

fered varieties with more of an upright growing pattern, and a finer bladed type of turf that could handle the heat. That's why we went with it," Klein says.

This past season, the infield was grassed with 419 Tifway bermudagrass, at the request of the infielder players who wanted a shorter height of cut and a faster ball roll on the infield. "The infielders like it fast. The pitchers like it slow. This year we had a better earned run average with it fast as opposed to when I had it taller to help the pitcher," Klein says. "Sometimes coaches over-read these things. In my eyes, both teams have to play on it. You either have players or you don't have players."

At Minute Maid Park, home of the Houston Astros, Dan Bergstrom, senior director of major league field operations, says "I'm really excited about the new zoysiagrasses."

Although the field at the park is mainly grassed in seashore paspalum, Bergstrom has tested Zorro Zoysia, Zeon Zoysia and

L1F Zoysiagrass in certain areas. Right now, on Tal's Hill, the slope at the rear of the outfield that is in deep shade for most of August and September, Bergstrom maintains 2,500 square feet of L1F Zoysia.



▲ **The sloping**, grassed hill in centerfield at Minute Maid Park in Houston features L1F zoysiagrass. Photo courtesy of Houston Astros.

"We put L1F on the hill and it has been absolutely gorgeous. It's got the esthetics we're looking for. We're able to mow it down tight under 3/4-inch. It's a beautiful color. It's a *matrella* with a super fine texture. It's wear tolerant. It's been bulletproof," Bergstrom says.

Tal's Hill gets different, more aggressive wear than the rest of the field.

"When a player makes a play on that hill, he gets there at full speed and stops at full speed, when he is chasing the ball to that hill. Every team that comes in does practice on the hill. The visiting center fielder will run up all over it for a half hour before batting practice," Bergstrom says.

"Our stadium tours go past the hill; it gets a lot of foot traffic. It's also the area immediately behind our stage for major concerts. All of our power cords, and all the traffic related to

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▲ South San Antonio High School's ball field grassed in Zeon Zoysia. Photos courtesy of Richard Mendez.

Zoysia has also been used on baseball fields at the high school level. Richard Mendez was the sports turf manager at South San Antonio High School in San Antonio when the field was renovated in October 2010. The original plan was to grass with bermudagrass but once he saw Zeon Zoysia, Mendez changed his mind. "It blew me away," Mendez says. "The feel of the grass, how when a ground ball is hit it slows the ball down because it is so thick, that was a good thing for our infielders, for the ball to slow down."

The base paths, infield, and outfield were all grassed with Zeon. Mendez says he noticed a difference in maintenance requirements almost immediately.

"I cut down my watering by 33%, if not more. This grass just needs less water," Mendez says. "I didn't have to run the sprinklers, especially during the tournament nights, so we didn't have to come to a wet field in the morning. For us it was a big plus, to be game ready a lot sooner for the morning game."

He also used less fertilizer on the zoysia than on the field when it was bermudagrass.

"We didn't have to fertilize but maybe a pound of nitrogen a year. That cut back our budget quite a bit. Our athletic director was pretty pleased about that, that we didn't have to buy as much fertilizer as we did with bermudagrass to keep it green," Mendez says.

He also no longer had to overseed the field.

"Maintenance costs were cut down in the fall and the spring because you didn't have to overseed anymore. The reason to overseed is to keep the body of the grass. Bermudagrass loses the body, zoysia does not. I wanted to paint it but we didn't. My test was that it would need to be green by the time our annual tournament came along in the second week of March. We had a green baseball field by then," he says.

Mendez says he sees a place for zoysia on sports fields.

"I think zoysia is going to be the grass of the future for sports fields because of the low cost of maintenance, especially

in high schools, because school budgets are cut. If we can have less maintenance costs we can put that money into education," Mendez says.

Coach Donaldo Perez of Somerset High School in Somerset, TX guided his baseball team to the playoffs that were held at South San Antonio's field grassed with Zeon Zoysia. Perez says that both he and his players noted an improved difference on the zoysiagrass field.

"The grass at South San is so tight-knit. The ground balls to our players were so sound, a lot sounder than most fields. They were pure

ground balls toward you. The field plays real smooth," Perez says. "The grass makes a difference in how the ball is played. I felt that that field really was a really good field to play on. We had some true hops. There are other fields that you play on that are not the same. This was really player friendly, ground ball friendly."

