

# Beach Party at Spring Hill

By MIKE SONNEK

Assistant Superintendent, Spring Hill Golf Club

During the fall of 2004 at Spring Hill Golf Club we underwent an in-house conversion of our bunker sand. Many clubs have experienced the same complaints about bunker sand that we were hearing and so I would like to share with you the story of how we came to the decision to change the sand, our methods of doing it and the colorful characters that helped make this project such a success.

Spring Hill is a Tom Fazio designed golf course in Orono, Minnesota that opened in 1999. At time of construction, we decided to use a locally available masons blend sand in our bunkers that had a natural brown color and is similar structurally to the sand used in our greens mix. This sand has a physical description of being subrounded to rounded. We tested this sand for firmness with a tool called a penetrometer.

The measurement of 2.2cm/kg<sup>2</sup> classified our sand as having a slight tendency to bury the ball. This sand was less expensive than the alternatives and looked and performed well as long as it stayed moist. When this sand dried out it became soft and unstable, resulting in many plugged lies and poor playability.

It was always difficult to rake the sand smooth regardless of whether it was wet or dry. Within a couple of seasons we started to hear member complaints about the softness of our sand, the number of plugged lies and the inability to rake it smooth.

As with many Fazio courses our bunkers have a lot of contour with sloped sand faces that are difficult to maintain. The contours of our bunkers force us to hand rake because we are unable to enter our bunkers with a mechanical bunker rake. As a result the sand never became compacted as it would over time by using a mechanical bunker rake. Another factor that leads to bunker sand compaction is

normal subgrade contamination. We experienced virtually no contamination because during construction we treated the subgrade of our bunkers with a soil stabilizer called Klingstone. (For more



Using the conveyor to empty the bunker.

information on Klingstone you can refer to an article on the product in the Oct. 2004 issue of Hole Notes.)

In 2003 we decided to do some course bunker trials to compare different bunker sands side by side with our existing bunkers. We also wanted to let these bunker trials overwinter so we could make a fair comparison over a full season.

Initially we tried altering depths with our existing sand to see if we could reduce the plugged lies and improve the playability. We tried reducing these to 1" and 2" with nightly irrigation of .20". Plugged lies were reduced but we were unable to maintain any consistency at such shallow depths.

Furthermore, our bunkers were originally designed to hold 6" on the faces and 6-10" in the base. With this design we had to keep extra sand around the bunker edges to cover the lips. We found we were still having balls plug in this ring of deeper sand. Keeping less sand in the bunkers also made them more susceptible to washouts during rainstorms. Our second trial had a face depth of 2" and a base depth of

3" with .20" nightly irrigation. This sand played firmer but would soften when the upper 1" would dry out around noon.

Our third trial consisted of removing our original sand and replacing it with a 50/50 blend of our original sand and the Ohio Signature sand. The Ohio Signature sand is a 100% angular sand. Our hope with the blend was to improve the firmness and playability of the sand while still maintaining a natural color. Color was a major factor in choosing our original sand and we were hoping to avoid the contrast with the bright color of the Ohio sand. We maintained this blend at a depth of 1 1/2"-3" with nightly irrigation of .20". The sand maintained stability and we were able to rake it smooth.

The penetrometer value for this blend was 2.65 cm/kg<sup>2</sup> which is classified as having a low tendency to bury the ball.

We received positive feedback from the membership on the look and playability of the blended sand. The sand stayed firm even without the nightly irrigation. One of the drawbacks of the blend was that the two sands would tend to segregate following irrigation or rain with the fines settling out and the coarser material migrating to the top.

An additional drawback would be the expense because this sand would be a custom blend for our course. We also tried to create this blend by only removing half of the existing sand in one of our bunkers replacing the removed portion with Ohio Signature sand. We tilled the two sands together in the bunker until they were visually blended. We were hoping to be able to match the 50/50 blend while avoiding the cost and labor of completely emptying out the old sand and replacing it with the blend. We found it difficult

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to achieve a uniform blend. We were still getting 'fried egg' lies but not as frequently as with our original sand.

