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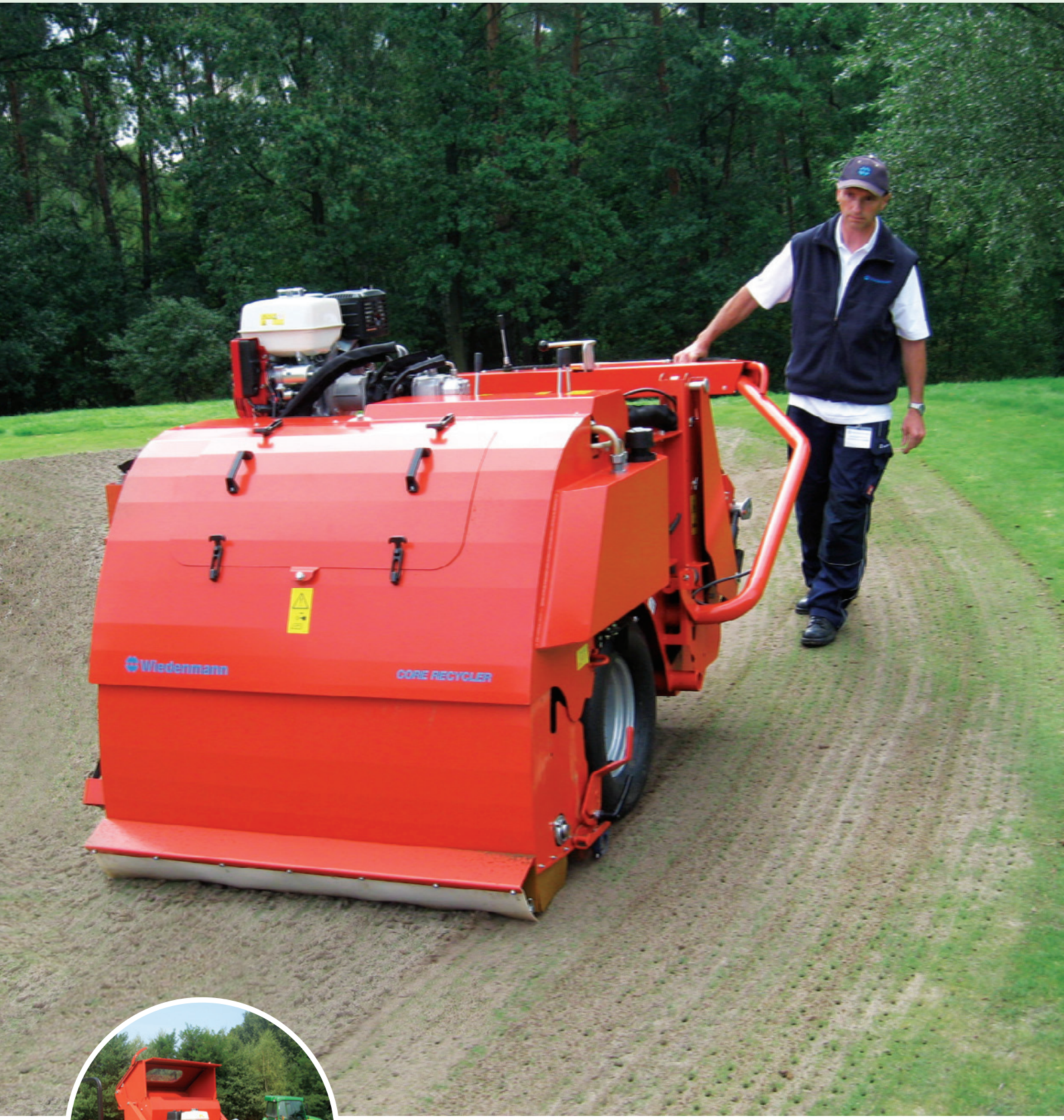
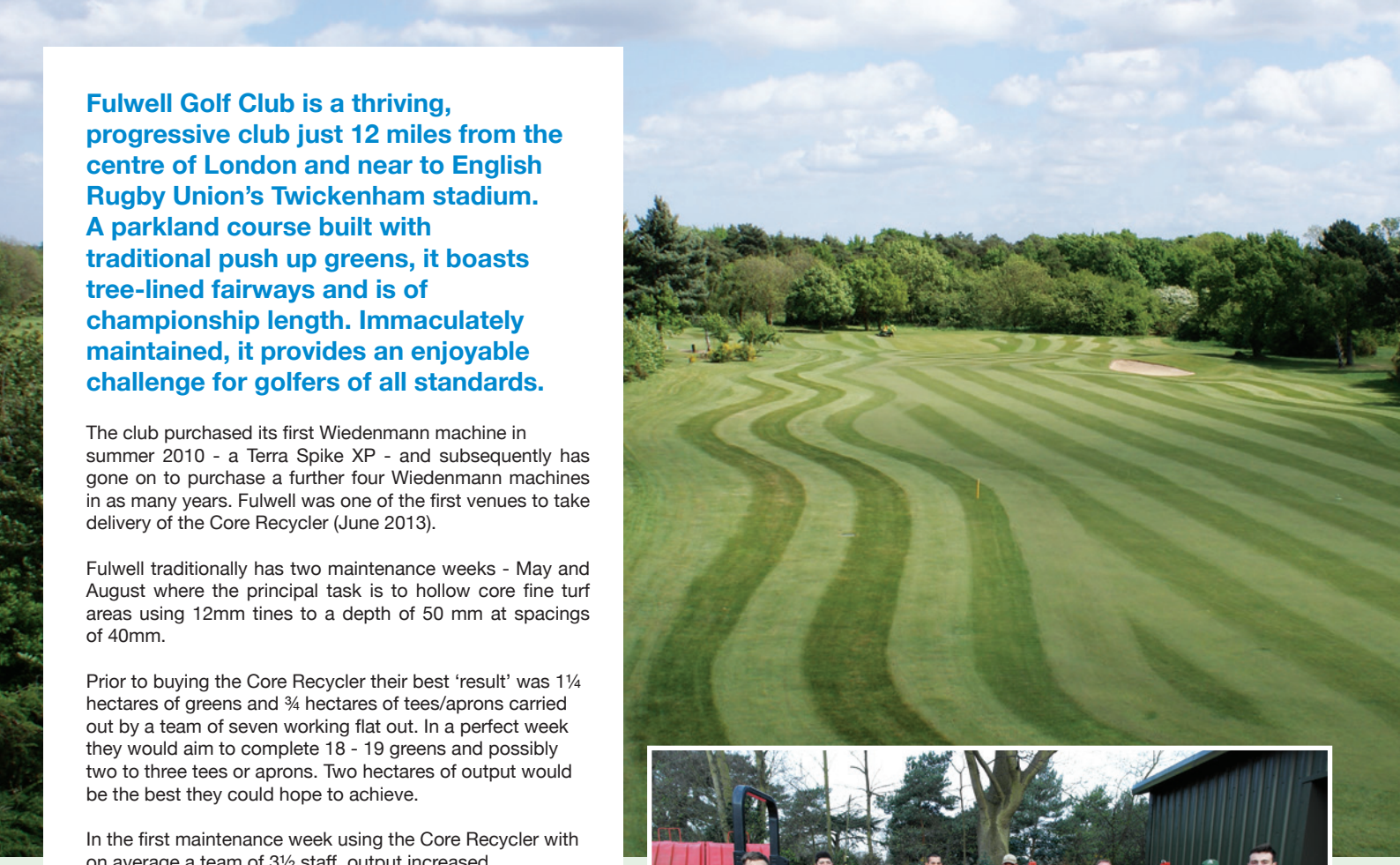


