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Infield Soils and Topdressings Part 2

Paul Zwaska

Editor's Note: The following article is the second in a two part series authored by Paul Zwaska, Beacon Athletics. This article was written in 1999 when the author was Head Groundskeeper, Baltimore Orioles.

Infield Topdressings

In general, there are four types of topdressings on the market today. Calcined clay is probably the most widely known.

Calcined Clays: Quality calcined clays are usually made from the montmorillonite family of clays. They are fired to about 1200 degrees, a point where the clay particles become stable. Stable particles will not become soft or melt into a slimy clay when wet. Instead, they maintain their original shape and hardness. The firing process evaporates the moisture in the micro pores of the clay particles, making them extremely absorbent. Particles will release absorbed moisture, but at a slower rate. Calcined clays work exceptionally well as a topdressing for high-sand infield mixes. The firing process gives the clay particles a light bulk density. This prevents too much clay from sinking into the sandy soil. It also helps hold moisture at the surface. Normally, large pore spaces in high-sand base mixes allow gravity to pull moisture out.

Calcined clay also works on normal infield mixes, but at times it can hamper field preparations after a rain. Particles that are on the field when rain comes absorb the water to their field capacity. When you're trying to dry out the skin, the particles continue to release moisture. You have to add more calcined clay to the field to dry it up, and suddenly you have too much topdressing on the skin.

Vitrified Clay: Vitrified clay topdressing is made from the montmorillonite and illite clay families. These clays are fired to 2000 degrees, causing the particles to expand. The process creates macropores and reduces the amount of micropores. Thus, the vitrified clays absorb much less water than a calcined clay. If you're looking for absorption, the finer grades will work a little better than the coarse grades.

Vitrified clay topdressings are not to be used on infield base mixes with high sand content. Vitrified clays have a heavier bulk density than calcined clays, and the topdressing will sink fairly quickly as it is agitated by play and regular maintenance.

However, vitrified clays work tremendously well on normal or high-clay/silt infield base mixes. They can be used straight, but they work even better when mixed with a calcined clay in approximately a 60:40 or 70:30 vitrified to calcined ratio.

(continued on page 5)

Infield Soils and Topdressings - Part 2

(continued from page 4)

Vitrified clay in these base mixes creates a buffer zone between players' cleats and the infield base mix. This allows you to wait a little longer before you cover the field for a light to moderate rain. Vitrified clay sheds water as it gets wet. It allows the water to roll through to the base mix until it has absorbed all that it can handle. Any excess water will run off if the grade on your infield is correct. A small amount of calcined clay in your mix will help increase your water holding capacity a little.

Unlike calcined clay, vitrified clay won't absorb water to field capacity and extend your drying time by releasing the moisture.

Because of its lack of moisture-absorbing micropores, vitrified clay products will not work as a drying agent during a game. Also, it's not highly recommended as a soil amendment for tilling into your base mix.

Crushed Aggregates: The third type of topdressing material, crushed aggregates, combines various crushed stone products with crushed brick. These materials absorb minimal amounts of water, and they have a heavy bulk density.

Again, because of the bulk density, crushed aggregates should not be used on any high-sand base mixes due to rapid migration down into the mix. They can be used on normal infield mixes, and even high-clay/silt mixes, but only as a topdressing.

These topdressings perform better when enhanced with some calcined clay. Don't till these materials into your mix, or you may eventually wind up with something similar to concrete.

Diatomaceous Earth: The fourth and final topdressing material is diatomaceous earth. It's made of sedimentary rock composed of fossilized skeletal remains of diatoms (microscopic, single-celled plants). The material is very high in silica (between 86% and 94%). During processing, it is crushed, dried, and calcined to remove any organic contaminants. It becomes a very porous product that can absorb large amounts of moisture.

Diatomaceous earth works well for drying a field after rains, but it's very expensive and creates several major problems. First, it has a very light bulk density. This allows it to easily blow off your field in the wind, causing

(continued on page 6)

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(continued from page 5)

major problems with lips where your skin meets the turf edge. Also, when incorporated into the soil, diatomaceous earth tends to float back to the surface in time. It breaks down very rapidly from friction wear (dragging the infield). And finally, due to the high content of silica, it has a funny color and has shown some problems with glare on sunny days. For Oriole Park at Camden Yards, we currently use a mixture of 80% vitrified clay and 20% calcined clay as a topdressing for our infield. We maintain approximately a 1/4-inch layer of topdressing on our skin areas.

Maintenance issues

Base Mix: Here, the key is moisture, moisture, moisture.

Moisture is what will give your base mix the corky feel that the players desire. Try to keep your infield skin as moist as possible. Soak the skin deep in the evening after the last game has been played. It then has all night to perk as deep as it can into your mix without evaporation stealing too much away from it.

