



ON THE COURSE

By Dr. Wayne R. Kussow

Department of Soil Science, University of Wisconsin-Madison

This article deals with some issues and problems that have surfaced on golf courses this season. While some of the problems are undoubtedly weather related and may not reappear next year or the year thereafter, they are red flags that warrant thoughts of remedial action.

About a month ago, after some torrential rains, the issue of bunker drainage was aired on the Noernet. Questions arose regarding how to effectively tile drain bunkers. A quick search in textbooks revealed extensive discussions of the importance of diversion of surface water away from bunkers, but almost nothing on subsurface drainage. None of the authors pointed out that you cannot effectively drain bunkers that contain the oft recommended 4 to 6 inches of sand. That information came from Dr. Oscar Miles at the Merit Club. He pointed out that you need about 11 inches of sand over the drain lines if good drainage is to occur. Why is this?

Movement of water out of sand into pea gravel and then into a drain pipe involves movement from relatively small pores into humongous pores. In order for this to occur rapidly, two conditions have to be met. First, the water at the interface between the small and large pores must be at near zero tension. This condition only occurs when there is saturation of the finer-pored material. The second requirement is that there has to be a pressure that "pushes" the water into the larger pores. That pressure arises from the water in the pores in the sand. To get sufficient pressure for rapid water movement into the drain tiles, you need considerably more than 4 to 6 inches of sand. This, by the way, is why putting greens are constructed with a 12-inch root zone. Dr. Miles recommended 11 inches of sand to get the pressure required for drainage, but to not dry out the surface as much as on a putting green. Good advice!

The bottom line here is if you are going to install subsurface drainage in

bunkers and expect that it will function properly, the mode of construction needs to be essentially the same as that of a putting green. The subgrade has to be prepared and trenched for drain lines embedded in peagravel and some 10 or more inches of sand placed over the drain lines. The depth that will work best is dependent on sand particle size. I suggest going with about 12 inches to begin with. If the sand gets too dry, remove it down to where it seems to have the degree of wetness desired.

After reading this, you should now appreciate even more the need to make sure that the area around your bunkers is contoured so as to divert any surface water away from the bunkers. With a little luck and some tolerance on the part of your golfers, you may be able to avoid the expense of putting effective subsurface drainage in bunkers.

So much for bunkers. The rains also brought to the forefront problems with wet tee boxes. The proverbial sand or sand-peat in bathtubs filled up and needed subsurface drainage. Everything I have said above about bunker drainage applies to these sand-based tee boxes. Native soil tee boxes also suffered from excess moisture, but in this case, the problem was generally compaction of excessively moist soil. If you are considering reconstruction of these tee boxes, you might want to consider what I will call here the Penn State and Ohio State approaches. Dr. Peter Landschoot at Penn State University (PSU) has had great success in amending soils with composts. While developed primarily for lawns, the technique has great promise for fairway and native soil tee box renovation. Once the existing sod is stripped, approximately 2 inches of a good quality compost is spread on the soil surface and thoroughly incorporated to 6 inches or so with a rototiller. The tee box then needs to be graded to provide a slight slope from back to front to ensure surface

drainage. The box is then ready for sodding or seeding. Seeding is preferred so as to not introduce a layer of unlike soil.

If the PSU approach has a limitation, it is finding a uniform, high-quality compost in the quantities needed. The compost must be dark brown to black in color, have a crumb structure, be free of large pieces of debris, and have an earthy aroma. You also need to have the compost tested to make sure it does not contain excessive amounts of soluble salts.

Dr. Ed McCoy at Ohio State University has recently completed an extensive study of blended topsoils. He found that the best mix from the perspective of soil physical properties that seem to most influence turf quality is a mix that contains about 65% sand and 8% organic matter by weight. The creation of such a mix is not something that can be done effectively on-site. It involves blending of existing soil with sand and a good source of organic matter. Dr. McCoy

(Continued on page 39)

PENDELTON TURF SUPPLY

Ed Witkowski

- Chemicals
- Full Line of Turf Products
- Competitive Pricing
- New Product Information

Satisfaction Guaranteed

414-421-6474

9305 Oak Creek Ct.
Franklin, WI 53132

(Continued from page 37)

used foundry sand and sphagnum peat in his research.

Now I want to share with you some things I have learned this year in my putting green management systems project. One lesson learned relates to another discussion on the Noernet that took place in early spring. That discussion was one about algae on putting greens. I very effectively created the problem this year by mowing at 0.125 (1/8) inch or less and applying simulated traffic that compacted the green surface just enough to increase water retention and keep the surface continually moist. There is no algae where the mowing height is 0.156 (5/32) or more, even where the green is heavily trafficked. From these observations, I can conclude only one thing: algae on putting greens is a self-inflicted problem. Expose the soil surface to sunlight, encourage surface wetness, and the problem is yours to deal with.

The protocol for the putting green management systems project this year calls for dropping the mowing height to 0.109 inch on one set of

plots and applying Primo. The object is to have putting green speeds consistently above 11 feet throughout the day. Due to excessive rainfall and soft greens, it is only recently that I have been able to mow at 0.109 inch without scalping. This gave me a window in which I could establish how putting green speeds vary through the day before Primo is applied. The same will be done after application.

What I have observed is that between mid-morning and early afternoon, speeds can change anywhere from 0 to +8 inches. This, I assume, is due to drying. From around noon to mid-afternoon, the speed change has ranged from -4 to +11 inches. After 3:00 pm, the speeds have consistently declined, the amounts ranging from 3 to 15 inches. In many instances, these late afternoon declines in green speed have done nothing more than bring them back to where they were in mid-morning.

As you can see, there is tremendous variability in what happens during the day to the speed of greens rolling in the range of 11 feet. The type and amount of change that has

been recorded varies with the weather, which bentgrass cultivar we are looking at and whether or not the green has a sand-based or native soil root zone. Hot, sunny days are typically associated with substantial increases in green speed between mid-morning and early afternoon, but little change thereafter. On cool, overcast days, changes in speed during the day are minimized while late afternoon reductions tend to be accentuated. 'Penncross' creeping bentgrass tends to give the largest changes in speed and 'Crenshaw' the least, but exceptions to this have often been encountered. Similarly, the native soil green has often exhibited wider swings in speed than has the sand green, but exceptions have not been uncommon.

Given the variability I have seen in putting green speed and the multiple factors that seem to be involved, I cannot perceive that application of Primo to bentgrass-dominated putting greens is worth the expense and risk involved. The situation may be different for bent-Poa greens. I will be checking this out next year. ♣



Golf Course & Athletic Field Mixes

We understand the needs of professional groundskeepers – quality and time are important!

Say no to:

- Delayed Deliveries
- Contaminated Sand
- High Prices

Call Wolosek's, the company who cares with:

- Consistent Particle Size
- Proper pH
- On-Time Delivery
- Affordability

GUARANTEED!

We Offer:

**Kiln-Dried Sterilized Top Dressing Sand
80/20 Top Dressing Mix
Construction Mixes**

Bunker Sand • Reed Sedge Peat • Cart Path Aggregate
Bark, Boulders & Decorative Stone
Custom On-Site Blending



(715) 423-3909 Fax (715) 423-4215

Product meets standards for putting green root zone mixes as specified by the USGA.