CORE RECYCLER **CASE STUDY**



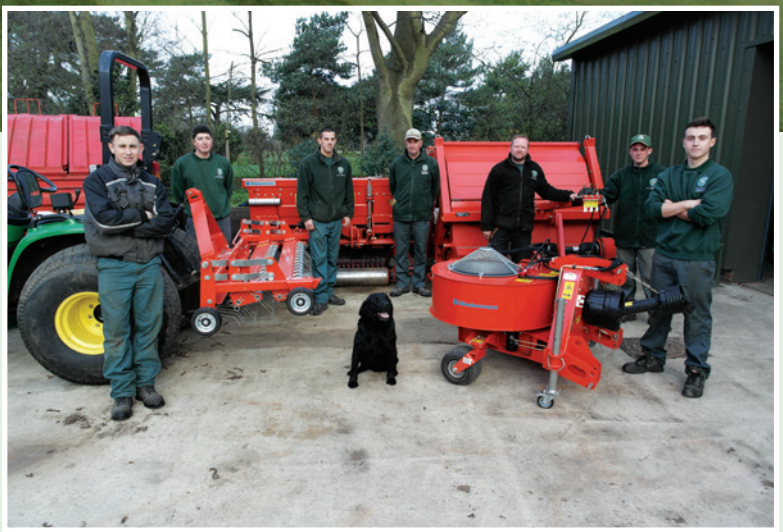
Fulwell Golf Club is a thriving, progressive club just 12 miles from the centre of London and near to English Rugby Union's Twickenham stadium. A parkland course built with traditional push up greens, it boasts tree-lined fairways and is of championship length. Immaculately maintained, it provides an enjoyable challenge for golfers of all standards.

The club purchased its first Wiedenmann machine in summer 2010 - a Terra Spike XP - and subsequently has gone on to purchase a further four Wiedenmann machines in as many years. Fulwell was one of the first venues to take delivery of the Core Recycler (June 2013).

Fulwell traditionally has two maintenance weeks - May and August where the principal task is to hollow core fine turf areas using 12mm tines to a depth of 50 mm at spacings of 40mm.

Prior to buying the Core Recycler their best 'result' was 1¼ hectares of greens and ¾ hectares of tees/aprons carried out by a team of seven working flat out. In a perfect week they would aim to complete 18 - 19 greens and possibly two to three tees or aprons. Two hectares of output would be the best they could hope to achieve.

In the first maintenance week using the Core Recycler with on average a team of 3½ staff, output increased dramatically. They completed 20 greens, all 18 teeing areas, some of which have four or five separate tees, (¾ hectares of tees), 1.2 hectares of aprons, and a hectare of run offs. It took just that initial week for the Fulwell squad to become comfortable and competent operators.



Impact of the Core Recycler at Fulwell GC

	TIME	STAFF	COVERAGE	METHOD	COST OF TOP DRESSING	COMMENTS
May 2013 **'Before the Wiedenmann Core Recycler'**	5 days	7 persons	2.0 ha (1.25 ha greens, 0.75 ha tees and aprons combined).	Hollow tine then apply new top dressing form ordered supplies. Discard cores.	55 tonnes sand purchased @ £36 / tonne for use on 1.25 ha greens.	At maximum output.
August 2013 **'After installation of the Wiedenmann Core Recycler'**	5 days	3.5 persons	4¼ ha (1.3 ha greens 0.75 ha tees 1.2 ha aprons 1.0 ha run offs).	Hollow tine then recycle > 50% of indigenous top dressing back into turf surface.	20 tonnes purchased @ £36 / tonne for use on 1.3 ha greens.	Potential for more output.

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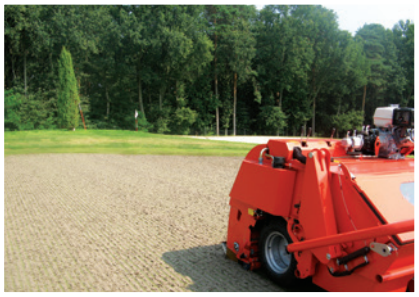
How it was achieved

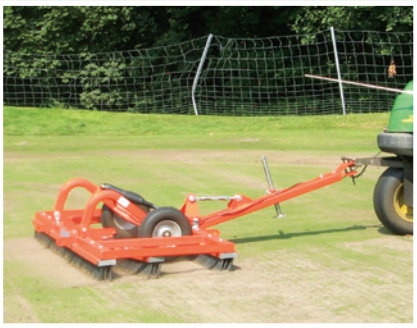
At the start of each session the greenkeeping team hollow cored the fine turf to 50 mm depth and then left the cores sufficiently long for moisture to evaporate naturally.

