

PHYSICAL CONDITIONING FOR INFIELDS

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When this article is posted on the internet, there's no doubt that the title, Physical Conditioning for Infields, will cause some search-engine missed hits for all but the core of people interested in improving their skin that comprises most of the body of a baseball field. Improper toning of this playing surface can cause undue stress for the field manager, as well as the players, coaches, and spectators. A smooth surface with well-defined curves and no lips requires regular health care. These repetitions can be thought of as being a daily massage that will increase the stamina of your field. OK, all surfing aside, a better title for this is "Physical Conditioning For Non-Turf Areas of Baseball Fields".

Skinned areas are different from turfed areas in that there is no need to support plant life and much less organic matter except for what comes off or out of the players, like blood, skin epidermal cells, hair, etc. The skin surface should provide for uniform ball response and good traction for running, stopping, and sliding. Equally important is how much it's playable under various soil-moisture and weather conditions. Can it handle a rainfall event, mainly through surface drainage? How long until it dries out enough to be safe upon which to play? How long does it take to dry down to the point that dust and wind erosion become a concern? These answers would depend a great deal upon the weather conditions. Was it a short thunderstorm in a passing front, and now the sun is out and the wind is brisk? What about days of clouds, fog and misting rainfall? All answers could depend upon the composition and maintenance of the skinned area.

There has been no published research directly addressing skinned areas that I can find. Nevertheless, the American Society of Testing and Materials has set Specifications in their 2001 publication, "Standard Guide for Construction and Maintenance of Skinned Areas on Sport Fields" (F2107-01). The document content is straightforward with regard to maintenance but is difficult to understand when it comes to the composition, unless you're a civil engineer or are familiar with the terminology. Most popular literature cites trends and commonalities among fields managed by successful groundskeepers, usually at the major league level, even though many of the old timers have guarded such information.

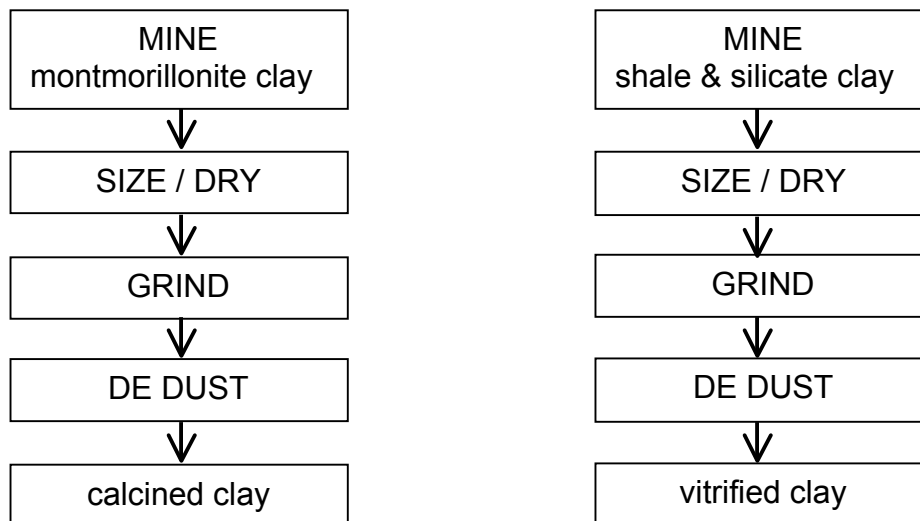
The most common recommendation is for a soil texture of 50% sand, 30% silt, and 20% clay, with the sand optimally being an equal mix of sharp and round sands. Keep in mind that this is on fields that have a tarp that can cover the entire infield during rainfall events. Where the skin can't be tarped, you should choose a 60-20-20 mix. In all cases the sand-particles sizes should vary over a wide range with nothing greater than inch. This along with an appreciable amount of the sand having angular shapes will insure good soil strength at varying soil-moisture contents. Another characteristic to consider is the soil's evaporation rate that can be checked with a cup or bucket test where the different samples are saturated and then set side-by-side outside. Other things being equal, the best choice will be the one that firms up first. Soil color is the least important parameter unless management or ownership mandates it, then it can be one of the most critical.

