

"There's always someone behind me who can do that job," he says. "I like personally motivating myself. Might that change in 10 years, maybe. Maybe I won't want that pressure, or maybe it's still something inviting to me. Right now, I still love being around sports, so it's very easy for me to get motivated."

On game days, Smith typically doesn't have responsibilities, but many NFL Sundays he still ends up at the practice facility, mowing, painting or getting fields ready for incoming weather.

But on those game-days when Smith is free, you can find him right there at Mile High cheering on his team or watching at home on away-game days.

"I'm a huge fan of all sports, but when the team that you work with Monday through Saturday is on TV and you get to know the players and the coaches and their personalities, you always watch."

Speaking of players, Smith speaks highly of Denver's roster.

"Almost every football player that's come through here is very appreciative of not only my department, but all the support staff," he says. "They understand that you are trying to help them be the best. About 90 percent of the players get it, and the others are prima donnas that don't last long in this league."

"Most of these players are normal people and are appreciative of what you do and that we're out there with them in the snow, the heat, the cold. They are great guys, and some of them have turned out to be some of my best friends. After they retire, I'll stay with touch with them by email or text."

"Do I have to bark at 300-pound players to move? Yes. Mr. (Pat) Bowlen (owner of the team) pays me to keep these fields playable year-round, and if I see something that is detrimental to that, I'm going to tell them they need to move. Sometimes I feel like a sheep-dog with cattle, always nipping at their heels to move them around."

If he doesn't, he adds, players will head to the same spot every day. After explaining the reasons why, though, they generally get it.

"Because they know you're just doing your job," Smith says.

WEATHERING STORMS

Any Coloradoan will know what one of Smith's largest obstacles is year in and year out is—the mountainous state's penchant for blustery snowstorms.

"I know the time of year when certain cultural practices have to take place for the best fields, and the weather is the biggest unknown," he says. "It could snow in March when we need to get outside, or rain all of June, or we could have a wet training camp in July and August and really put us behind the eight ball."

"One of the hardest times that I've had in this job as a turf manager was in December of 2006, when we had two blizzards six days apart. Our organization does not own an indoor practice facility, and we had approximately 27 inches of snow in the first blizzard and 12 inches 6 days later. We were in the season and trying to get the parking lots cleared and sidewalks cleared, get players to the fa-

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cility to practice, move all the snow and to pull off practice was the hardest 2 weeks I've ever had as a turf manager. I've dealt with blizzards in season, but one at a time. To have two within six days was the absolute hardest.

"We had 16 feet of snow piled up around synthetic field. We had almost 40 inches in a week, and we couldn't even get on our natural grass fields. There was no way. I stayed here and I would plow the synthetic field with our pickup truck after every 4 inches of snow-fall, because we had to get practice in.

"It puts a lot of pressure on me and my staff to have things ready."

GETTING INVOLVED

Smith's involvement with STMA leadership began at the group's local chapter in 1994. He began as the executive secretary and worked his way up to the president in 1999. Due to another member's illness, Smith was asked again to fill in as president of the state chapter in 2001.

A few years later, his involvement broadened to the national level.

"I thought it would be pretty neat to represent the facilities used by professional athletes as a category 1 member," he said. "I was honored and humbled that someone thought of me to represent this group."

He won that election in 2005 to serve as a director on the group's board.

"Then I got a phone call that I had been thought of to run for the executive council, which means you're ascending into the presi-

dency," Smith adds. "And that was just amazing to me that now people really thought that I was smart enough, wise enough and had the vision enough to lead our organization."

Having watched presidents in the board room as a director and ascending to the presidency, Smith says he's learned many valuable lessons he'll apply as the leader this year.

"Going to the national board, I didn't know a lot of the things that I know now about scholarship, finances, outreach, audits and budgeting for staff, but a lot of those things come with the process," he says. "I've very much enjoyed my journey and my time to represent the organization."

But those rewards of getting involved in STMA leadership don't happen naturally.

"It takes becoming involved and getting to know people," Smith says. "You have to network. You have to get out there and let people see that (you) might be a good board member. It's very fulfilling."

BIG TO-DO LIST

Looking at the year ahead, Smith has a full plate of accomplishments he'd like to make for the association.

He lists member benefits, educational bulletins, information outreach and the website as areas he'll focus on.

"Anything that we can do to help educate our members, I want to see that stay very strong," he says. "And in this economy we must be even more fiscally responsible. We have to stay judicious in our responsibility to our membership on that."