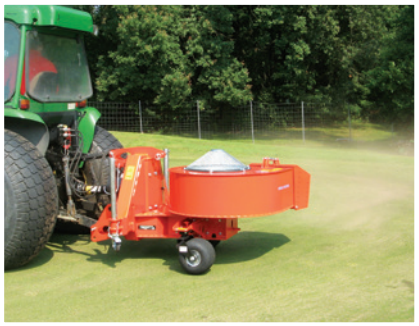
The Core Recycler lifted the cores with the four internal rotating sieves at the heart of the machine separating the fibrous content from the sand/soil mix. More than half the material lifted was returned to the surface.

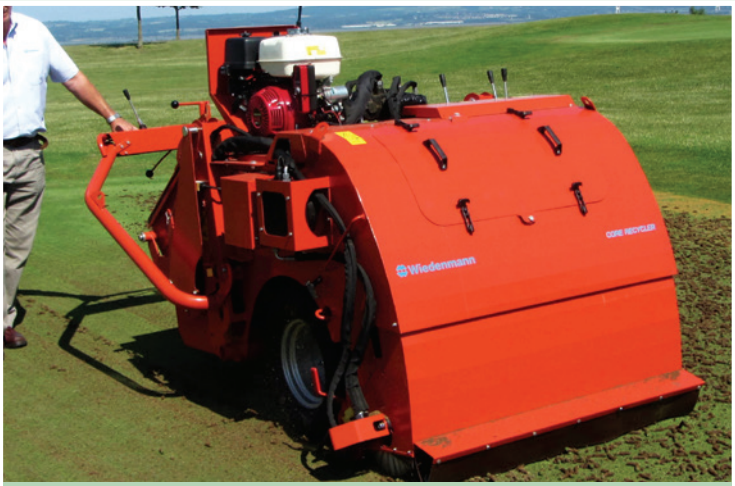
At this point two of the Fulwell team were assigned to operate both the Mega Blower to remove debris and Terra Brush to work in the "good" part of the recycled core back into the surface.

Finally a dressing of sand was applied and brushed into the surface to complete the process and fill in any remaining holes.









Height adjustable rollers make the job of either lifting or recycling cores smoother.

A typical 'before' and 'after' representation of the work of the Core Recycler. On the LHS is a full size hollow core collected from the surface. On the RHS it has been lifted by the Core Recycler, processed through its sieves. Now only the fibrous content of the core remains and at a glance it can be seen just how much of the core is returned to the surface.

A mid-stage photo of the Fulwell operation: here NO further dressing has been applied other than what has been recycled and brushed in, easily over 50% of the tine holes have been filled.

The ameliorated route

The team at Fulwell was operating in very dry conditions so decided against sanding prior to recycling. However, in different conditions for example, they would have dressed the surface with sand prior to coring. A very interesting theory is to top dress first before coring. The recycler then lifts both the cores and top dressing, all of which travels through the sieves of the recycler and is then returned to the surface in a "mixed" state.

This shows a typical ameliorated mix. The surface has been dressed first, then cored, then the sand and cores are lifted together as one. Once they are sieved through the recycler this resultant quality mix is returned to the surface.

Specified for either low or high dump collection the Core Recycler makes for fast straight forward emptying.

Close up of a single pass with the recycler fitted with solid tubes in the sieves thus performing as a collector rather than a recycler.

Showing some of the green still to be recycled. A clear picture of the recycled passes.

A handful of recycled cores after passing through the sieves showing the separated thatch content.

Paul Brown, Course Manager, Fulwell Golf Club, Middlesex gives his view:

"In a very short time we've found the Core Recycler to be absolutely indispensable. We were stunned at just how much it achieves relatively effortlessly. Genuinely, we more than doubled our output using half the team we did before and we hardly broke sweat.

Before the new machine we only ever budgeted to hollow core in maintenance weeks. Knowing the Core Recycler's capabilities now I see huge opportunity. It's game on throughout the year for places where we would never ever have considered anything beyond low cost operations like thatch control and scarification. We got such a handle on the Core Recycler after that initial maintenance week that we will use it on areas looking outward from the greens. It's free hand now to do what we like… everything obviously as long as we don't upset the putting surface.

