SAND-GROWN SOD REVISITED©

I have been employed in the turfgrass industry for 40 years this year, and I am now convinced I will go to my grave (or the crematorium) not understanding sod transplant problems or lack thereof. In most cases where the installation and post-installation care are done properly, there are no problems. I wish that was always the case. But before you even talk about maintenance, you must select the sod.

The standard in the industry is that the sod *must* be grown on a sand to be transplanted onto a sand-based mix. When you talk about a standard in the industry there are usually legal ramifications that if you don't follow those standards things don't work out they way they should. I don't deny that using sand-grown sod is the preferred way of sodding a sand-based field, but it often comes at a huge expense to the owners. Let's face it, there really aren't too many sod growers in this country that are growing their product on a sand, much less a sand that is sized similarly to what a field is built with. Therefore, sand-grown sod is sometimes transported hundreds of miles to reach the installation site.

The fact is, I have probably seen at least as many problem fields where the "standard of the industry" is followed as not. In some of those cases the problem could be attributed to post-installation care. A new sand-based field is often a challenge to sports turf managers without experience with this type of field. There is definitely a learning curve. Based on my experience doing the forensic work on these problem fields, over-irrigation is often the suspected cause (**Figure 1**). I would guess that there is some element of fear that the mix will be droughty, that fear leading to excessive irrigation. A properly designed and built sand-based system should not be droughty, but that is a topic for another article.

On the other hand, I have seen installations that should have failed (based on our standard of the indus-

▼ **Figure 1. Overwatering** can cause issues even with sand-grown sod.

try) that have done extremely well. These were sand-based fields that were sodded with sod grown on fine textured soils; as fine as silt loams. Higher profile examples of these include the Great Lawn in New York's Central Park and two sand-capped soccer fields at Cornell University.

In a recent project I was retained by a design firm to write the rootzone and turfgrass specifications for two sand-based fields for the Rush Henrietta School District in suburban Rochester, NY. The rootzone mix was my standard specification taking into consideration local materials. I specified a sand-grown sod. At the preconstruction meeting the cost of importing a sand-grown sod was discussed, as it was a concern. I explained that the use of a sand-grown sod was the standard of the industry and that using such reduces the risk of soil incompatibility problems. But then I shared my experience of successful projects where soil-grown sod was used on sand-based mixes, making it clear it was not my recommendation. I further explained that if there was a problem, regardless of the cause, that they would have no problem finding an expert to say that sod incompatibility was the problem. The risk was theirs to take.

The school district would realize thousands of dollars in savings if they used a local, soil-grown sod. They decided it was worth the risk. Before construction began we built a mockup of the field profile using the proposed rootzone mix and sod. Since this was done in winter, the study was conducted in a small growth chamber. I applied about 2 lb. P_2O_5 /1000 square feet from triple superphosphate and a pound of nitrogen from urea to the mix preplant. The fertilizers were mixed into the top 2 inches. The sod was watered lightly to wet the sod twice daily with a deeper watering every 3 days. By week two I backed off on the water to once every 3 days without any problem. In 25 days we had dense rooting to a depth of 6 inches (**Figure 2**). This study provided the school district with some level of comfort in their decision.

The sod was a blend of Kentucky bluegrass cultivars with a small amount of Thermal bluegrass grown on a loam soil (49% sand, 42% silt, 9% clay). The football field was sodded in late July with temperatures well into the 80s. By the time of the first game was played 8 weeks later, roots were deep and dense (**Figure 3**).

I have to note that the sands used to make the root zone mixes in the Rush Henrietta fields as well as the Cornell sand-capped fields were coarser than a USGA greens sand. The fact that these coarser sands may provide better aeration and higher oxygen diffusion rates may have contributed to the massive and deep rooting we observed. I'm not sure I would be as comfortable using a soil-grown sod transplanted onto a sand on the fine end of USGA greens construction guidelines. But then, we aren't talking about greens.

If a soil-grown sod is used on a sand-based field, I think it will be especially important that the sports field manager employ a core cultivation program to include harvesting or sweeping the cores, followed by sand topdressing. In the long term it will be best to remove as much of

▼ **Figure 2. Left:** Rooting of sod 25 days after sodding in growth chamber. **Figure 3. Right:** Rooting of soil-grown sod on sand-based mix, 7 weeks after installation.

▲ **Figure 4. Rush** Henrietta field after first game.

the imported fine textured soil as possible to maintain the sand as the growing medium.

In the event you have no choice but to use soil grown sod, here are some tips*.

• First, don't even consider a sand-based field unless you have the resources and commitment to maintain it properly.

• Set up a mockup profile as discussed with the rootzone and sod proposed for your project; see how it goes.

• Use a sod just mature enough to harvest. Do not use old sod.

• Have the grower cut the sod as thin as possible, minimizing the amount of fine textured soil transplanted.

• Consider having a rootzone mix designed with a sand coarser than greens construction sand but still meeting accepted performance parameters.

• Practice good pre and post plant care, especially with regards to post plant watering.

A sod grown on a soil media similar to that on which it will be transplanted is still the best way to minimize the risk of soil compatibility problems. My intent in sharing these experiences was not to debunk or challenge any standards, but to offer some information and hope to those that may want a sand-based field but no easy access to sand-grown sod.

* My experience is predominately with cool-season grasses. These tips and your outcome may or may not apply to warm-season grasses. ■

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▲ **Top Left:** Excess skin soil is being removed from the base path to improve surface drainage. **Bottom Left:** A tractor is being used to spread the amendment evenly over the entire skinned area. **Middle:** The amendment is being rototilled into the existing skin soil at the recommended rate. **Right:** Notice the color is dull because the amendment is dusty from the tilling process.

