

Life in the Bunkers

by Jeff Michel, CGCS

When bunker maintenance starts to consume more hours and dollars than greens maintenance it is time to take action. That is the situation that occurred with the fifty-nine (59) bunkers at Mount Vernon Country Club in 1998. The general membership was becoming displeased with the playability of the recently renovated bunker, inspired by the major inputs coming from the grounds department. Greens chairman Dennis Evenson placed the bunker tragedy as the most disappointing piece of our Master Improvement Renovation and charged me with developing a solution to the problem.

The bunkers at Mount Vernon were rebuilt from 1994 through 1997. The standard construction technique of coring out the cavity, compaction, installation of drainage was performed. The sand used in the bunkers had demonstrated good success at the club in the past and was selected again because of its consistent availability over a multiple year timeframe (a misjudgment of grand proportion). The bunker failures began to develop shortly after installation. Poor drainage characteristics began to develop. Erosion from the steeply splashed bunker faces added some of the fine marine clay soils to the sand exacerbating the problem. Compaction set in and black layer developed in the sand. Ponding occurred after as little as .1 inches of rain or medium irrigation application. Maintenance costs soared and employee moral was being challenged.

The bunkers became the number one topic of the membership. The inanimate object, sand, was detracting from the fine playing

conditions of the turfgrass. Debate centered on the fact that the bunkers are a hazard and playability is subjective. The fact that the bunkers played poorly and were a major maintenance drain could not be ignored. The greens committee decided that action needed to be taken immediately. The plan to correct the bunkers centered on several items:

- Selecting a sand that membership appreciated
- Selecting a sand that met physical properties and maintenance requirements
- Developing a method for keeping the soil from contaminating the sand

We decided that the best method for selecting a sand was to let the membership do it. We would accomplish this by replacing the sand in three high play bunkers on the course with new bunker sand. The sand would be selected from several options that were available in the Mid-Atlantic region. Samples of various sands were sent to me for review. All physical properties of the sands were evaluated prior to review by the greens committee. The committee settled on three sands that meet the physical property guidelines recommended for bunker sands.

The challenge of separating soil from sand was more interesting. Physical liners were used in 1983 when the bunkers were constructed. The liners succeeded in keeping the sand clean until a

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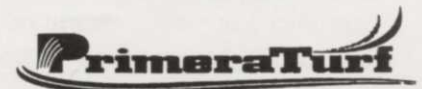
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bunker rake snagged the fabric. Afterwards, the bunkers became a mixture of sand and pea gravel and were unplayable. Add to the fact that the fabric inferred with play and became a hazard to golf, you can understand the membership resistance to adding fabric to the bunkers.

Enter polyurethane. I had saved a direct mail card from a company named Green Mountain International. GMI provided polyurethane to various industries to stabilize soils. A phone call and subsequent conversations with GMI revealed that they had a sprayable polyurethane that could line a bunker cavity quickly and easily. The liquid would saturate the soil and create a permanent physical barrier between the sand and the clay. Needless to say, I was intrigued by the possible application for the bunkers at Mount Vernon. Permanent separation of sand and clay that would allow the physical properties of the sand to remain intact longer, and no soil contamination. This resulted in better playing conditions. The cost of the material was

about \$ 1.00 per square foot applied in house. I proposed that we install the sprayable polyurethane in the three test bunkers the members were using to evaluate sand. The proposal was presented to the board and approval was granted.

We installed the test bunkers in April of 1999. The existing sand was removed and the drainage checked. The polyurethane was applied next. It was very easy to apply using a chapin 12 volt drum pump. We installed the sand about an hour after application. We monitored the three different sands throughout the 1999 golfing season. One sand stood out above the others for playability, the VFB Premium White. The activity of the polyurethane proved to be most interesting. Sampling the bunkers revealed a very hard barrier between the soil and the sand. This barrier became harder as time progressed. Irrigation or rainfall events did not adversely affect the position or playability of the sand. (Remember the two hurricanes in September, no sand slumping off of slopes and the bunkers were playable when the rain stopped!) I was impressed. Impressed enough to submit a request to replace all of the bunkers with the VFB Pre-

mium White Sand and use the Green Mountain Polyurethane as a liner.

The total cost of the proposal for replacing the bunker sand was \$152,000. This cost, coming on the heels of a 1.2 million dollar golf course renovation, was precarious at best. I can't give enough credit to green committee chairman, Dennis Evenson, for performing the necessary political activity to get the project approved. We scheduled the work to begin on September 27, 1999.

The key to a successful project is good planning and execution. The planning is the easy part, the execution can transform into a firing squad quickly without good people. I have complete faith in the maintenance staff at Mount Vernon Country Club. The crew is seasoned and wants to provide a good product. The project involved 1150 tons of sand in 59 bunkers. I planned to use 1900 gallons of polyurethane in the cavities. The logistics are as follows:

- Remove old sand.
- Clean and check existing drainline; make repairs as necessary.

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- Install polyurethane using various drum pumps
- Install new sand
- Spread new sand and open bunker to play.

The project was completed in nine working days with two days lost to weather and sand shipping delays. Disruption to play and the golf course was minimal. The general membership was amazed at the speed and efficiency of the operation. They even like the new sand!

The greens committee helped solve the number one concern at Mount Vernon Country Club and is focusing on other golf course issues. The Board of Directors enjoyed the fact that the project was completed ahead of schedule and \$14K under budget. As for me, life is just a little easier. The maintenance of the bunkers has been reduced 75%. We have had minimal erosion of sand in the bunkers, even on the steeply faced slopes. The polyurethane has prevented any soil contamination in the sand. We can leaf rake the bunkers to create a good playing surface. The bunkers can be skipped and still provide good playing qualities. The crew is happy, the members are happy, and I am happy!

There are several keys to successfully applying the polyurethane to the bunker cavity. Foremost, the soil in the cavity needs to be a dry as possible, and the surface of the cavity has to be conditioned to absorb the polyurethane. If the soil is too wet, you will not get penetration (the old oil and water don't mix theory) The polyurethane should be warm when applied because of viscosity concerns. Use multiple pumps to speed the rate of application. We also used

a drum transfer pump and it worked better than the Chapin pump mentioned above. Wear old shoes and a tyvek suit when applying the product. (Shoes absorb the material and become ruined) Finally, use plenty of pump flush to clean your pumps after application. This will prolong the use of your pumps.

If you have any questions about the project, or the ongoing analysis of the polyurethane, please feel free to contact me at any time.

2000 MAAGCS Calendar

December 2	Martin's West/Baltimore, MD MAAGCS Holiday Dinner Dance
December 12	Sheraton Columbia Hotel GCSAA Educational Seminar "Enhancing the Image of the Golf Course Superintendent"
December 12	Sheraton Columbia Hotel Annual Meeting & Elections
December 13	Sheraton Columbia Hotel GCSAA Educational Seminar "Bentgrass Management and Rootzone Maintenance"



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