Doing what's best for STMA membership comes naturally for Smith, according to Abby McNeal, CSFM, director of turf management at Wake Forest Athletics, who served last year as the board's past president.

"He always has what is best for the association and the members at the forefront of his thoughts," McNeal says, adding that he's not afraid to offer thoughts in the board room that are different than others on the board.

During his time on the board, Smith also has had a good presence with several committees, including chapter relations, certification, and finance and audit, McNeal says, and that will help him continue to provide membership benefits and strong education programs through a variety of vehicles.

Smith adds that focusing on outreach and education can help ensure that younger STMA members will have long careers ahead of them.

"This is such a high turnover profession," Smith says. "People that just get into the industry, if they can last 5 years, they'll last for 20 years. The 1st through 5th year is really tough. We need to keep education going for those groups."

Progress in environmental stewardship is also a top priority for Smith. The association needs to show that the profession is good for the environment and end-users, he adds.

Smith also says he sees great opportunities ahead through international growth and partnerships, especially in shared online resources with other countries' sports turf management groups.

Finally, Smith would like to redevelop the current strategic plan for continuity of new programs and services for STMA's next five years.

"With 1-year presidencies, I feel that it's important that if a president begins something in their term in the strategic plan, that it's communicated to the president-elect," he says. "That the strategic plan is there to lead us. To create a strategic plan for the next 5 years is one of the big things that I have on my plate for the year."

A strategic plan will be no problem for Smith, adds McNeal.

"He has a great vision for the organization as well as a strong understanding of the strategic plan," she says. "He truly knows the direction that the organization is headed and he will be successful in helping continue to raise the professional of the STMA and its members."

McNeal isn't alone in her accolades of Smith's abilities as a leader.

"When Troy Smith talks, people listen," says Kim Heck, CEO of the STMA, who adds that he has a calm and disciplined manner of bringing forward ideas and reactions to issues.

"When he chaired the Certification Committee, he created and communicated his vision for the certification program," Heck says. "He helped committee members understand why this is so important to STMA, and then he got everyone working to achieve that vision. That's exceptional leadership."

"And that's definitely his style inside and outside of the board room."

As McNeal rotates off the board, she says she'll miss working with Smith.

"He has taught me many things that have benefitted my personal and professional growth," she says. "He's a great teacher and will continue to teach those around him to be better professionals and sports turf managers."

"Troy Smith has perfected many of the leadership qualities that sports turf managers work our whole career to develop," adds Mike Andresen, CSFM, facilities and grounds director at Iowa State University, who rotated off STMA's board last year. "Most of all, Troy is always exceptionally informed and prepared. (He) accounts for every detail. He has vision, focus and a deep passion for this association and where we need to head...With all those qualities, Troy may still be the most humble sports turf manager I know."

GETTING BY WITH A LITTLE HELP FROM HIS FRIENDS

Humility is a common thread to the words Smith himself uses when he talks about the honor of serving as STMA president.

He says he could never have achieved this goal without the support of his staff, which includes his assistant, Kyle Bauman, one seasonal employee and one intern, as well as his family—wife, Bobbi, daughter, Brianne (21) and son, Brian (18).

"My wife," he says, "Thank God she loves the NFL."

"I want to say how honored and humbled I am to be elected to lead the organization," Smith adds. "That I was thought of highly enough, it's been very rewarding. I have a friend who says this many times, that I will never be able to put into this association what I get out of it, ever. As hard as I work to guide this association, I've gotten so much more out of it than I'll ever be able to put into it." ■

Darcy DeVictor Boyle is a free lance writer based in Lawrence, KS.

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Skin surface selection and management for infield

THIS ARTICLE provides information on infield mix (soil) selection for use as baseball and softball skin surfaces, as well as maintenance guidelines to provide uniform playing conditions.

Soil used to construct a skin surface is referred to as infield mix. Thus, soil selection and management of skin surfaces will affect playability. A high quality skin surface is smooth, uniform, and provides consistent footing and ball response; whereas a poor skin surface can result in errors by players fielding ground balls, player injury, and chronic puddling in rainy weather.

A high quality skin surface is often described as one that is moist and cork-like, as opposed to hard and dry; the surface should allow players' cleats to penetrate the surface and leave an imprint with very little soil disturbance or displacement. The skin surface should not give way (break loose) when players plant their feet to throw, field a ball, or run. These characteristics are strongly controlled by the physical properties of the infield mix and its maintenance.