Charles Harris is president of Buy Sod, Inc., a licensed producer and installer of Zeon Zoysia in Pinehurst, NC and a member of the The Turfgrass Group's Zeon production network. Harris says he's grassed two high school baseball/softball fields with Zeon Zoysia in North Carolina so far.

"Zeon is very fine-bladed and esthetically, it's a great turf. The ball rolls across it very well. It's very dense," Harris says.

Using zoysia on the fields he's installed, he says, has produced

"positive feedback. They've been very happy with the result of what we've put in."

Harris says the key is for sports turf managers to be aware that maintenance requirements on a zoysiagrass field are different than on a bermudagrass field. "I think it's just people getting used to growing zoysia. You can't grow it like a bermuda-

Although zoysia is a very dense turf and can withstand a lot of wear, "once damaged, it doesn't have as quick a recovery as bermudagrass," Harris says.

grass. It doesn't need the same amount of nitrogen feed. It's a little slower growing so the maintenance practices are different. It's a learning curve as they get into it," Harris says.

Although zoysia is a very dense turf and can withstand a lot of wear, "once damaged, it doesn't have as quick a recovery as bermudagrass," Harris says. "So the question is, how will it recover? What is the threshold for the number of events it can withstand? In many ways, it's better for maintenance and es-

thetics, but what we have to consider is, is it the right fit for the facility? I think it needs to be experimented with more and used more. It's certainly is a very good turf for sports turf. It could definitely work very well."

Kevin Morris is the Executive Director of the National Turfgrass Evaluation Program based in Beltsville, MD. Morris worked at NTEP for 15 years with the late Jack Murray, the legendary USDA turf breeder who is credited with bringing many of the zoysiagrass accessions from Southeast Asia into the United States, including, among others, the turf that eventually became Zeon Zoysia.

Morris says NTEP recently completed a 5-year trial on zoysiagrass and the program has plans to launch a new zoysia trial this summer that includes some 35 unique entries. So far, most of the testing NTEP has done on zoysia has been for home lawns and golf use. The program has yet to conduct a wear tolerance test specific to sports field use.

Still, Morris says, "zoysia holds a lot of promise." He notes that although there are real distinctions between cultivars, zoysia, in general "does have better winter hardiness than bermudagrass." The grass can also survive in lower pH soils. "The whole pH and low maintenance aspects are where it has advantages over bermudagrass or the cool season grasses," Morris says.

Brian Schwartz, Ph.D., is a zoysiagrass and bermudagrass breeder at the University of Georgia. "Zoysia has a stronger leaf ... it doesn't wear a path as easily. It's a lower fertility input grass. So, from a benefit for the end user, they'll spend less on management and it maintains density. That's very important to an athletic field, that it maintains density with less input. If you fertilize bermudagrass with the same level of N, it would be alive but not as dense. I could see it working. That's why I think it would be a positive. There's better color retention into the fall. In the fall it doesn't change to the dormant color without a real freeze. Bermudagrass starts turning dormant, not only with cooler temps but with shorter day lengths. So, a lot of the zoysias need a freeze to turn them dor-

mant. Some of them will be growing and recovering from a traffic event in the fall when there's football. So, that's a positive," Schwartz says.

"On the negative side, once the leaf in the canopy does get worn, it will have a harder time recovering as fast as bermudagrass," Schwartz says.

He says that he'd like to see more research on zoysiagrass for sports turf use. "I would love to see a football or soccer field grassed with 50 yards in zoysia and 50 yards in bermudagrass. That would be the coolest thing in the world for me. It would receive the same amount of wear and we would see which one would hold up. That's never going to happen, but it would answer 90% of our questions on one or two fields," Schwartz says.

