Old Conna Golf Club

Overview of the Bunkers at Old Conna

April 2018

As most of you will no doubt be aware, during the past winter, we completed the re-design, refurbishment, refreshing of drainage, installation of Sportsbond liner and the installation of new sand in all our course bunkers.

This project took over five years in total to complete as it had to be executed on one of the busiest golf courses in Ireland with minimum disruption to play.

I would like to remind everyone of the driving force of the project, and why it was essential, that we undertake this work. Before work commenced it was common for the greenkeeper to arrive at the course, at any time of year, after heavy rain and be faced with numerous bunkers with up to a foot of water in them. (See pictures below) This water would take weeks to drain away naturally and it inevitably meant using external pumps to get rid of the majority of the water and subsequently extensive work by the staff to try and regenerate a partially playable bunker.

(Bunker at front left of ninth green)

(Bunkers at front of sixteenth green)

The sign “Bunkers out Of Play” became the norm not the exception in Old Conna during the winter.

Last but not least this meant that the greens staff were spending 20-25% of their available man hours trying to maintain the bunkers alone. Even with all this effort the quality of the product being offered to the members was far from satisfactory.

This whole situation was simply untenable so we bit the bullet and began the refurbishment project.

I do not want to bore you with all the details of what was involved here but I will list a few key critical elements that had to be addressed if we were to have any chance of success.

1. **The contours of the land surrounding the bunkers.**
   Golf course architects can get carried away with presenting golfers with a visually challenging golf hole. A thing of beauty to behold for sure, but to be honest, for the most part they give little or no consideration to the maintenance challenges they are creating for the poor greenkeeper whose job it is to maintain the fruits of their creative genius!
   In Old Conna a lot of the greenside bunkers were situated directly at the bottom of steep, up to 30 degree, slopes, in some cases.
   The inflow of water from the land was such, in a number of instances, that no drainage system would be capable of removing it.
   So, in these cases the surrounding land had to be re-contoured to direct the water around and past the bunker before any re-instating of the bunker could be considered. In some cases the only solution was to reposition the bunker completely.
2. **Drainage.**
   At the time this project began there was a pretty standard methodology for draining bunkers. You simply dug a cross shaped drain in the bunker and filled it as per a standard French drain with graded infill. If the bunker was near an existing course drain, or close to a ditch, you then connected your bunker drain into the most suitable adjacent drain or ditch. In the absence of a suitable drain or ditch (a most likely scenario with a fairway bunker) you had to resort to creating a very large volume, sump drain, either under the bunker floor itself, or external to it, if needs be. This is still the accepted methodology for bunker drainage today.

3. **Bunker Liner**

Until very recently bunker liners were a constant headache for course designers. After the drainage is installed you have essentially got a compacted soil base with a cross shaped drain cut into it. The question is how do I put nice new sand into this and protect it from getting contaminated by the dirty soil floor and how do I stop the sand blocking my drainage system. The most widely used solution to this problem was to line the bunker floor with a crushed fine stone powder and to compact this into the soil base and then put the sand in on top of that. More advanced solutions involved installing water permeable geotextile liners that were pinned to the bunker floor with pegs. The main selling point of these is that they were more effective in preventing sand soil contamination. The problem with the latter however is that they frequently became detached from the bunker floor either by a player playing a shot or by the maintenance staff trying to maintain the bunker.

Both of these approaches had the same major flaw. If water flows into the bunker it will usually pass through the sand to the bunker floor but it then has to flow along the bunker floor, to the cross drain, before it can exit the bunker. This action leads to the sand essentially being liquefied and its characteristics therefore mimic that of a liquid. It then tends to flow off the bunker faces and down into the centre of the bunker leaving the bunker face exposed. Subsequently when the greenkeeper tries to re-instate the bunker it will inevitably result in contamination of the bunker sand with soil from the bunker floor which will result in contamination and subsequent compaction of the expensive new sand.