Physical properties of an infield mix are strongly affected by its sand and fines (silt and clay) content. Maintenance of a skin surface involves managing water (irrigation and tarping), dragging and grooming, and the use of conditioners. Dragging and grooming loosens, levels and smoothes the skin surface to maintain safety and playability. Conditioners are typically granular, clay-based materials used to maintain playability over a range of weather (water) conditions.

SELECTING AN INFIELD MIX

ASTM (2007) suggests that infield mixes consist of 60 to 81% sand with the remainder being comprised of silt, clay, and gravel (preferably none) according to the particle size specifications. A 4- to 6-inch layer of mix is placed above the subsoil and finished to final grade. In cases where the infield mix contains greater than 85% sand

and exhibits high internal permeability after heavy compaction, the mix should be placed above a gravel drainage blanket to improve water retention and stability of the skin surface.

Mixes with less than 19% silt and clay are better suited for rainy climates due to better internal drainage; however, these mixes will require more irrigation in dry periods to minimize dust and provide a firm stable playing surface. In contrast, mixes with greater than 19% silt and clay will drain more slowly and retain more water; hence, the need to irrigate (frequency) will be less. Mixes with > 19% silt and clay will also be more prone to compact and be difficult to loosen, especially when dry.

Some field managers prefer skin surfaces that contain a greater percentage of fines (silt and clay) compared to the ASTM recommendation for infield mixes. An infield mix should contain between 50 and 75% sand because mixes with > 75% sand can become too loose and are readily moved (displaced) during play or dragging leading to high and low spots, as well as the formation of lips at the skin-turf boundary. Infield mixes should not exceed 40 to 50% silt and clay because these materials can become compacted, reducing the ability of the surface to accept water, and thereby limiting the grounds manager's ability to "soften" a hard skin surface with irrigation. [We] recommend infield mixes be comprised of approximately 60% sand, 20% silt, and 20% clay.

Skin surfaces should be constructed with a finish grade that provides adequate surface drainage (water runoff) away from and off the skin due to the limited permeability of most infield mixes. Baseball and softball

skin surfaces should be designed with a finish grade of 0.5 to 1.5% slope away from the center of the infield.

Baseball and softball fields designed into multi-sport fields should surface drain water away from the infield and skin surfaces. Field designs that position skin surfaces of infields at the lowest elevation can render the baseball/softball field unplayable for several days after rain.

The following design parameters will provide reasonable skin surfaces for the majority of municipal and board of education baseball and softball infields.

1) Excavate 4 to 6 inches of native soil from the site.

2) Match the subgrade to the finish grade contours (ideally 1.0% slope away from the middle of the infield) using laser-guided equipment.

3) Firm, if necessary, but do not overly compact the subgrade (i.e. roll with a small [< 1 ton] pavement roller disengaging any vibratory function); any internal drainage that can be achieved through the subgrade will be beneficial.

4) Replace the excavated layer with 4 to 6 inches of infield mix containing no more than 70 to 80% sand (remainder silt and clay). Ideally, there should not be any gravel in the mix.

5) Use laser-guided equipment to final grade the skin surface to mimic the contour of the subgrade. This will ensure the correct contouring required for proper surface drainage.

6) A calcined clay conditioner product can be applied as a topdressing (0.25-inch or less) to the surface to create more consistent ball bounce and desirable sliding conditions.

SKIN SURFACE MANAGEMENT

Skin surface management is typically as much art as science and practices have often been handed down from one field manager to the next. The skills of the grounds manager are often a greater contributing factor to the playing quality of skin surfaces than the infield mix itself.

Grounds managers must use practices that are appropriate for the specific field or modify the field conditions to match a

given maintenance program. While skin surface management techniques may differ from one grounds manager to the next, there are specific tasks that need to be performed to produce safe playing conditions on skin surfaces. These tasks include but are not limited to watering, scarifying and dragging, leveling, lip removal and conditioning.

The frequency and intensity of these tasks is strongly influenced by the particle size distribution (sand, silt and gravel content) of the infield mix.

WATER MANAGEMENT

Water availability is probably the most important factor affecting the overall performance of skin surfaces. The water content of a skin surface affects both ball and player reaction. Water is needed to soften fine-textured infield mixes (high silt and clay content) and firm coarse-textured mixes (high sand content).

Field design should include water supply to the skin surface.

A quick coupler (hose connection)

should be located approximately 6 feet behind the mound on a baseball field; the safest and most logical place for the coupler. More involved irrigation designs include automatic pop-up irrigation sprinklers to lightly water (syringe) skin surfaces.