"I just think there's a yearlong benefit of having zoysiagrass on a sports field like baseball or softball, where you're not worrying about wearing it out. For lower

yearlong nitrogen rates, and less yearlong watering, you can keep the density so high and uniform with less inputs. Especially on a municipal level where you may ignore a field for a period of time, zoysiagrass could be ignored and you could get it back very quickly. At the lower input level, it could be very successful and beneficial for folks who can't keep up with the mowing rates and nitrogen rates that a high end bermudagrass would need," Schwartz says. "Add in some shade issues with stadiums, you have a fit for zoysiagrass for a lower requirement for light. Zeon would make a beautiful fit for stadiums because of shade." ■

Stacie Zinn Roberts is an award-winning writer and president of What's Your Avocado?, a writing and marketing firm based in Mount Vernon, WA

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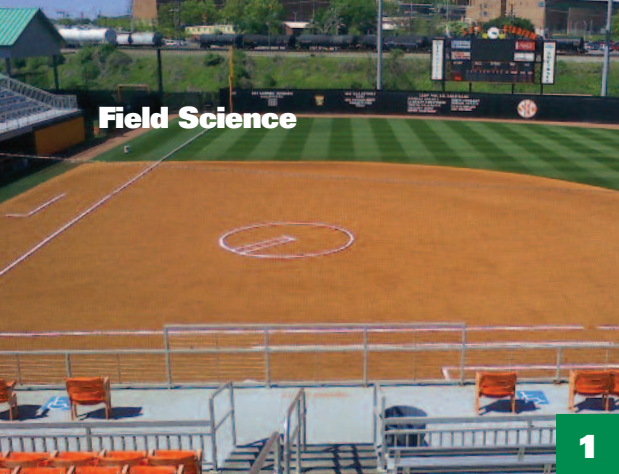
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▲ **Field #1:** Sherri Parker Lee Stadium on the campus of the University of Tennessee, Knoxville. Photo courtesy of Darren Seybold. ▲ **Field #2:** Husky Softball Stadium on the campus of the University of Washington in Seattle. Photo courtesy of Tyler Clay.

Advice on maintaining softball infield skins

SportsTurf asked the following turf managers who maintain softball diamonds a few questions on how they make their skins better.

- Tyler Clay, University of Washington
- Herb Combs, CSFM, Athletic Field Supervisor, Intercollegiate Athletics, The Pennsylvania State University
- Jason DeMink, CSFM, University of Michigan
- Eric Harshman, Assistant Sports Turf Manager, University of Kentucky
- Tracy Schneweis, Sports Turf Manager, America Softball Association Hall of Fame Complex
- Darren Seybold, Director of Athletic Surfaces, University of Tennessee

What combination of clay products, amendments, moisture and maintenance routine do you use to keep the pitcher's circle in top condition?

Seybold: The infield consists of a high density red clay material that helps us produce a firm but not hard surface that can absorb a lot of water but not lose its ability to produce a quality footing, as well as smooth ball/surface interaction. Our team in the past has been built around the concept of speed and therefore the coaching staff wanted a “hard” surface. This material allows the agronomy staff to have enough water in the profile to provide the infielders with a tremendous fielding surface as well as accommodating the teams need to have a fast surface for their hitters to slap hit and steal bases.



Leaving your finished clay work a fraction of an inch below the rubber will promote less digging, and limit the opportunity for the surrounding surfaces to build-up. — Tyler Clay

DeMink: We patch daily and apply conditioner as needed. The only amendment we use is a natural clay enhanced with polymer.

Combs: We use mound clay for our pitching mound and cover it with a thin layer of amendment. The mound is repaired daily and watered as needed. To help maintain the overall quality and moisture of the mound we tarp when it is not in use.

Harshman: I water the infield (pitchers circle included) at least three times a day, if not more or less depending on weather conditions. I try to water the infield first thing in the morning. The first watering of the day consists of a heavy soaking, making sure the entire playing surface is well saturated evenly throughout. I then follow up with a water cycle before or shortly after lunch, cutting back on the amount of water from the first cycle of the day but still making sure to water evenly throughout the entire playing surface. The final water cycle is done right before practice or before a game. This cycle is done quickly, applying the least amount of water for the day. If done correctly the playing surface will keep a consistent moisture level for the entire practice/game.

Our infield mix consists of a high density red clay. All maintenance repairs to the infield (pitching lane, batters box etc.) are done with this same clay.

Our infield conditioner helps in maintaining proper and consistent moisture management. Like most infield conditioners this product breaks down over time and I apply fresh, new material when necessary and try to remove whenever possible.

