INFIELD SOILS AND TOPDRESSINGS - PART I

By Paul Zwaska

Editor's Note: *The following article is the first in a two-part series and was written in 1999 when the author was Head Groundskeeper, Baltimore Orioles.*

Baseball is a unique sport in grounds management. It's the only major sport that is played on a field that has both turf and exposed soil for a playing surface. Ballplayers scrutinize the playability of your skinned areas more closely than you're turf areas. Your reputation as a groundskeeper will depend on the skin you keep.

This is not to say that the turf areas on a baseball field are unimportant. But if you think about it, 75% or more of the game occurs on the skinned areas of the field. Unfortunately, this crucial subject is avoided by the academic institutions that teach many of today's up and coming athletic field managers.

With no written guidance, new groundskeepers must resort to trial and error if they haven't been lucky enough to learn from another groundskeeper in the business.

GOALS FOR A QUALITY INFIELD SKIN

Traction: Most players desire the same quality in an infield skin: traction. That's the reason for the spikes in their shoes.

Nothing makes a player happier than a firm infield skin that is moist and cork-like, not hard and baked dry. The cleat should penetrate the skin and leave a perfect imprint. Very little soil should be disturbed or displaced. When players plant their feet to throw, field the ball, or run, the soil should not give way under them. The traction in your infield skin comes from its base soil. Choose your mix carefully. Many companies that sell infield skin mixes know nothing about their proper function.

Many mixes are too sandy. Soils that don't firm up (high sand content of 75% or higher) are more mobile. This creates low spots in high-traffic areas (around bases and fielders' positions) more quickly, especially as the field dries out. The loosened material is more likely to be carried to other portions of the field to create high spots and huge lips at the infield skin/turf interface.

These sandy infield mixes increase infield skin maintenance problems. The loose soil also causes unstable footing for ballplayers, increasing the risk of foot, ankle, and hamstring injuries.

Drainage: The proper drainage on your infield skin dictates how quickly you will resume play after a rainfall. About 95% of the water that falls on the skin should run off the surface.

Good surface grade and proper maintenance techniques will give you the best results. Your infield skin should have a minimum 1-1/2-inch fall from the front of the skinned area to the back. Percolation rates on a good, firm infield skin should be 0.03 to 0.05 inches of rain per hour. Only in rare, special problem areas should a sandy infield mix be used to help drainage problems.

Drainage lines installed under the infield skin are a waste of time. If you use the proper soil for the skin, it will never perk enough rain to reach the drain tile. A drain line is more appropriately positioned five to 10 feet behind the infield skin in the shallow outfield. Here it will capture water that runs off of the skinned areas.

Amending infield soils with various miracle materials to enhance drainage throughout the skinned area usually proves unsuccessful. At best, these amendments provide a very short-lived remedy.

Topdressing: Choose the proper topdressing to work with your base mix. Think of your skin as a two-tier profile: the top 1/4- to 1/2-inch consists of your topdressing, and the remainder consists of your base infield mix.

The topdressing on the skin provides a cushion for the players. It creates a buffer zone between the players' cleats and the moist base soil mix, and prevents the soil from sticking. The topdressing layer also helps you endure light rain showers during games.

Don't go any thicker than a 1/2-inch layer of topdressing on the surface of the skin. A deeper layer will cause the ball to skid under infielders' gloves instead of taking the proper hop. It can also drastically influence a ballplayer's traction.

INFIELD BASE SOILS

Testing: If you don't know the percent breakdown of sand, silt, and clay in your skin base mix, have it tested to give you a reference point for comparisons. Send a sample of your soil to a private testing lab or county extension office that performs particle size analysis or soil texture analysis work. These labs will give you the composition percentages, and they'll show you where your soil fits into the soil texture triangle. A simplified home version of the test is also available. It can give you a ballpark figure of your percentages.

There is a simple way to get an estimate of the percentages of sand, silt, and clay that are in your base mix. This experiment provides a nice, cheap way of checking soils if you are looking around and can't afford to do a lot of testing.

DETERMINING SOIL TEXTURE

Step 1. Obtain a quart mason jar with a lid, like the ones used for canning. Fill it a little more than half way with the soil you wish to test. Fill the rest of the jar with water, and attach the lid tightly.

Step 2. Shake the jar vigorously for a couple of minutes to fully separate and wet the soil. There should be absolutely no lumps of soil left when you're finished agitating it.