Differences in the approach to watering skin surfaces are attributable to water accessibility, budget, labor, climate, particle size distribution of the infield mix, and coach and player preferences. Irrigation water for skin surfaces and turfgrass is often unavailable in the case of municipal fields. Conversely, managers of professional fields often “flood” skin surfaces before a homestand, immediately after a game, before lunch on game day, and conclude with a final light watering in between batting practice and pre-game activities.

Water held within a skin surface produces the “corky” feel that players desire; water is often provided through irrigation after games in addition to supplemental game day irrigation dictated by weather.

[We] recommend skin surfaces be deeply ir-

rigated at a rate that allows water to infiltrate slowly into the surface and be retained for a considerable amount of time. Care must be taken to avoid overwatering areas surrounding skin surfaces.

INFIELD DRAGGING AND GROOMING

Periodic scarification, leveling, and smoothing of skin surfaces is required; this can be accomplished with commercially purchased grooming machines or constructed drags which can be hand-pulled or towed by a small tractor or utility vehicle. Scarification and leveling methods should produce a thin (0.25-inch) loose layer or “cap” on the skin surface. This cap provides more uniform ball bounce and roll and a good surface for sliding. Scarification of this layer should not exceed 0.5-inch (too deep) otherwise traction (footing) will decrease and ground balls can skid rather than bounce. Scarification often involves dragging the skin surface with a nail-drag (or similar) to loosen the surface 0.25- to 0.5-

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inch. This loosened material is used to level-out high and fill low spots, which decreases the time to dry the surface after rain (puddles are reduced in size after leveling). After scarification and leveling, a steel drag or cocoa mat is often used to groom (smooth) the surface before play.

Proper infield dragging, leveling, and grooming techniques maintain/improve surface drainage, safety and playability of skin surfaces. Improper techniques that physically move infield mix into turf will encourage the development of a lip. A “lip” is a mound or ridge at the boundary between a skin surface and turf. Lips impede surface water drainage off the skin surface as well as present unsafe playing conditions. Therefore, it is imperative that infield dragging and leveling along the perimeter 12 inches or more of a skin surface be performed by hand in a direction that moves soil away from or along the skin-turf boundary, not toward the turf. Wind and water erosion can also move infield mix into border turf areas resulting in a lip.

Invariably, movement of infield mix into the bordering turf does occur and routine corrective practices should be used to reduce lip development. Stiff-bristled brooms are often used to brush 6 to 8 inches of the bordering turf towards the skin surface. Blowers, irrigation hose spray and power washers have also been used successfully.

If allowed to develop, large lips require costly and time consuming methods to correct. A sod cutter will be needed to remove the grass and buildup of infield mix from the lip along the skin surface-turfgrass border. Repair of large lips may also require substantial re-grading to re-establish an acceptable grade along the skin surface and turf boundary area. Typically, the turf-skin boundary is re-established with sod.

Adding infield mix to “eliminate” a lip is a common mistake because this action elevates the skin surface relative to surrounding turf, decreases playability and safety, and often stops surface drainage. Repeated addition of infield mix eventually results in major renovation work to fix these compounded infield problems. Renovation involves the “extra” infield mix being removed and re-grading to reset the proper infield contours. The turf-skin boundary can then be re-established with sod.

USE OF INFIELD CONDITIONERS

Conditioners are materials designed to be spread on top of skin surfaces to improve playability over a range of weather conditions. Calcined clay is one of the most commonly used conditioners. Typically montmorillonite clay is fired at approximately 1200F to form granules of calcined clay that remain hard even when wet.

Conditioners are often used to soak-up excess water after rain; finer-textured conditioners work best for this purpose. Conditioners used for this purpose should be swept-up (removed) from the skin surface after play, stored and allowed to dry for re-use.

A 0.25-inch layer of conditioner can be spread (topdressed) evenly across the skin surface to produce the loose cap described previously. Using a granular conditioner as the cap material rather than infield mix generally makes it easier to remove migrated material from the turf boundary back onto the skin surface and prevent the development of a lip.

Skin surface water retention is a function of the amount of silt and clay in the infield mix, not the amount of calcined clay on the surface. Calcined clay applied to the skin surface will often dry before the underlying infield mix resulting in some grounds managers applying unneeded irrigation water. Fine-textured infield mixes can be modified to react more like coarser-textured mixes by incorporating calcined clay. In contrast, coarser textured infield mixes would be less affected by adding calcined clay because of the similar particle sizes between the infield mix and the conditioner. Thus, a particle size analysis of the existing infield mix is necessary when deciding whether to incorporate a conditioner; the addition of calcined clay to a coarse-textured infield mix often will not improve playability.