There is no difference in my maintenance practices for the pitcher's circle. All maintenance practices for my clay surface are treated the same way for 100% consistency.

Clay: The upkeep of our clay surfaces (pitcher's circle, home plate and bullpens) consists of daily maintenance and repair of any holes which have resulted from practice or play. Our primary amendment used is a finer granule when compared to a basic



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▲ **Field #3:** American Softball Association's Hall of Fame Stadium, Oklahoma City. *Photo courtesy of Tracy Schneweis.* ▲ **Field #4:** Beard Field at Nittany Lion Softball Park, University Park, PA. *Photo courtesy of Paul Curtis.* ▲ **Field #5:** Wilpon Softball Complex: Alumni Field on the campus of the University of Michigan. *Photo courtesy of Jason DeMink.*

amendment. We have found that the coverage and resiliency of the finer granule product is much better than the other products, ultimately countering the additional cost of that product.

Our maintenance routine is the most important component of keeping our clay surfaces safe, firm and resilient, especially with the prevalence of wet conditions in the Pacific Northwest Region. Our clay routine is as follows:

Scarify "action" area; going several directions to break down any high points and loose material.

Pull/brush back using a small broom, any loose material in and surrounding the said hole(s).

Once surface is "bare," we use a small hand sprayer (pump action) to wet the "bare" area.

You will not always need to wet the bare area; there is no need to saturate the surface.

Add the clay product to the hole first, avoid tapering off into the less disrupted and bare surfaces, avoiding this will help prevent the slow build up which commonly occurs. The deeper the hole, the more important it is to add the clay in layers to promote a solid bond and rid the clay of any pockets which may have formed. While layering, a quick mist of water before adding the next layer will promote a solid bond.

When tamping the clay material, use a firm downward action to initially pack the clay into the hole. Inspect layer tamped and add material as necessary. Regardless, finish tamp the surface, overlapping each tamp to produce a smooth surface.

It is important to not build your clay up to "flush" with the pitching rubber or home plate because when adding your finishing amendments such as Turface, you will be adding a layer which will bring the soil above the rubber. Leaving your finished clay work a fraction of an inch below the rubber will promote less digging, and limit the opportunity for the surrounding surfaces to build-up.

Once the clay has been thoroughly tamped, based on observed moisture in the clay, it may be necessary to apply a light coat of water before scarifying over the work to knock down any high spots, loose material, etc... will aide in the bonding of the top layer.

Using a rake, pull any loose material and debris to the center of the circle, dragging it over the clay work you have just completed, the dust and finer particles will work well as a "mortar" to fill any small cracks and openings in the packed clay.

Remove the debris and material collected.

Finish groom/rake the circle.

Based on weather conditions and soil moisture, water as needed and tarp once moisture levels appear adequate.

Tarpping is the other critical element of clay maintenance. This very tedious process will help surface hold-up better leading to less disruption and quicker maintenance turnaround.

Schneweis: Because I was new to the position (I started in April of 2013) and to the area, this past playing season was more of an experiment. Coming from a baseball background, I was also new to softball. We tried several types of mound clays and conditioners to see

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what one(s) worked best for our fields. I wanted to test them all throughout the spring and summer and see which clay held up the best in the conditions we have here in Oklahoma. I also wanted to see which conditioners worked the best for the different types of clay we were trying.

Most of our events are youth tournaments that start on Friday and end on Sunday. During these events we re-pack all the clay on Monday. We have four fields here and all four receive the same attention on Monday. We don't do much, if anything to the pitching circles again until Thursday. On Thursday morning, we start managing the moisture again and adding water/conditioners as necessary. Friday morning we check all the areas to make sure they are safe and ready for the games, which typically start around 10. Friday night after the last game we re-pack all the clay and have them ready for Saturday morning. Saturday's games usually start at 8:30, so we try and get everything done the night before. After the last game on Saturday, we repack the circles again and have them ready for Sunday's games, which usually start at 8:30. If during the days any of the circles become unsafe with large holes, we will repack in between games. During the College World Series and the World Cup, we re-pack the circle between every game.

How do you keep the rest of the infield skin safe, firm and resilient?