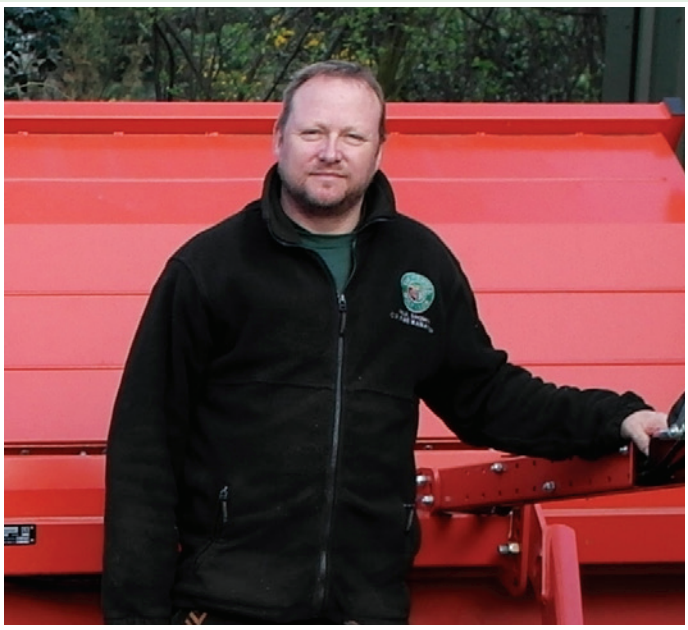
Take the tees and approaches - most clubs, including ours, even though we are fairly affluent - could never ever consider buying in £5000 - £6000 of top dressing specifically for these areas. We still can't, but what I can do is hollow core. This will be hugely beneficial with the Core Recycler recycling that material back into the tees to help surface levels. That is something we are actively going to look at doing… for tees, probably hollow coring four or five times a year and the aprons the same amount.

Prior to the Core Recycler, if we were going to hollow core those areas, pick up the cores and throw them away that would have a large cost attaching. For our tees I would guess about sixty tonnes every operation and not be just sand at £36 a tonne but higher grade material at £48 per tonne every six weeks of the growing season. This [way] enables us to do an operation when we like when before it wouldn't even have been a consideration.

Going forward we know for a fact that if you aerate greens on a more regular basis the soil biology improves. Just the fact that you can 'churn' soil then recycle it by topping it back up and keep moving back down towards the sward adds benefit. It's all enormously positive. I am guessing the more that you hollow core and recycle and keep churning the soil backwards and forwards through its profiles it will lead to things like fertiliser inputs dropping and irrigation requirements dropping.

Before the advent of this new technology one of the big contradictions for me was that we were spending our £36 per tonne on top dressing greens and nursing it to a state where it was biologically active in the soil - having come in sterile... We would put on bio-stimulants or until recently beneficial fungai and bacteria. What we were doing was working really hard, spending a whole lot of money building up the soil biology so it works in a symbiotic relationship with you and the grass plant. Then what do you do? You come along, hollow core it and throw it all away and then replace it with sterile material again… It just didn't add up.

If we use the machine at the rate I think we will use it then it will be 5 years by the time the machine is paid back. But of course in that 5 year period it is not actually going to have a 'hard' life. There will be so much more life left."



Paul Brown, Course Manager, Fulwell Golf Club, Middlesex

"We're recycling easily 50% if not 60% of the cores back into the surface. If you look at some of the bigger clubs who set aside a budget of £10,000 - £15,000 a year on top dressing alone - they've got big savings to make. Not to mention all the additional work it can be doing. After four years the machine is effectively paying ***you*** to work!"

Where the team at Fulwell will make savings in their maintenance week:

- 125% improvement in output (up from 2.0 ha to 4.5 ha)
- Up to 233% saving on staff.

  Instead of deploying seven team members for five days, Fulwell averaged 3.5 people on each of the five days. Next time round Fulwell will manage this task with just 3 staff. This will mean that the new 'coverage' eg 4.5 ha will take the equivalent of 15 staff days, eg 5 days x 3 staff. Without the Core Recycler previously that would have taken them 35 staff days. Therefore Fulwell will be able to deploy their team to deal with other maintenance tasks.
- Previously the 1.3 ha exercise required 55 tonnes of sand @ £36 a tonne = £1980. With the Wiedenmann Core Recycler it cost just £720. However the saved top dressing costs were then used to widen the project to 4.5 ha.

Maintenance

The Core Recycler is cleaned every day after use. However the only wear that is likely to occur - in time - is to the brush heads so there is no complicated or expensive maintenance.