**Our fourth trial** was 25% of our original sand and 75% of the Ohio Signature sand at a 4"-6" depth. This blend stayed firm without any nightly watering but was noticeably whiter than our original sand or the 50/50 blend.

**Our fifth trial** was using the Ohio 50/50 blend sand at the 4" and 6" depths. This blend is 50% Ohio Signature and 50% Ohio 535 (100% semi-angular sand). The penetrometer measurement for Ohio 50/50 is 2.8 cm/kg<sup>2</sup> compared to the 2.2 cm/kg<sup>2</sup> of our original sand. This sand proved to be the firmest of all of our trials and also received positive feedback regarding playability.

The Ohio 50/50 is readily available so it would be less expensive than our custom blends. Some concerns we had from a maintenance perspective included the increased raking required to keep the sand from becoming too compacted, potential slower drainage in the future and the effect of this sand when it is splashed on the greens.

The Ohio 50/50 is coarser than our original sand and was very noticeable when splashed on the greens and would this structurally different sand lead to hard spots on the greens in the future? There was also the aesthetic question of how the white sand would affect the natural look we wanted for the golf course.

**After going through a season with our variety of bunker trials** it was determined that we would switch to the Ohio 50/50 blend sand based on its playability and its availability. This sand also has a good track record locally and nationally.

After evaluating the various expenses for the project including such things as sand cost, labor, rental equipment and other materials, we decided to do the project in-house. However, the only way we would pursue this is if we didn't compromise our normal course conditioning. We also wanted to minimize the impact of the project on the golfers so we tried to be working on only two holes at a time.

We wanted to be repairing and refilling the bunkers right behind the crew that was removing the old sand. With this approach we felt that we would be better able to control the project schedule and expenses by doing it in house. Therefore, our game plan was to bring in some temporary staff for roughly 10 weeks and rent

the necessary additional equipment for moving the sand around the course. The rented equipment consisted of a mechanical 25' conveyor to aid in removing the old sand, an additional skidloader, a tractor and trailers. We did purchase a trailer with a hydraulic lift so we could dump the new sand into the bunkers without having to enter them.

**In addition, during this process, we decided to do some contouring** around the bunkers for water diversion.

Depending on the grade surrounding the bunkers we would create channels and build up berms to keep surface water from flowing into the bunkers. We hoped that the combination of diverting the water before it reached the bunkers and having the full 4"-6" of sand in the bunkers would help reduce washouts from rain.

Towards the end of August we started to work on a couple bunkers to refine our methods and come to an estimate of how long the process would take. As I mentioned earlier, our bunkers are contoured so we are unable to enter them with large equipment. This meant we would need to hand shovel roughly 600 tons of our old sand out of the bunkers and a 1,000 tons of new sand back in! Our temporary workers would need to be some hearty souls.

**After cleaning out the bunkers we would repair any degraded lips**, clean out the drain tiles and reshape the subgrade to avoid having any bunker edges with more than a 4-inch lip. We didn't want to have any exposed soil lips that might degrade into the light-colored new sand. With a 4" lip and 4" of sand on the faces we would avoid the exposed soil edge. Many of our bunker lips were 6"-12" deep. To correct this we used a compactible sand/clay mixture to build up the subgrade in the areas where the lips were too deep. We would then treat these areas with the Klingstone soil stabilizer.

After the first two bunkers it was apparent the most time-consuming part of the process was going to be emptying out the bunkers. We contacted a temporary employment service to provide eight workers to come in and work on cleaning out the bunkers. Tuesday, September 7, would be the first official day of the project. Our goal was to finish by Halloween.

The sun was shining and it was a beautiful day to start our project. I was very enthused and looking forward to hit the ground running. My enthusiasm waned somewhat as only two of our eight temp workers showed up for our 8 o'clock start time. Two more showed up around 8:30.