Schneweis: Moisture control is the most important, and challenging, part of maintaining our fields. On a typical Saturday, when we are hosting a tournament, the games run from 8:30 am until 11:00 pm, or later. Games usually last an hour and a half and we have 10 minutes, at the most, to do all of our work: drag, chalk lines/batters boxes, etc. So trying to keep water on them in July in Oklahoma when it's 100 degrees is nearly impossible. We have irrigation heads behind the pitching circles that do a pretty good job of getting some water out, but usually we don't have enough time to do more than just settle the dust down. We try and keep a layer of conditioner (about 1/2 inch) on top of the fields to help hold some moisture in.

Obviously, weather conditions determine what we can, or need, to do for moisture. If there is no rain forecasted, we will start putting water on the dirt on Wednesday. We soak them all on Wednesday afternoon. We then monitor the fields all day Thursday and add water if necessary. Our goal is to have moisture throughout the profile by the time we leave the complex Thursday night. Friday morning we will check them all and determine if more water needs to be added.

During the day on Thursday, we also try and nail drag and roll the fields. This doesn't always happen; sometimes because of time constraints and sometimes because they don't need it. Rolling the fields with a 1/2-ton roller has allowed us to be able to seal off the top and hold some of the moisture in. It also "tightens" up the dirt, so it doesn't get as chewed up during play.

Combs: We maintain our infield skin daily with your standard infield maintenance equipment to ensure the safest surface possible. We manage our firmness with moisture and rolling the infield skin with a roller. We cover our infield skin with an amendment layer.

DeMink: We nail drag our skin daily; it helps fill in all those cleat marks. We also use a rain groomer on a Workman vehicle to level any high or low spots around first and second bases. If needed, we will roll the infield skin with a 1-ton roller. And we chain drag and use big brooms daily. Also we will broom twice during games to keep playing surface level and safe during games.

Seybold: The amendment that is currently being used helps retain moisture as well as provide a medium to slide and play the game. The surface is nail dragged at 1/8 inch to try to mitigate as many cleat marks as possible and a 1-ton roller is used sporadically during the season to aid in tightening the top quarter inch of material that is disturbed from the barrage of practice and games.

Clay: Our skin surface is evolved into a complex hybrid mix of several products over the past several years. Our last renovation included the addition of 30 yards of 70:30 (clay:sand) mix. This material was tilled into the existing ag-lime and then graded respectively. Moisture and continual maintenance are the two most important factors to keeping our skinned surfaces resilient. The use of amendments allows us to control our moisture levels, as well as keep the field firm and playable through the winter months. Once a low-spot is identified, address the issue as soon as possible and begin adding material to it. Based on soil composition and condition, tilling of the existing surface before, or during addition of material may be required. This will prevent the scope of your off-season renovations, as well as keep your surface safe and playable. It is a good idea to save and store some extra material for the maintenance of your skin surface throughout the playing season.

Following activity, based on the field conditions, spike or nail drag the skin to break down any chunks, a major disruption. If conditions permit, follow spike/nail drag with a matt/chain drag, allowing skin material to move and redistribute itself into low-spots much more efficiently. When dragging is completed, we remove any debris and foreign materials gathered by our drag mat. Once satisfied with the turnover, soak your skin surface to promote any re-bonding. Allow adequate time for material to settle before next activity. Additional fine tuning will be required around bases and one rake width around the surrounding edge of the skin.

Using a vehicle with worn or bald tread tires will act as a roller and allow the compacting of any loose material. To get optimal firmness and bonding, use a 1-ton ride on roller to compact any loose material. Follow the process, Drag-Water-Roll-Repeat. Common spots we check are the lead-off/running lanes by all three bases and all position spots. The most observed traffic areas decrease respectively as you move from first base to third around the infield. Sticking to our maintenance program, as well as avoiding activity when conditions are wet and soft, allow us to maintain a resilient surface with a level grade.

What are your short and long term solutions to lip build-up?

Schneweis: Short term, we blow out the lips every Monday. Some weeks we use a backpack blower, others we use a 1-inch hose and wash them out. Once a month we try and "hard rake" them out. We take

a normal garden rake and go at a 45 degree angle and forcefully rake out the edges. We go back and forth a couple of times, one side to the other. It's amazing how much thatch, conditioner, etc., that we remove by doing this. We then rake the "trash" up into a pile and remove it from the field.

