

# Trade Show and Equipment Demonstrations at Rutgers Lawn, Landscape, and Sports Turf Field Day,

By Brad Park



July 27, 2011, Rutgers Adelphia Research Farm, Freehold, NJ

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.

## 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

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## Dr. Henry W. Indyk Graduate Fellowship in Turfgrass Science

As many of you know, the turfgrass industry lost a dear friend and colleague in September 2005. We will all miss Henry very much and would like to insure that his legacy lives on. The Indyk family would like to establish a memorial fellowship to support graduate students interested in applied turfgrass science. This fellowship is being created to help assure that tomorrow's graduate students have the financial resources to get an advanced degree in turfgrass science at Rutgers University. To fund a full graduate assistantship each year in Henry's name, we will need to raise a total of \$400,000. Your generous support at this time will bring us closer to reaching this goal.

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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.

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.

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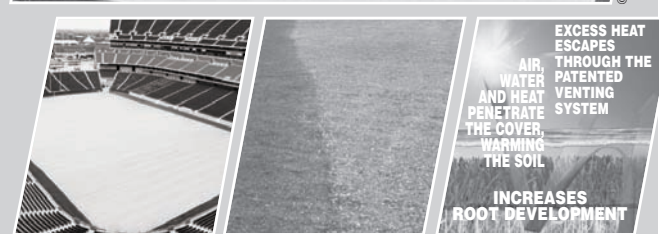
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These topdressings perform better when enhanced with some calcined clay. Don't till these materials into your mix, or you may eventually wind up with something similar to concrete.

**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 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.

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# SETTING YOUR LINES RIGHT WITH THE EMPHASIS ON STENCILING

Don Savard, CSFM, CGM



Whether it is for function or decoration, lines and logos personalize your fields and give your team the home field advantage. Almost all sports and games played on turf or packed clay require some form of lines or markings to help define boundaries, and assist the officials in making correct calls. Lines help the participants perform best by bringing order and strategy to the game. These markings are usually painted or marked with a non-caustic pulverized limestone. Here are some things that I have learned from other sports field managers that help me set lines.

**Measurements:** Sports require accurate measurements. Tape measures are more precise than measuring wheels. Surveying instruments are the most exact and may be required at the higher levels of the sport. "Square" or 90° corners can be made without surveying instruments by using the 3-4-5 method. Where you want to make a corner, make one line perpendicular to another. On one line, measure out from the corner 30 feet.

On the adjacent line, starting from the same point, measure out 40 feet. Draw a line from your 30 foot mark to the 40 foot mark. The result should be 50 feet. If not, adjust either line so that there is a 50 foot measurement from the 30 and 40 foot marks.

**Dry Line Marking:** For human safety, always use a non burning, non caustic marking material such as pulverized limestone. Avoid marking turfgrass with a dry marking material as it might injure turf, modify the soil or over time, create a ridge on the playing surface that could become hazardous to players. Dry marking materials work best on bare soil or "infield dirt". Dry line markers are similar to a drop fertilizer spreader. The marking apparatus features a narrow opening that is the width of the line and can be operated by one person. Other types of markers include a trough type that can be several feet long for marking base paths or shorter for marking batters boxes. These are usually used in the higher levels of baseball or softball and can require 2 people to handle.

*Continued on next page*



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# STENCILING

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**Field Marking Paint:** Paints consist of liquid (or solvent), color (or pigment), sticker (or binder) and other additives such as a fast drying agent. Sports field marking paints are usually water based latex acrylics. Petroleum distillate based paints or volatile organic compounds (VOC paints) can be injurious to plant tissues. Field marking paint is available the forms of aerosol spray paint in inverted cans and bulk paint in 1-5 gallon pail containers. Bulk paint may be premixed ready to use or it may need to be diluted with water in some ratio.

**Painting Equipment:** The most basic field paint equipment is the paint brush and roller, simple and effective but time consuming. Many sports field managers with only a few sports fields use the inverted aerosol spray paint can holder machine. This is a tool that no sports field manager should be without. It is helpful for touchups, for painting contrasting colors quickly and as a backup for when the primary paint machine breaks down. Most sports field managers use some form of a powered paint machine. These include sprayers ranging from a CO2 tank units to gasoline powered compressor or pumps to electric pump models. Push, self propelled and riding paint machines are available. Be sure that your machine is kept clean; in good repair and have spare parts are on hand.

**Preparations for painting:** For best results, mow the turf (at least where the lines are) before painting. In dry weather, avoid painting right after mowing unless you give the turf some water. This will help prevent a burning effect. Avoid painting wet grass. Paint does not adhere well to wet grass. To remove dew, connect two 100 foot water hoses and with a person on each end, start in the end zone and drag the hose the length of the field.

**Paint Can Tips:** Before shaking, tap the can with your hand to gently break the marble loose, then shake vigorously to thoroughly mix the paint. If you store aerosol cans upside down, it will make it easier to break the marble loose. Avoid temperature extremes. In cold weather, fill a 5 gallon pail with hot water, and put the aerosol cans in to keep them warm. Some brands of spray paint have adjustable tips on the can that can rotate to make a wide or narrow line.

