Factors to consider when total infield renovation is *not an option*

Editor's note: *We asked some people who make infield skin products this question: What factors should a turf manager consider if they want to improve their infield mix and/or skinned areas for this season and total renovation is not an option?*

>> **LASER-GRADING** the infield at two-time STMA Softball Field of the Year at Stetson University, DeLand, FL.

TOM BURNS, TXI Diamond Pro

This is a very difficult question to answer because so many factors need to be considered. First, determine what you are trying to change. Is the field too hard or too loose? Then I would get my infield mix analyzed and use the results to determine if I want to renovate or replace it. Next, you have to ask yourself what you can afford to do. Often times we can make improvements by amending the mix with a different textured soil or a manufactured soil amendment. Soil testing can determine what to use and in what volumes.

Next I would look at the grade. Do I have the proper fall to allow the skin to drain? Do I need to add more infield mix? Are the lips properly maintained? Many times the skin looks to be low when in fact the grass edge is too high. A little bit of daily maintenance on the lip can be a mini-renovation in itself.

Be sure to do an assessment of your maintenance program and be honest with yourself. A less-than-ideal mix can still perform well with a good management program while a great mix will not perform as well if it is not managed properly. Be honest with your expectations and factor in your limitations (financial and logistical); only then will you be able to make the right choice.

CLAYTON HUBBS, Stabilizer Solutions

We receive infield samples from fields all over the country. The first question we ask is, "What is your biggest complaint?" Focusing on your biggest complaint usually alleviates smaller complaints. This may sound like an oversimplification, but most complaints fall into three categories: too hard, too loose/soft, or poor moisture management.

The next question to ask is: where is my infield mix right now? The answer to this question lies within a particle size analysis. Typical infield mixes should be composed of 70% sand and 30% split between silt and clay for amateur fields and closer to 60/40 for professional. Pay close attention to the coarseness of the sand. If the sand particles are very fine, then the mix may be unstable despite the proper proportions of silt and clay. While these percentages are a good rule of thumb, it will vary per region and parent material of your existing mix.

Understanding that parent material may provide insight into why the mix may not be performing, even with a satisfactory particle size distribution. If your mix is dug from near a river bed, it may have too high of a silt over clay content, and the sand particles may be more round than angular. Mixes that are derived

from crushed stone may have the angular sand particles needed, but the fines may not act like true silt and clay particles. Also, mixes with good clay content may contain highly expansive clay particles that can wreak havoc during fluctuations from wet to dry and vice versa.

Now that I know where my infield mix is, can I adjust my maintenance regimen to compensate? If your biggest complaint is a loose field, then most likely your particle size analysis shows that you are low on clay content. Instead of immediately adding clay content, you could first try increasing your watering and rolling regimen.

If your complaint is a field that is too hard, and the analysis shows high clay content, then you could increase watering and nail dragging. Depending on your region and your silt content, increased watering may work against you, so make sure you don't experiment during a critical time of year. If nail dragging does not help, then try a different type of nail with greater weight added on top of the drag.

If changing your maintenance regimen does not provide sustained results, try amending your infield with sand, clay, or an infield amendment. Take great caution when adding sand or clay content. As mentioned before, sand should have a variety of particle sizes from fine to coarse. Too fine of sand may not have the desired results. The same goes for too coarse of sand. When adding clay content, it is inevitable that you will add silt as well. Take care in not adding too much silt content as this will have the opposite effect. It is recommended that you try a small test area first before adding sand or clay content over the entire field. Also, some fields may have several different mixes added over the years. This may cause a layering effect or pockets with varying particle size distributions. It is a good idea to survey different areas of the field to find out if these pockets exist and make the proper adjustments.

Sometimes a safer route, adding infield amendments, can often make a bigger impact. For hard or low drainage fields, conditioners such as calcined clay can be added. For fields that are unstable or have poor moisture management, organic infield amendments can stabilize the infield. While manufacturers may recommend incorporating amendments by mechanical blending (as we do), many times they can be nail dragged into the top couple of inches to provide short term relief.