We had our conveyor set up in a fairway bunker on hole #1. With the five of us working we had this bunker cleaned out in a couple of hours and proceeded to move the conveyor to the greenside bunker. At this point two of the four temporary workers had decided that they had had enough. Progress slowed considerably. After lunch another temporary worker decided to abandon the project. The crew was down to myself and Dave. Dave and I had struck up a good

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conversation during the morning work. I was impressed by his ability to accurately state the time of day based on the sun position in the sky. Dave and I looked at each other with the sweat rolling off of us and we came to the conclusion that this was going to be quite a long project if he and I were the only ones shoveling.

**Dave told me that he was a manager of a local baseball team, "Los Bravos," or The Braves.** He said that some of the guys on his team were looking for work and they would be reliable. I told him that sounded great and to bring them in.

**The next day we were joined by half of the team** as Dave brought six guys with him. Within two weeks the Braves were moving along at a terrific pace. They had quickly picked up on what needed to get done and were so reliable that I was able to break away and spend more time with our staff on repairs that needed to be done to our emptied bunkers and start getting them refilled with the new sand. We were able to draw from our seasonal staff to do most of the bunker repair work. We

brought in an additional six temporary workers two or three days a week to spread out the new sand and check for depths. This second group of temporary workers also did a very good job and helped move the project along at a good pace.

**By the first week of October we were on our last couple of holes** that had some bunkers that required reshaping. At this point we had moved roughly 600 tons of sand out of and back into the bunkers. If the weather held up we would finish by the end of October as scheduled. We had also amassed two huge piles of our old bunker sand. We wanted to incorporate the old sand into our fairway topdressing program in 2005.

We tried to keep it the sand clean when emptying out the bunkers but it was too contaminated to use for our fairway topdressing. Since we had such a large quantity of sand we hired a service to screen it for us. The sand was screened to 1/8" to remove mainly pearrock that had migrated out from the drainage trenches along with other miscellaneous contaminants such as weeds and soil clumps from degraded lips.

Some rain showed up in October to

slow us down a little bit but we were able to complete our last two holes that needed bunker reshaping.

**We finished the project on Friday, October 22,** a week ahead of schedule. Everyone was pleased with how the project went, especially the maintenance staff. The concern over the color of the bunker sand was alleviated when the membership liked the look of the new bunker sand with the contrast of the bright sand against the background. They were also happy with the firmness and playability of the new sand. This was a large project to take on in-house. With the way the project started I was anxious about how it would turn out. Without the dedicated efforts of our staff, Los Bravos, and our other temporary staff it would not have gone as smoothly. Whether you decide to contract out a project like this or tackle it in-house, finding good people for the job is the key. Some final numbers from the project:

Spring Hill staff labor: 1,160 hours  
Bunker crew (los bravos): 1,384 hours  
Additional temp. staff: 505 hours  
Ohio 50/50 sand delivered: 1,048 tons

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In the end we did end up leaning a little more heavily on our staff than we had planned. However a good portion of the hours were in October when our daily maintenance schedule allowed for some more flexibility.

**One week after we had finished the project we received a fast falling 2" rain.** In the past, with our old sand, this would have meant a full day of shoveling up washed out bunkers. You could see lots of smiles on the maintenance staff as there was nary a washout to be seen. The impact of our water diversion work and having the correct volume of a more compactible sand in the bunkers



*Creating a berm above the bunker to divert water.*



*Los Bravos*

showed an immediate benefit.

**There are many different ways to go about a project like this and have a successful outcome.**

This was just one example. Whether you contract out or tackle it in-house like we did, be sure to address any issues that may have a long term impact on your maintenance procedures. As long as you are working in the bunkers, this is the perfect time to do the necessary water diversion or bunker reshaping. If you have subgrade contamination, implement a long term solution whether laying down a mat or applying a soil stabilizer. The reduced maintenance hours down the road will make the extra effort during your renovation worthwhile.

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