During the daytime, add water as time and weather dictate. I can't stress enough how important it is to keep your field moist as long as possible. When it dries out, it takes a long time to reestablish a good moist base again.

If your base mix is getting too tight or hard, you might decide that you want to open it up to introduce some pore space into it. You want to till it; I prefer to save rototilling for when I'm adding an amendment to the soil mix and I want to mix it really well. Otherwise, I think a rototiller adds too much air to the base mix at one time. You have to spend too much time with a roller trying to firm the base mix back up.

I like to use a greens aerator to open up my infield mix. It increases pore space while maintaining most of the integrity (firmness) of the base mix. Unless you want to use it to amend the base mix, scrape off your infield topdressing or pull it to the side before you start.

I might go over it once or twice, depending on how much pore space I want to create. Always soak the infield the night before, or do this procedure after a rain so the skin base mix is not hard and dry. Moisture will determine this method's success. Of course, you still re-roll the skin once you've dragged the infield after this operation.

One caution: never till or aerate your skin with the intention of leaving it open to help moisture soak deep. I have seen too many people end up with a quagmire because of this. Always roll your base first before adding water.

There will still be plenty of pore space left.

When I open the skin with an aerifier, I usually re-level my infield skin mix at the same time. When you are re-leveling your skin, you are basically rechecking the grade of the base mix from front to back to ensure that it's a smooth grade with no high or low spots.

When doing this, it's important to have your topdressing removed to allow the soil you add to properly adhere to the existing infield base soil. A nice, deep spiking of the skin works well to loosen the top inch or so to make it easy to cut down high areas. It also allows any soil you add to low areas to mix and bind better with the existing base mix.

You should re-level your infield at least once a year, and twice if it receives year-round play. At Oriole Park, we level our base mix three to four times per season. Frequency should be based on how mobile a base mix you have, the level of activity the field receives, and your manpower and time availability.

Re-level your skin periodically to prevent drainage problems caused by high and low spots.

Re-leveling allows you to cut down any high spots and fill any low areas. These areas can develop for two reasons: high concentrations of play (around bases and players positions), and dragging/grooming patterns you use on the field.

We check our grade by running a tight string line from the turf edge at the front of the infield to the turf edge at the back of the infield. It's important to remove any lips at the turf's edge before you run your string lines, since they can seriously throw off your grade reading. Roll and soak the base once you've completed the re-leveling project.

Topdressing: When you initially put your topdressing over your base mix, it should be spiked into the top 1/2 to one inch of the base mix. Once you're finished working this in, drag it and water it. Adjust your topdressing application so that you have about 1/4 to 1/2 inch of loose topdressing on top, and maintain that throughout the season by replenishing when necessary.

Spike your infield on a regular basis to smooth out cleat marks and other imperfections. You shouldn't have to cut deeper than 1/2 inch. Follow-up by dragging and watering the skin. Again, keep that skin moist as much as possible during the season.

Special pure clays are used in the batter's boxes, catcher's
(continued on page 8)

Infield Soils and Topdressings - Part 2

(continued from page 6)

box and the pitcher's landing area. Topdressing these areas takes a little more care. This clay is chewed-up by cleats and eventually spread around into the topdressing, so it's a good idea to sweep off and replace this topdressing on a regular basis.

When that clay mixes with the topdressing, it inhibits the flow of moisture and makes the topdressing very sticky. This makes it hard for deep watering of the mound and home plate skin areas. At Oriole Park, we usually replace ours after every third game.

If you use dry line chalk to mark your foul lines and batter's boxes, it's a good idea to scoop up what's left of the lines after the days games. This will prevent the chalk from becoming part of your skin mix, which can cause discoloration, a change in your soil texture over time, and a decrease in the flow of moisture into the base mix.

Finally, as you head into winter, when the field will be unused for several months, either scrape the topdressing off

the field and remove it, or create a catch basin an inch or so deep in the skin wherever the skin meets the turf. This prevents large amounts of topdressing from blowing into the turf edge and creating large lips during the windy months of winter. Here at Oriole Park, we do both as a good preventative maintenance practice for lips.

Remember, these are just guidelines to help you make better decisions when building, renovating, or maintaining an infield skin. There are many variables, especially when it comes to soils.

It's the responsibility of each groundskeeper to know what makes an ideal skin and to apply that knowledge. Use the resources available to you. You may not have the time or dollars to create the perfect skin infield, but you can't improve what you have unless you know what you're working towards.

*Paul Zwaska, Beacon Athletics, Middleton, WI.
Paul provides technical support and troubleshooting for Beacon Athletics customers.*

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