Another option to consider adding is a stabilized infield mix, which contains a stabilizing agent, most often organic infield amendments, already pre-blended to work in conjunction with the proper amounts of sand, silt and clay. This can be an affordable option to get you through the season by addressing just the surface. When considering this option, request more information from the manufacturer's rep, if done incorrectly or with an unsuitable mix, a layering effect may occur.

The final option to consider without completely renovating a field is if the infield can be improved mechanically. Usually mechanical blending is used in conjunction with infield amendments, but can be done without their use as well. Ripping and tilling is recommended once a year. Fines do sink to the bottom, your surface may

become too loose and drainage layers may form. The surface soil particles themselves can also become crushed from overuse, depending on the parent material of the infield mix. Also, soil particles weather and break down from exposure to rain, snow, and sun. Ripping and tilling once a year evenly blends soil particles, brings fresh soil particles to the surface, and provides a good opportunity to level the infield by adding additional infield mix. Take caution not to till into your base material.

Like most things in life, infield mixes change and evolve throughout the years. This could occur from soil particles weathering and sinking, or from the addition of different mixes and amendments. Regardless of how it occurs, your mix is unique to your field. If you don't have the option to replace the mix with something more predictable, then you must become the expert of your own mix. The best way to become the expert is to experiment and see how your mix reacts to different variables.

GRANT MCKNIGHT,
Natural Sand Company

In general, amendment projects tend to be about one-third the cost of renovation. The best way to predictably alter an infield skin without renovation is to follow the T.A.C.S. process: Test, Analyze, Compare and Solve.

Test. In order to improve existing material, it is important to "know what you have." A soil test report with a particle analysis and size distribution will reveal the cause of many poor-playing infields. For example, an infield with excessive silt content and low sand is often described as playing "soft" and blows away over the course of the season.

There are a number of soil testing facilities across the country, some better than others. A reliable lab will be A2LA accredited.

Analyze. Analyzing the soil test report requires an understanding of the values it renders. The values on the soil test report include: sand content (overall), silt content, clay content. The size distribution portion of the test shows the array and concentration of sand particle sizes within the overall sand content.

Here are some basic principles:

• Sand (overall). Provides structural stability for the infield mix (think sand castle v. mud pies).

• Silt and Clay. Clay provides moisture-retention for the infield mix. Silt binds sand to clay.

• Sand (size). The larger the sand, the better stability it will provide.

Compare. A lack of specifications for infield soils has plagued this industry. By studying our projects, we have found the following to be true:

• Sand (overall). Should make up about 58-75% of the soil profile. Facilities with high-level maintenance will require less sand than fields with volunteer maintenance.

• Silt and Clay. Combined, these values should not exceed 42% of the soil profile. The ideal ratio of silt to clay is 0.5 - 1.0 (silt to clay ratio = silt ÷ clay).

• Sand (size). The majority of the sand should fall between the very coarse, coarse and medium sand ranges. Large concentrations of fine and very fine sand indicate a lack of stability within the mix.

Solve. Determine what objectives need to be met (i.e., increasing sand content, decreasing silt to clay ratio, decreasing very fine sand content, etc.), then choose a material and a method for the amendment project.

It is very important to only use materials that identify their particle makeup as verified by an independent soil test report. Engineered soils can be made into specific amendments for your project. Here are some general guidelines:

To increase sand content: Use a soil with a sand content higher than your current levels. Be sure that the amending soil does not contain an abundance of fine and very fine sand, and that it has a silt to clay ratio of 0.5 - 1.0.

To decrease sand content: Use a soil with a sand content lower than your current levels. Be sure that the amending soil has a silt to clay ratio of 0.5 - 1.0.

To decrease silt to clay ratio: Using soil with more clay than silt will always decrease the silt to clay ratio.

To decrease very fine sand content: Use a soil with minimal amounts of fine and very fine sand content. Be sure that the amending soil has a silt to clay ratio of 0.5 - 1.0.

Amendments require incorporation into the existing soil profile. We recommend tilling to a depth of 2-3 inches for optimal blending.

It is best to obtain another soil test report a few weeks after your amendment. The test report will reveal the changes made to the infield skin profile. If further amendment is required, simply repeat the T.A.C.S. process until you are satisfied with the test results.

JEFF LANGNER,
Turface Athletics

The first step to improving an infield mix is to really understand the kind of field you are working with. Every infield mix a combination of sand, silt, and clay, plus any conditioners or additives incorporated previously.