MOUNDS AND BATTER’S BOXES

Clayey soil or “bricks” (clay >35%) are used to construct a stable, wear resistant surface for the “table” (the area behind and to the sides of the pitching rubber), landing area of the pitcher’s mound, and the batter’s and catcher’s boxes around home plate. The installation of a clayey soil often minimizes the damage caused by a pitcher digging in

front of the rubber. Clayey soil should be placed and compacted (hand tamper) about 0.5-inch below the surface of the mound; infield mix is used to bring the area to final grade.

Particle size guidelines for an infield mix to be used in the construction of a skin surface range from 50 to 81% sand and 20 to 50% silt and clay. Infield mixes that contain greater than 75% sand will require substantial irrigation to provide a firm and stable playing surface during dry weather. Conversely, infield mixes with less than 60% sand will be very firm when dry and irrigation will be needed to “soften” the skin surface for play.

Regardless of infield mix selection, skin surfaces must be graded to provide surface drainage away from the infield (0.5 to 1.5% slope). It is also important to provide a water source to irrigate the skin surface. If irrigation is not available, playability of a skin surface will be less than optimum during drought. Grooming methods are needed to produce a uniform 0.25- to 0.5-inch cap over the skin surface and preventative maintenance is necessary to minimize lip development. Lips along skin surface perimeters present a hazardous condition and require costly, time consuming renovation work.

Conditioners can be applied (top-dressed) to skin surfaces to act as the cap; finer-textured conditioners can improve playability during rainy conditions. Additionally, conditioners can be incorporated into finer-textured infield mixes to improve surface hardness and increase permeability. A particle size analysis should be performed on the conditioner and infield mix to determine compatibility before incorporating conditioner into the infield mix.

Pitcher’s mounds and the batter’s and catcher’s boxes should be constructed with clayey soil or “bricks” containing > 35% clay to provide the stability, traction and durability needed in these high traffic areas. ■

Bradley S. Park is sports turf research and education coordinator at Rutgers University; Dr. James A. Murphy is extension specialist in turfgrass management at Rutgers. This material is online at <http://www.cpe.rutgers.edu/brochures/pdfs/Skin-Surface-Selection-and-Management-for-Baseball-and-Softball-In-fields.pdf>.

JOHN MASCARO'S PHOTO QUIZ

John Mascaro is President of Turf-Tec International

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Answer to John Mascaro's Photo Quiz on Page 33



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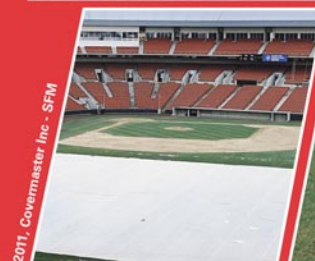
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What's your infield mix?

Editor's note: *We asked some veteran infield skin managers about their infield mixes and why they chose that combination and/or products:*

ERIC BLANTON, Reno Aces

I have Gail Materials Collegiate blend infield mix. It consists of a 60% sand/20% clay/20% silt mixture. It was chosen due to its high clay and silt content and NO cinder content. It holds together very nicely with very little cleat marks after games. Gail Materials has continuously tried to make their products better no matter what outcomes they have. They are a company that strives to be the best and that also was another reason I chose their product.

GEORGE MARSHALL, Stetson University

Here at Stetson University in Florida we use a clay field approximately 6 to 8 inches deep on a sand base. We mix in with it Turface Pro League Red that serves as our playing surface. We laser grade the infield annually in the off season, and will do it twice if necessary depending on the rainy season. Usually after laser grading we will add around 1 to 1 1/2 tons of Turface and play with it after that to get it to our liking. We try and aerate with our Toro aerator a couple times a year to aide in drainage and fight compaction.

LARRY DIVITO, Minnesota Twins

Our infield mix is from Natural Sand in Slippery Rock, PA. Grant McKnight is the owner there and he is the one who engineered this infield mix. It is somewhat similar to what the Mets used for their installation at Citi Field. Bill Deacon gave me some great anecdotal evidence of its performance. As for the blend, I would leave it to Grant to discuss. (see p. 22)

DAN DOUGLAS, Reading Phillies

Infield mixes in general have improved dramatically in the past 25 years. Suppliers are now producing much cleaner

products and are more conscientious of the makeup of their mixes. There are also a lot more choices of amendments. Whether a mix is loose, tight, dry, sticky or just an unappealing color, there is an amendment available to correct the problem. In most cases, I recommend finding a fairly local supplier of infield mix (to save on trucking costs) and changing any characteristics of the mix you don't like with amendments.

