



# The Open 2013

## The greenkeeping story

STRI Turfgrass  
Agronomist  
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reflects on 2013's  
superb Open  
Championship  
at Muirfield  
and tells the  
agronomic  
story behind its  
success

**The 2013 Open Championship at Muirfield in July was certainly one to remember. Muirfield was in fabulous condition and the playing surfaces were the firmest and fastest in recent years and perhaps even in the history of the Championship.**

The firm, fast and bouncy conditions set a great challenge for the players. The leaderboard and Phil Mickelson's eventual win suggested

that the traditional links conditions challenged and identified the best golfers in the world.

The warm and dry weather played a major part in the story of The 2013 Open but so did the agronomic quality of the course, combined with the skill, judgement and knowledge of the greenkeeping team headed by Course Manager Colin Irvine. This article starts to tell the greenkeeping story of what was a truly memorable Championship.

Since 2009, STRI have a team of four at The Open to take a range of objective measurements from the greens and other parts of the course. We measure firmness, speed, smoothness and trueness of the greens, along with the firmness and soil moisture of selected green aprons and fairways.

We begin this process on the Tuesday before official practice and continue up until the Championship ends. The detailed information

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striking and accurate positional play. The surfaces should remain receptive to a well struck shot taken from tight fairway lies but release those that are poorly struck or taken from the rough. In essence, well struck shots are generally rewarded and poorly struck shots are punished.

Now that we use the Clegg Impact Hammer to measure surface firmness we can put a number on this. The target is to achieve Clegg Hammer values of 100-130 gravities. However, since testing began in 2009, a run of successive wet Opens has meant the top end of this range hadn't yet been tested.

The achievement of target firmness is all about the condition of the underlying soil profile. The desired level of surface firmness cannot be achieved if the soil profile is failing and too moisture retentive. So, the focus in the years leading up to The Open involved regular sand top dressing to regulate organic matter content and create a sandy, dry and free draining soil profile.

Sand top dressing was applied to keep organic matter to 4-6% and 0-20 mm and less than 5% lower down. Due to the intensity of sand top dressing, organic matter was in the perfect place for The Open.

Careful management of organic matter to reduce moisture retention was one part of the strategy to optimise surface firmness. The other part of the strategy involved consolidation of the soil profile by regular rolling and targeted aeration.

Objective measurements and bespoke research carried out by STRI in the years leading up to The Open demonstrated that the soils were a little loose and there was a significant difference in firmness between trafficked and non-trafficked areas. The trafficked areas were firmer and supported tighter soils, with a higher soil bulk density, whereas non-trafficked areas were looser and slightly softer. To provide optimum levels of firmness, we needed to carefully manage soil moisture but also improve the consolidation and bulk density of the soils.

The strategy to improve the consolidation of the underlying soils

involved a programme of regular rolling combined with routine hand mowing. From early April, rolling was implemented two to three times a week with the Tru-Turf roller.

This operation intensified in frequency through the spring and daily operations were implemented in the final four to five weeks before the Championship. In addition, from mid-April, all mowing was carried out with John Deere 180 hand mowers and the frequency intensified throughout the spring.

Daily operations were implemented from mid-May until the Saturday before official practice began. The squeezing and soil consolidation effect of rolling and hand mowing was probably most effective during early to mid-June when a period of wet weather occurred which increased soil moisture values.

During the latter stages of preparation, careful regulation of soil moisture via specific wetting agent use and accurate irrigation inputs, aided with the regular use of a Theta Probe soil moisture meter, was the plan. The initial target during May and June was to maintain soil moisture around 12-15% (weather permitting) and to retain strong and healthy growth to facilitate the necessary sward refinement operations.

During mid-June, the firmness values were 119 gravities at a soil moisture content of 14% - progressing nicely towards the target.

As the Championship moved closer, the aim was to reduce soil moisture values further to optimise surface firmness and reward accurate ball striking. It was possible to reduce soil moisture without compromising sward health and ball roll qualities.

This was due to root development being deep and strong, and the fact that browntop bent and fine fescue dominated the sward. On 10 July soil moisture values were 9.2% and surface firmness had increased to 132 gravities. These values were the firmest achieved since objective testing began at The Open in 2009.

In the last seven to ten days leading up to and then during the Championship, soil moisture measurements were taken from all

provided informs and supports the decision making process regarding daily course setup. It also provides an accurate record of the performance from each Open and the standards achieved. This allows assessments of what worked and what didn't and drives a constant culture of learning for the future.

Very firm surfaces are at the heart of links golf and The Open Championship. The aim is to provide very firm surfaces that reward clean ball

greens twice a day. From this information, green specific irrigation inputs were calculated and applied.

The aim was to ensure sufficient moisture was applied to keep the surfaces healthy, and to ensure that the surfaces were uniform and very firm to provide the optimum challenge to the players. It was also important to ensure the visual presentation of the greens were authentic to the warm and dry weather conditions encountered in the weeks leading up to The Open.

Accurate measurements of soil moisture were a crucial part of this process, combined with the incredibly skilful implementation of hand watering from the green staff. This was top class greenkeeping in action. At the start of The Championship, surface firmness was 147 gravities and soil moisture values were 6.5%.