A field that is made of 100% sand would be loose, free flowing, and would drain well. When dry, however, a sandy field would produce an unstable and unpredictable surface. With the right amount of water it will be firm and playable but forgiving, allowing for sliding and clean ball hops. Consider a beach where the water meets the shore. This area would make a very playable surface!

The other two components of soil, silt and clay, present contrasting characteristics to sand. Drainage is poor, creating puddles and slippery areas and causing rain-outs. When clay and silt get too dry they become rock hard, often cracking, creating dangerous hops and

possible injury. These issues can be greatly compounded when clay and silt get compacted due to heavy traffic. If kept at the right moisture level and properly maintained, however, clay and silt are very stable and wear resistant making them ideal for high impact areas.

A blend of the three components is necessary to attain a safe and playable field that is easier to maintain. Knowing the makeup or composition of your existing infield mix will help determine how you approach conditioning the field, and how you manage moisture on the field. Water management is critical to providing a safe and playable field, no matter what mix of soil components are at play.

Calcined clay field conditioners help improve fields of any soil composition, because of their ability to reduce compaction and hold moisture. For example, Turface has 74% internal pore space, meaning that there is significant space within the particles to hold air and water. This keeps the field from becoming compacted, and promotes drainage in times when the field endures heavy rains.

And calcined clays don't just moisture but, similar to the effect of a sponge, will release water back into the surface of the playing field over time as things dry out, preventing the hardened, cracked fields that become such a burden in the hot summer months.

The multiple benefits of these products make them an effective addition to any infield mix. The amount of product added to the field should take into account not just the existing infield mix, but other factors such as the amount of traffic the field endures, the availability of irrigation and the frequency of rainfall, the number of field managers able to maintain the field, along with the frequency of field maintenance that takes place.

A field that doesn't have the benefit of frequent watering, endures high traffic, or lacks routine maintenance will benefit from a slightly higher amount of calcined clay conditioner worked into the field.

For a full renovation on a 90-foot field (high school, college, or pro), for example, it is recommended that 8-10 tons of product be incorporated into a field at a 4-inch depth with a roto-till, resulting in about an 18% rate by volume. For fields with smaller budgets, 4 - 5 tons could be incorporated into the top 2 inches using a nail drag, or even a ½ ton of product could be applied as a topdressing to at least create a consistent playing surface.

There is a significant difference in the improvement one could expect to see from a field based on these varied methods of application, and amounts of product. Understanding your existing infield mix and evaluating the external factors surrounding your field will help you better get started on a long-term maintenance program for your field, so that even if immediate renovation isn't a possibility, you can at least get the "ball rolling" on a better, more playable field.

LARA WEINSTOCK,
Game Time Sports Systems

To improve an existing field you can add products to help improve infield surfaces at a nominal cost. Consider adding 4-8 tons depending on the size of the infield surface and the type of material the skinned surface is made of. The materials will need to be worked into the top two inches of the existing infield dirt. Before any amendments, consider edging the base paths and the arc, and reduce or eliminate lips if possible. Try to promote surface drainage by re-establishing the grade of the skinned surface so it slopes toward grass areas. Mechanical weed management and good routine grooming practices will promote a safe playing surface, and a good visual experience until funds and more time allow for a more extensive repair or upgrade.

DAVID A. CYGAN,
Pro's Choice

I always tell prospective customers they should think of soil conditioners as the icing on a cake. Some field managers think that you can dramatically change an infield with conditioners. While conditioners will improve any infield, the best results occur when conditioners are added to soils consisting of sand, silt, and clay.

The amount of conditioners will vary depending on what is wrong with the field. If drainage is an issue, more material would be needed. For example a high school or college field with 90-foot base paths and poor drainage might require 10-12 tons of conditioner. A field that is hard and compacted can usually be helped with 6-8 tons of conditioners.

Note, when I refer to conditioners I specifically mean "MONTMORRILLITE" clays. These have been the industry standard since 1941. These types of clay are heat treated and are actually turned into a ceramic sponge. They are the only mineral that can absorb excess water, hold it, and release it when conditions become dry. They do all this while maintaining their particle size, and they continue working year after year. ■