Luckily for us, just as we began this project a major new innovation in bunker lining was just taking off. The essence of this new development was to line the bunker floor with a new porous liner that covered **the entire bunker floor** and was permanently fixed in place. There were a few variations of this approach but the same principle applied to all of them. The one we choose was developed by DAR Golf and it is in fact a porous concrete. Now most people do not associate concrete with porosity but this product was in fairly widespread use in roadworks construction, where it is used to allow water to flow off motorways, into underground drains, without having to use road grills for example. In simple terms if you mix sand, aggregate and cement you get standard concrete. If you omit the sand and get the ratio of cement to aggregate right you get, a concrete strength medium, with holes in it. Think of it as a two inch, concrete honeycomb. Now when the entire

bunker floor is lined with this solid porous honeycomb, and water enters the bunker, it passes through the sand directly into the porous layer and the water then flows freely, within the porous layer to the main bunker drainage. This has two very important advantages. It prevents sand liquefaction (developing the characteristics of a liquid) and the subsequent flow off the bunker face. In extreme conditions, for example, a thunderstorm, if some sand liquefaction does happen and there is slight wash down the sand can readily be repositioned from the bunker floor without any soil contamination.
Although we were among the early adopters of this new liner approach it is now the method of choice for practically all golf courses where bunkers are being refurbished. For example, Dun Laoighaire, The Castle, Edmundstown, Wicklow, The Grange, The Island, and Wentworth in the UK, and many many others have all adopted these new liners.

There is just one other thing to understand about this type of liner. It is often referred to as a ”dynamic liner” The reason for this is that the liner not only allows the water to drain freely to the bunker floor it actually sucks the residual water out of the sand above it also. This is just simple physics at work. If you imagine one of the pores is just a straight straw type pore running from the top to the bottom of the liner. Once this straw fills with water then when the water flows out to the bunker floor then this creates a vacuum above it which sucks residual moisture from the sand and results in the bunker sand drying out more quickly than normal.

Playability of the New Bunkers.
Anytime you renew sand in bunkers you can expect high levels of dissatisfaction from members. We were well aware of that and we did put out an advance warning to that effect but not surprisingly this cut little ice with the members when reality dawned. I don’t think this response is peculiar to Old Conna members. To be fair, even the most reasonable member, who finds that half of the time that their ball goes in the bunker, they finds themselves with a “fried egg” lie, is not looking for an explanation but more likely is looking for someone to “kill”.
The main problem when fresh sand is installed is that it is very difficult to compact it properly. You can use watering and mechanical whacking to improve compaction, but even with doing this, the degree of compaction is insufficient and the expected complaints will still flow.

To a large extent you are depending on weathering to get proper compaction, and unfortunately, this takes time. So how is this weathering effecting the compaction? Again this is down to a number of different processes happening concurrently. Ironically if you have not re-designed your bunkers properly, you will get quicker compaction, because you will get course wash down carrying soil fines into your bunker that will act almost like cement. Again if the bunker floor is exposed and more soil fines are added to the sand, again quicker compaction. You will of course get wind borne soil fines carried in on windy days. You also have mechanical damage to the sand from players feet, shot playing, staff maintenance and even organic matter, grass seeds, leaves and a myriad of other sources of organic matter all acting in concert to improve compaction.

So by re-contouring the bunker surrounds to direct course run-off away from the bunkers and installing a fixed liner that avoids any contact between the sand and the bunker floor we have effectively removed the two primary causes of bunker compaction. Also not surprisingly wet sand is more compact than dry sand and we have installed dynamic liners that dry the sand out more quickly that old type bunkers.

But as a result of all this good work it is undoubtedly the case that the sand is taking longer to compact than normal and understandably this has led to some frustration from the members. I would like to reassure you that we are acutely aware of this and have not been sitting back congratulating ourselves on a "great job"

On the contrary we had the contractor back on site in early last summer to reposition, wet, and whack all the greenside bunkers to improve the compaction. This worked very well but after about six weeks of almost completely dry weather a lot of this compaction was lost again, so as expected, it was not a permanent solution.

In November- December we purchased our own whacker plate and the greens staff, in a quite labour intensive program, re-compacted all of the bunkers again. They are now at the level of compaction that I feel most members would appreciate. All is now good but I would again like to sound a note of caution. We are in winter the sand is wet, is easy to compact and is great right now but what happens if we run into a long dry spell next summer will they lose their compaction again?