As the greens became firmer and drier, ball roll qualities continued to improve. Due to the relatively benign weather forecast for the Championship, it was possible to safely generate additional green speed.

The aim was to achieve speeds of 11ft for the start of play. On Thursday morning, the average speed was 10ft 11in following a double cut at 4mm and Tru-Turf roll.

Green speeds had consistently increased by 2-3 feet during the course of the day throughout the practice rounds, and the forecast suggested a similar trend would be sustained. So, the firmness and speed of the greens were set for a challenging day of links golf.

Thursday certainly developed into an interesting day. It was particularly sunny with a warm and drying westerly breeze. Temperatures increased slightly higher than predicted with a maximum of 27°C and very high solar radiation. Records from the Muirfield weather station showed it was in effect the warmest and sunniest day in July and one of the most extreme days of summer weather for several years.

These conditions, combined with footprinting from play, desiccated the sward and gave the greens a particularly glassy appearance.

The resultant effect was significantly greater increases in speed during the day and some particularly challenging conditions for the golfers during the latter part of the afternoon.

Contrary to the comments from some players, the greens were certainly not dead!

The greens became very quick, especially in areas of high foot traffic, which inevitably meant the area





around the hole. While the surfaces were quick, there was never any suggestion of play having to be suspended.

To reinvigorate the sward and replenish lost soil moisture, hand watering was accurately and expertly delivered overnight.

Soil moisture measurements from each green were taken along with spatial measurements to each individual surface. The plan was to increase soil moisture levels slightly in comparison to the previous day in order to retain moisture within the leaf for longer and therefore provide a better balance of speed between the morning and afternoon. The amount of water applied was minimal and amounted to 1-1.5 mm.

As moisture increased to 8.7%, excellent levels of surface firmness were retained at 147 gravities and green speeds were set at 10ft 2in for Friday morning. As with Thursday, the greens dried out similarly through Friday but not to the same extent. Speeds increased by 2-3ft during the course of the day.

For the weekend, the objective was to set the course up in a similar way with very firm greens and speed

increasing during the day although not to the extent of Thursday and Friday.

It remained crucially important to ensure the visual appearance of the greens were consistent and authentic to the warm and dry weather received.

A further 1-1.5 mm of irrigation was delivered by hand. As the greens did not dry as much during the less extreme conditions on Friday, soil moisture values were 10.5% for Saturday morning, with firmness values of 138 gravities and green speeds of 10ft 4in.

Although firmness had been tempered slightly, they were still the firmest and indeed driest greens in recent years for The Open.

Again, on Saturday, the greens picked up significant pace during the course of the afternoon.

The same programme of irrigation was repeated on Saturday night for the final day of play and almost exactly the same conditions in terms of speed, moisture and firmness were presented on the morning of the final day.

Unfortunately, the weather didn't develop as predicted with tempera-

tures peaking at 19°C and solar radiation 50% less than Thursday. This meant the greens didn't dry as they had on Thursday, Friday and Saturday so speeds were slightly slower on Sunday compared to previous afternoons.

Achieving firmness to the greens was of course important but it was essential to match the firmness values of the green aprons and indeed fairways to those of the greens. To achieve this level of consistency, selected green aprons and fairways were selected for Clegg Hammer and Theta Probe readings to accurately inform the necessary maintenance operations.

In the 10-14 days before the Championship, verticutting was carried out to the aprons to refine sward density in addition to careful regulation of irrigation and regular rolling. By the start of practice, the fairways were consistent with the green aprons and the green aprons were perfectly consistent with the greens.

They remained this way throughout the Championship due to careful regulation of soil moisture. It is this level of refinement and

#### about the author



#### Richard Windows

Richard is Agronomy Service Manager for STRI working from a Glasgow base. He has worked as an STRI Agronomist for 13 years. A major part of his work is to provide agronomic advice and support on behalf of The R&A to all Open Championship venues in Scotland, a role he has carried out since 2003. In addition to this work he has helped develop the STRI Programme Agronomy Service and was co-author of the Disturbance Theory.

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La Moye Golf Club

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*“Even with snow cover we achieved five weeks disease prevention.”*



**Stan Power**  
Head Greenkeeper  
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*“The greens treated with Medallion TL came through the harsh winter period with no signs of disease.”*

maintenance accuracy which highlights the value of objective measurements.

The 2013 Open at Muirfield was truly memorable. The agronomic and playing performance of the course was superb.

The course was kept as dry as was considered to be reasonably possible, resulting in the firmest and fastest Open greens in recent times. Accurate, objective measurements informed Colin Irvine in his decision making and the maintenance operations were superbly and skilfully implemented by Colin's team of dedicated greenkeepers.

Working with the Muirfield staff for two weeks, it was abundantly clear we were working with a team of greenkeepers at the very top of their profession.

Despite the agronomic challenges presented by the hot and dry conditions, the course was universally praised.

The quality of the leaderboard reaffirmed Muirfield's status as a superb golf course which presents its greatest challenge when played in traditional firm and fast links conditions.



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