Step 3. When you feel that the soil is fully dispersed in the solution, set the jar down and begin timing. After 45 seconds, mark a line on the side of the jar with a grease pencil or White-Out where the top of the layer of sand has settled out in the jar. Next, put a mark at the top of the next layer after three hours have passed; this is your silt layer. After 24 hours, your clay will have settled out as well.

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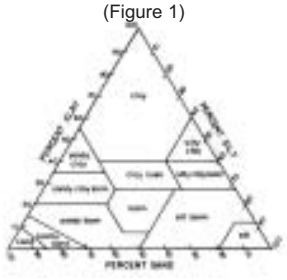
Step 4. Measure the total depth of soil in the mason jar. Then measure the thickness of each of the three layers using your marks on the jar.

Step 5. Calculate the percent of sand, silt, and clay in your soil sample with the following procedure:

1. Divide the thickness of the sand layer by the total depth of the soil in the jar.
2. Follow the same instructions for both the silt and clay layers.
3. Multiply each of the three figures by 100, and you will have the percentages of sand, silt, and clay in your sample.

Step 6. You can now check the soil texture triangle to see where the intersection of the three values places you on the triangle (see Figure 1). Remember that this is an estimate. If you need a more precise test, it is worth your while to have a professional test done by a private lab or a county extension office.

(Figure 1)



Soil testing labs use a couple of different quantitative methods to determine relative amounts of soil separates. Once the relative amount of sand, silt, and clay are known, you can determine the soil's textural class using the soil texture triangle provided. Each side of the triangle represents the relative content or percent of one of the three soil particle size classes.

General Guidelines: Remember that soils differ greatly around the country and they react differently to many things. The following gives generalizations as a guide for base mixes. Soils in your area might not always fall into these guidelines.

You want to keep the sand fraction of your base soil between 50% and 75% (normal base mix). Soils with higher sand content normally become too loose and mobile. The soil becomes loose with play and is transported to other areas of the skin by the dragging process or by play.

You may think you'll gain drainage if your base mix has high sand content. In fact, it creates more maintenance headaches.

The mobile soil rapidly develops high and low spots in the skin, and lips at the skin/turf interface. Those low spots and high lips interfere with the surface flow of rainwater draining off the skin, and large puddles develop.

In base mixes with higher sand content (>75%), there is not enough binder (clay and silt) to hold the soil firmly together. As a game progresses, the skin becomes more loose in the high-traffic areas. This reduces traction and increases risk of injury to feet, ankles, and hamstrings.

Soil texture affects many properties of soil. Compactability, porosity, bulk density, water-holding capacity, and drainage are all affected by the makeup of the soil.

Soils high in sand normally hold very little water and drain rapidly. Soils high in clay normally hold large amounts of water and can drain variably, depending on structure.

Soil texture refers to the percentage of sand, silt, and clay particles in a soil. These particles are defined by their size.

To tighten up a high-sand base mix, till in a nice clay loam soil. Add several tons at a time, till it, work it, let it settle, and pack and see how it reacts before you add more.

High-clay and high-silt soils create a different problem: compaction and hardness. Generally speaking, the combination of these two materials should not exceed 40% to 50% of your soil mix. Too much of either of them can inhibit intake of water into the skin due to lack of pore space from compaction.

The result is a hard field that is unable to take up moisture to help soften it. The best solution is tilling in calcined clay to help reduce compaction and increase pore space. But be careful not to blend in too much material.

Again, add your calcined clay by a couple of tons at a time. Till it, work it, let it settle, and pack and see how it reacts before you add more. The alternative is to replace the base mix with a new mix.

Rocks and pebbles in an infield base mix can be a major problem. Your base soil should be able to pass through a 1/4-inch screen, or at the very least a 3/8-inch screen, to eliminate any rocks or pebbles.

For Oriole Park at Camden Yards, I use a 60% sand, 20% silt, 20% clay base mix. This translates to a borderline sandy loam and sandy clay loam. I've used it since the day we moved here. It's a very stable soil with little mobility. Low spots on my infield are rarely a problem, but that is also partially due to the management of the skin.

The lesson to be learned here is don't just pick any old soil for your base mix. Know what you are getting by asking for a soil particle size analysis.

And whatever you do, don't purchase a mix just because some salesman says that he has "x" ballclub and "y" ballpark using it. Most of those people have zero knowledge of what kind of soil creates the best infield skin.

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