**Mixing Paint:** Dilute (if necessary) your paint per the paint or sprayer manufacturers recommendations. Mix paint by pouring bucket to bucket, or, use a drill powered mixing device or use a bulk paint dispenser with agitation mixing. For best results, always strain the product before adding to the paint sprayer.

**Paint Application Tips:** Always string your lines for the best results. If you are painting lines on dry infield dirt, first moisten the dirt with water. This will prevent the paint beading up in the dust. Remember that when painting lines, your gait will influence not only the quality of the line (straightness, brightness and width) but also how much paint you will use.

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## Infield Soils and Topdressings

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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 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 is General Manager, Beacon Athletics, Middleton, WI.; and Member, Sports Turf Managers Association (STMA)*



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# STENCILING

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both common. Other tools include hash mark sleds and batter's box frames. Some sports field managers use planks as straight edges for painting along wide out of bounds lines or along end zone letters. If number stencils become warped, place on concrete and allow the sun's heat to warm and flatten them in a couple of hours. When dotting stencils, use an aerosol can to do it. This way the paint will dry faster. When painting logos, paint a white base coat first and allow it to dry. Then paint colors on top. Don't go by the rule "If a little paint looks good, a whole lot of paint will look great!" Too much paint can be harmful to turf. On most logos and letters, a border around each will make your work stand out on the field.

**Paint Removal:** If you make a mistake, be sure to keep an aerosol can of green paint or some turf colorant handy as an "eraser". I use a long handle, soft bristle truck washing brush and some mild soapy water as well as water hose for paint removal when necessary.

Sports field graphics make the game easier to play on and watch. Sharp looking field graphics draw the eyes away from field imperfections such as wear. It helps to create team pride, brings out the beauty of your field and showcases the talents of you and your crew.

*Don Savard is a Certified Sports Field Manager (CSFM); Certified Grounds Manager (CGM); Director, Athletic Facilities and Grounds, Salesianum School; and SFMANJ President*

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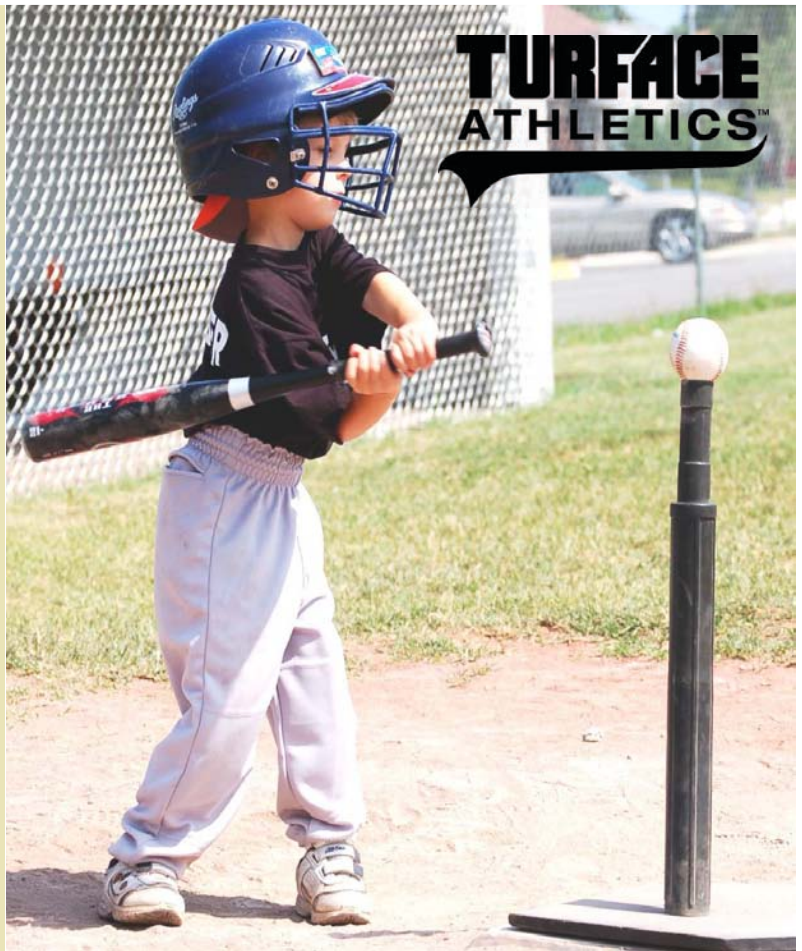
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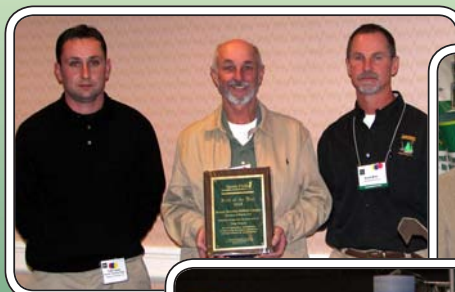


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