There is every possibility that some of them will but it is unlikely that they will de-compact to the level we saw this summer. The greens staff have detected significantly different levels of compaction in the bunkers that were part of the first phase renovation, indicating that natural

compaction is taking place. Should there be significant loss of compaction next summer we are ready to re-compact them again if needs be.
It may surprise you to learn at this stage that we know we could get the bunkers to compact in a matter of weeks by introducing more sand fines into the existing sand if we so wished. So, well you might ask, why are you not doing this? Again I remind you of the problem we started with. If we were to do this you would be delighted, for maybe a year. The next year you would be complaining that they are too compact, and if they get too compact the drainage will be compromised, and we will be right back to where we started.
So we are, as in a number of greenkeeping challenges, trying to strike a balance between having bunkers that drain properly and that the staff can maintain on the one hand and that the members feel, offer a fair playing challenge, on the other. That is a fine balance to strike but we are confident we can do this to the satisfaction of the majority of members. But I would like to remind you there are no perfect, consistent bunkers.
They do not exist!
(See article by USGA, Bunker Consistency- Can you handle the truth, http://www.usga.org/course-care/forethegolfer/bunker-consistency--can-you-handle-the-truth-.html

Too Much Sand in the Bunkers!
I cannot finish this report without addressing this widely expressed view. Why would I, the head greenkeeper, our contractor and our consultant listen to this refrain for over a year and not act on it? If all we had to do was take some sand out of the bunkers and everyone would be happy why would we not just do it?
The reason is we KNOW there is not too much sand in the bunkers. That's the symptom, but it's only a symptom, and not the disease!
For as long as the modern bunker has existed the standard depths for sand in bunkers is two inches on the face and four inches in the base. Clearly these depths were designed to avoid players making contact with the bunker floor, regardless of the type of base or liner. It is simple maths to calculate the amount of sand needed. As a result of normal play and poor raking technique employed by members this sand distribution is regularly completely disturbed. It is the job of the greens staff to regularly re-establish this optimum distribution and present the

golfer with the optimum playability. If you like to understand just how critical the maintenance procedure is to presenting the optimum playing conditions in a bunker I would refer you to the following YouTube video https://www.youtube.com/watch?v=aDDqUdZ9axU&t=321s , which gives an excellent insight into bunker raking procedures.

We have neither added nor removed sand from the bunkers all year.
The greens staff recently, in late October, re-distributed the sand in all the bunkers as some of the bunker faces had well below the optimum two inches of cover. A number of members asked why we had put more sand into the bunkers just when they were compacting nicely. As I said already, no new sand was added and no sand was removed from any bunker, but inevitably when you re-distribute the sand you do disturb its level of compaction creating the impression that new sand has been added.
So to make this absolutely clear **there is not too much sand in the bunkers.**

Bunkers out of Play
It is the ambition of the Club, not surprisingly, that this situation should be the exception rather than the norm as it has been in the past, particularly in the winter. Since the bunker project has begun none of the newly refurbished bunkers have flooded during even the most severe rain.
You will however have noticed in recent weeks that the "Bunkers out of Play" sign has appeared on the starter's notice board. It all these cases the problem has been due to frost not water. In heavy frost the bunker floors freeze and are considered dangerous when in such a condition and they have to be closed as a result. Obviously, just like the rest of the course, the bunkers will thaw out during the course of the day. So if you are playing in the afternoon and see the bunkers in a perfectly playable condition please be aware that in early morning, when the course was opened, that was not the case and in competition all members must play the same course.

Summary
The bunker project is complete in that all the structural challenges of the old bunkers have been addressed and corrected. However there are two challenges that still remain in terms of achieving optimum playability of bunkers one is maintenance dependant and the other, less controllable, is weather dependant

It is inevitable that due to poor raking techniques employed by members that the sand will routinely have to be redistributed in the bunkers by the greens staff. This has been addressed by agreeing a standard operating procedure for how the bunkers are maintained by our staff. The weather dependent part is more of a challenge. If we get prolonged periods of very dry weather it may well be challenging for the maintenance staff to maintain compaction levels and sand depths on certain bunker faces in particular. We have plans in place to address this, should it arise, which should minimise the impact. However there is no guarantee, during such periods, that the greens staff will be able to maintain the desired levels of compaction in the sand at all times but you can be assured that it will not be from lack of commitment to the cause.

One last thing it is simply not possible to present bunkers that will guarantee that you will not get a fried egg lie. If your shot is coming in from 150 feet or more above the bunker with lots of spin, like on hole 12 for example the chances of ending up with a fried egg lie are very high indeed. That's golf.

I hope this communication will give members a better understanding of the challenges of presenting "perfect bunkers" all year round and help alleviate some of the frustration **that has to be endured** when a "fried egg" lie occurs!
Remember, bunkers are called Hazards for a reason.

Henry Doran
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