The infield mix at FirstEnergy Stadium in Reading is a combination of Professional Diamond-Tex (50% sand/32% silt/18% clay) and amendments. Professional Diamond-Tex is tan in color, dries out quickly, does not get sticky when wet and, notably, is produced only 30 miles away by Martin Lime-stone.

The infield skin is renovated in

March when we: add new infield mix, if needed, to help meet grade; Stabilizer is applied; the top 2 inches are tilled and the infield skin is laser graded and rolled. A top-dressing combination of Turface Pro League and Diamond Pro Vitrified Infield Conditioner is maintained during the playing season. The amendments have aided in overall moisture management, footing, ball bounce and aesthetics of the infield at FirstEnergy Stadium.

JIM WIGGINS, Tomball (TX) ISD

We just recently rebuilt both our softball and baseball infields as both were in dire need of an overhaul from the bottom up. We ended up taking about 4 inches out of the baseball field and 2 inches out of softball. Starting with the new subgrade of 60/40 sand clay mixture we had blended, the contractor, 4E Turf Services, and then began the compacting and laser work on the subgrade. Both fields had Diamond Pro Vitrified Red added as the new topdressing and then rolled and nailed multiple times to achieve our finished product. After 10 years of amending and working on our fields we were able to finally redo both fields and are completely satisfied with our finished product.

In the past we have used Klakon and Turface as infield conditioners and have used and still use Klawog mound and home plate clay for those areas. Getting used to the new vitrified product compared to our calcined products will be a new learning tool for us. I was comfortable with my Klakon and Turface products, and still have them in our

infield mix ▷

If there are 1 or 2 crew members, working on four or more fields every day, the infield mix will need a larger sand content as watering and drying will not be able to be maintained by the grounds crew.

baselines, mound and home plate areas on the baseball field. I feel water management will become even more important now with this new conditioner, but look forward to the new challenges this may bring.

During the redo portions of both fields and with Rain Bird's help, we added new Falcon high speed rotors to both infields. These dirt zone sprinklers have been time savers for us over the years. We finished off the redo's by adding a quarter-inch of sand topdressing to both fields. Bring on the seasons which start in the middle of January here in Texas!

CRAIG SCHLENDER,
Ball Diamond Fine Sports Turf

I would have to say my favorite infield mix would be a 60% sand/40% clay silt mix, 6 inches deep, incorporated with 6-8 tons of calcined clay, on a regulation baseball field, with 1 ½ to 2 tons of calcined clay topdressing. I prefer the calcined clay amendments for good moisture holding ability on hot, dry days and the wicking

ability on rainy, wet days. The addition of calcined clay on very wet days, used as a drying agent, doesn't change the mix or color in the future. The silt and clay provide a high quality, solid base for spikes to get good traction.

As a field manager, I like a higher clay, silt content with the ability to keep a high moisture content in the mix so it has a very solid, firm base feel; 60% sand, 40% clay on days with rain approaching, backing off on water, so that it will wick more moisture when the rain falls.

As a consultant, I try to prescribe a mix suited to the manpower of the grounds crew staff. If there are 1 or 2 crew members, working on four or more fields every day, the infield mix will need a larger sand content as watering and drying will not be able to be maintained by the grounds crew. The mix will stay softer when dry and will be more playable when wet. I still like to see calcined clay amended to the mix. A 70% sand, 30% clay, silt mix works well for a recreational mix.

On all fields, surface drainage and available water is the most important part of a good infield. On high-use complexes where time is a factor of maintaining good moisture in the mix, I suggest the addition of high out-put irrigation heads, so water can be added at night or early morning. This should be set up with an automatic shut off should a rain storm show up.

Whatever the mix, if the moisture content is right, the mix will play pretty well. I prefer a darker mix to minimize the glare for players and fans. In Wisconsin, where I consult on many fields with low budgets, amending seems to be a considerable option due to trucking costs. Additional factors include true surface drainage, ability to water enough and normally the addition of calcined clay.

Some fields are more than 1% slope due to various reasons, and in these circumstances, I will use a higher clay content and vitrified clay as a topdress, as it will stay put better because it is denser but wicks less water. ■

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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