“The number one problem on most greens throughout Europe if not the world, is the organic matter content in the top 40mm,” said Keith Kensett.

“Organic matter content should be measured at two depths; the top 0-20mm and then from 20-40mm. If the organic matter problems are below 30mm it is beneficial to hollow core as well as Sand Inject, ensuring cored holes are backfilled evenly to the surface”.

Accurately measuring organic matter can help in working out what treatments will benefit a given playing surface. The accepted Industry Standard test will comply with ASTM F1647-02a. The STRI or any other accredited laboratory can carry this out. The test is carried out on a core sample taken at depths of 0-20mm and 20-40mm. Keith suggests that 90 to 95% of the time major issues are most likely to be found in the top 20mm.

The Graden Contour Sand Injection can be used at any time of year except when it is raining. With regards to the Seeder Attachment, soil temperatures of 100 plus are warm enough to promote germination. Obviously the warmer the temperature the faster the germination. Seed must not be allowed to dry out during the growing period and nutrient input needs to be monitored. According to Keith Kensett, Graden’s global technical advisor, germination can take place between 5 to 7 days if conditions are right.

STRI TRIALS SHOW THAT GRADEN CONTOUR SAND INJECTION PROCESS:

- Removes and replaces 10-12% of the playing surface in one pass
- Reduces organic matter by at least 15% in one pass
- Allows overseeding at a reduced seed rate

GRADEN CONTOUR SAND INJECTOR – OUTLINE SPECIFICATION

- Engine** Petrol Honda GX620 20hp v-twin with electric or recoil start
- Transmission** Fully hydrostatic forward and reverse
- Tyres** Front 16x6.50 8 Turf Pattern Tubeless
Rear 9x3.50-4 Slick Pattern Tube Tyre
- Blades** 17 x 210mm diameter with 8 tungsten tips
- Blade Width** 3mm, 2mm, or 1mm
- Blade spacing** 30mm
- Sand capacity** 75kg
- Working depth** 0 - 40mm
- Working width** 515mm
- Overall width** 103cm
- Length** 120cm
- Height** 123cm
- Weight** 290kg
- Retail price** From £11,250.00+ VAT

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