NO MORE MUDDY SKINNED AREAS

This article is the second in a series about muddy fields. The first one, "No More Muddy Football Fields" (July 2013), was about construction, reconstruction, and renovation practices that minimize muddy conditions on grass fields. This article is about alleviating muddy skinned areas of ball diamonds for both baseball and softball fields by replacing or amending the existing soil.

The number one complaint for skinned areas has to do with moisture—either too much or too little. Skinned areas with too much moisture will be wet, soft, and muddy, while skinned areas without enough moisture will be hard, dry, and dusty. It's important to remember, the recommendations that keeps fields from becoming muddy in wet climates also work for skinned areas in dry areas of the country. Soil texture and soil porosity are key elements for keeping fields playable in both wet and dry weather.

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The opinions presented here are based on my 30 years' experience with skinned area renovation and installation, along with feedback from hundreds of owners, coaches, and players. All of the examples are based on real world situations in renovating and building community fields, park and recreation fields, and high school and college fields.

THE IDEAL SKIN

The ideal skinned area has many or all of the following qualities: First and foremost, the skinned area is graded for surface runoff of water. It is playable soon after a heavy rain with excess water evaporating quickly. It has the ability to retain moisture yet deal with excessive rainfall. It resists rutting and washing out during a heavy rain event. And last but not least, it is easy to maintain, not dusty, and aesthetically pleasing. More qualities make the best possible skinned area.

AMENDMENTS V. CONDITIONERS

Amendments are relatively new for skinned area soil applications. Recently, crushed lava, shale, clay, and brick have been introduced for amending skinned areas. After crushing is complete the amendment is screened into a uniform range of sizes of 1/8 inch or less. Sometimes sand, silt, and clay is added to the mix depending on the texture of the soil to be amended. Amendments are typically added to skinned area soil that has a textural classification of "sandy clay loam" (the most common skin soil) at a rate of 50% amendment and 50% existing skin soil. At this rate, the physical properties of the existing soil are changed. The goal is to add enough amendment for bridging of the particles to create macropore space. A higher percentage of macropore space allows air and water to enter the profile then dry out quickly through surface evaporation. To take the guesswork out of the amendment process, make sure to choose a supplier who will test the physical properties of the existing skin soil and the amended soil. The amendment ratio varies from field to field depending on the texture of the soil to be amended.

Conditioners, on the other hand, have been around for a long time and have become a staple in the industry. Conditioners are either calcined clay, vitrified clay, or calcined diatomaceous earth products. They are usually incorporated into the existing soil at a rate of 10% by volume. However, this rate is not high enough to be effective in bridging together to create macropore space and therefore does not change the physical properties of the existing soil. Nevertheless, they are a good choice for field managers on lower budgets because playability is definitely improved when conditioners are incorporated.

▼ **The final product** looks like this after the first rain.

Before installing the amendment, prepare the skinned area by performing some simple renovation techniques. First of all, grade the infield for positive surface runoff of water with no standing water anywhere on the skin, infield grass, or foul territory. Remove all lips, mounded ridges, and hills leading from the grass to the skinned area. If there's any excess skin soil, remove it at this time to achieve the proper grade for surface runoff.

Next, seed or sod the edges before installing the amendment. In the North, the best time to seed is between August 15 and September 30. In the South, sod would be a better choice and can be installed anytime the sod is available. However, mid-August through late fall is usually the best time to sod the edges of both Northern and Southern fields because they may not being used at this time.

Now the field is ready for the amendment. Spread the amendment over the skinned area at the recommended rate. For the most part, an operator with a tractor can spread the majority of the material. Some hand work will be necessary along the edges and base paths.

For a 50/50 mix, rototill 1 inch of the amendment into 1 inch of the existing skin soil for a total of 2 inches of amended soil. Again, some hand work may be necessary along the edges and the base paths using a walk-behind rototiller.

Don't be disappointed in the color of the skin after tilling is complete. It's because the amendment got dirty during the tilling process. After the first rain, the amendment color will dominate because the rain will have washed the dust particles off the amendment.

REPLACING THE SKIN SOIL

In some cases, removing and replacing the skin soil is the only option. Some fields have an existing skin soil with many rocks over 3/8 inches in diameter. Other fields have a limestone skin area that's just too abrasive. The only way to improve the quality of both of these examples is to remove and replace the existing skin.

The first step is to grade the field for surface runoff of water. Perform the same renovation techniques that were described above in amending the skin soil. After renovation is complete, the removal process can begin. The reason for grading the field first is so a consistent depth of skin soil can be removed at a minimum of 3 inches deep. Then, the new material can be installed at a 3-inch depth over the entire skinned area. Now the field is graded perfectly for surface runoff. The final grade will mirror the grade that was established in the first step.

The companies that offer the amendments usually sell a skin soil that is made for new installations. It could be crushed material in a range of sizes of less than 1/8 inch to less than 3/16 inch with sand, silt, and clay added for stability. This blend has the same qualities and physical properties as the amended skin soil described above with one added advantage: the blending process at the plant is perfectly controlled with the right amount of sand, silt, and clay.

NEW CONSTRUCTION

For new construction, use the same blend of material that was described above for replacing the skin soil. Before installing the new material, make sure the subgrade is a mirror of the planned finish grade which is designed for surface runoff of water and a minimum of 3 inches deep.

Either the amended soil or the newly installed crushed material, with sand, silt, and clay is a great advancement in achieving the best possible skinned area for any baseball or softball field. And best of all, muddy conditions are alleviated. ■

▲ **After grading** for surface runoff, 3 inches of skin soil is being removed in preparation for the new skin material.

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