Because of the soil texture and soil strength needed, internal drainage will be poor. Therefore, positive-surface drainage is a must. While an internal drainage system may be installed under the skin, research here at MSU indicates that it would not be very functional unless the sand content was at least 90%. Such a skin would be too soft especially when dry. Other materials used in skins are crusher dust, which can be almost any ground natural or fabricated stone, or crushed brick, although this should be reserved for warning tracks.

Regardless, all infield mixes can be improved with the addition of conditioners, often as much as can be afforded. For a new baseball field, I've seen as much as 20 tons initially incorporated. Where large amounts are used, conditioners should be mixed into the top 3 to 4 inches. This should be followed with a topdressed layer of inch that is then dragged (see below). At the AAA and major-league levels, this surface layer is often removed periodically then topdressed again. After that, it's not that unusual for a big time groundskeeping crew to go through up to ten tons a year. Its primary purpose is to control moisture, that is to absorb, retain, and release, depending upon what's needed at the time. Other benefits are as follows:

- Increased soil strength
- Better footing
- Machinery support
- Less soil compaction
- Slowed down lip buildup
- Reduced slipperiness
- Dust suppression

An infield conditioner's desirable characteristics are that the particles be hard, durable, and porous. The material should not be dusty. It would be good if it were cost effective and available in several different colors. The two most prevalent conditioners are calcined clay and vitrified clay. The manufacturing processes for each of them can be compared in the diagrams below.



The major manufacturers and their name brands are shown in the table below.

Manufacturer	Brand
Profile	Turface
TXI	Diamond Pro
Oil Dri	Pro's Choice
Southern Athletic Fields	Mule Mix
Eagle Picher	Play Ball
Stabilizer Solutions	Stabilizer

Turface was the first product that became well known to the point that it's name has often used generically no matter what product is being used. Pro's Choice offers some research supporting its claim as a superior material. It also de-dusts before grinding, instead of vice versa, which is something the company says reduces dust in its products. The TXI main product is a vitrified clay and was the first of its kind. Because it is heated to a higher temperature, the silicates go through a "glassing stage" that makes it hard and durable. Some of the others are now also offering vitrified clays, but overall sales are still primarily calcined clays. Some groundskeepers are blending both types of clays into their skins. The last two listed are unique in that Play Ball is diatomaceous clay, which is fossilized diatoms mined in New Mexico. It claims to be equivalent to 1_ times as much calcined or vitrified. It's no surprise that the price is approximately 50% more than calcined and vitrified clays. The last product above, Stabilizer, is made from psyllium husks, the same thing that's in Metamucil. It is used in addition to other conditioners and helps "bind" it all together.

Conditioners are for the most part different than drying agents that are spot applied to absorb water. The most effective products contain ground corncobs, but it is imperative that the material be removed shortly following their use. If left on the skin, mound, or the areas around home plate, they will become a slippery mess when rewet. Other products contain fine particles of calcined clay, which can be left in place and then spread about and incorporated over time.

To keep the conditioned infield in its best playing condition, daily or almost daily maintenance is needed throughout the season. These practices are shown below in their prescribed order, more or less.

- 1) Broom or lightly rake conditioner from turf back onto the skin.
- 2) Hand rake areas around bases.
- 3) Make sure soil is moist and doesn't dry out.
- 4) Nail drag to divot depths.
- 5) Mat Dragging levels the skin.
 - Avoid getting too close to the edges.
 - Vary direction each time you drag.
- 6) Hand rake base paths.
- 7) Water down area.
- 8) Roll periodically, if needed.

Besides a nail drag that fluffs up soil and provides loose material for re deposition onto low spots, there are three other types of drags: steel mat, cocoa mat, and broom. They can each be useful depending upon the conditions and the groundskeeper's preferences. However, on a fine textured skin with no conditioner, only a steel-mat drag will be effective. There are also numerous all-in-one riding tractors that can be equipped with nearly every grooming tool imaginable. They can be most efficient, especially where hand labor is limited. The danger with these is that you might be tempted to drag too fast and too close to the edges. This will accelerate the build up of lips at those edges.

The cost of conditioners ranges from around \$200 per ton in bulk truckloads to \$7.50 for a 50-lb bag. Since substantial amounts would challenge most budgets, a good strategy is to invest in two to three tons annually. Evenly space the bags across the skin, dump each one, and then spread the material about using a hand rake. Then, drag it all in making sure that a thin layer stays on top. Think of it as "Fiscal Conditioning", and you will see your skin's playability steadily improve.