Long term is tough for me to say at this point. I would guess we will just re-sod the lips if they ever become unsafe.

DeMink: Lip prevention is done daily with push brooms, backpack blowers, and leaf rakes. Weekly I like to use a hose to blow it out with water. And, if needed, sod replacement.

Harshman: Short term, after daily practices, or normal usage: I come in and leaf rake all lip/transition areas pulling back material onto the infield that has found its way into the turf. After finishing up with leaf raking I use a backpack blower and get the material that has tried to imbed itself deep into the profile.

Long term: After heavy use: (camps, tournaments and weekend series) I will perform the same practices mentioned in the short term. In addition to that I will blow out all lip/transition areas with a water hose that is hooked up to a quick connect water source.

This process in my general maintenance is a delicate procedure. I make sure that the water pressure isn't full blast causing more harm

than good to the lip/transition areas. If your pressure is too high you have the potential of blowing out large chunks of your infield requiring you to come back in and make the necessary repairs to the clay infield playing surface. I regulate my water pressure making sure I gradually make small circular stokes along the grass edge blowing out all debris and material are free from working itself deep within the profile. By performing these practices I limit the amount of buildup over time that would eventually create an uneven transition between the clay infield and turf areas.

Seybold: The lips are "washed" out on all off days of all loose clay and conditioner that is worked in to the edge of the grass and during practice days or game days a backpack blower is used to remove as much conditioner as possible without damaging the grass to dirt interface on the edges. During the summer a roll of sod from the ring around the back of the skin is removed and replaced with new "fresh" sod to insure a clean edge is ready to go for the season.

Combs: We try and maintain our edges daily by sweeping or raking them after every use to minimize build-up. We edge the grass frequently to try and maintain a crisp edge. Our long-term solutions would be to flush the edges with a hose to try and flush out any infield material, if the edges are really bad we would just resod. ■

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As I write this article, we are in the middle of NFL playoff season, my favorite time of the year. Not so much because of all the quality play and intense rivalries unfolding on the gridiron, but more to check out how the fields are holding up in the middle of winter, and at the end of a long, extended season. Yes I know, words of a true “turf rotor head.” During the replays, I am checking out what type of traction the sod provided while everyone else is looking to see if the players’ feet were in bounds.

Being in the sports turf industry for more than 20 years, I can begin to appreciate some of the many challenges the professional sports field managers face. We all naturally look to the pro groundskeepers for ideas on what’s new, what’s proven, and what’s possible. We have seen the evolution of many products and practices at the professional level that eventually trickle down to college and amateur sports.

▼ Sod grown on plastic by Carolina Green Corp.’s sod farm in North Carolina.



The damaged stadium field was replaced following the concert and ready for immediate play (to view time-lapse video of field replacement log into



<http://www.cgcflds.com/CarolinaGreenWebcam.asp> and click on UVA Stadium Turf Replacement).

One area of advancement has been with in-season sod replacement. We see it on almost every natural grass NFL playoff game and college bowl game field this year. Either down the center of the field, or often the entire surface is replaced in a matter of a couple days with 1.5-2-inch thick sod that can withstand immediate play. Some replacements may look better than others, and field managers are great at masking the transitions, but all replacements have the same intent. Provide sure and consistent footing under a wide range of weather conditions. Sounds easy enough, especially with an NFL or bowl game budget, but what about for your high school field? Well, the industry trickle down is happening and here is the story.

THE HISTORY

The invention of big roll sod harvesters in 1991 was a big step in being able to provide thick, stable sod from farm to field. Slab and small roll versions were available before then, but a 42-inch or larger width roll really helped reduce the number of seams and allowed a more mechanized installation. Some of the problems include finding a good sod source and a farm willing to harvest thick cut. It is hard to convince a sod grower to change his cutting depth and truck off their most valuable resource (topsoil) in order to provide a field manager with heavy thick sod. Also, sod must be very mature and tightly knitted to hold together in a thick cut application, so planning a year in advance is necessary to secure a source.

Once the sod arrives at the field, there can be other problems. The thicker the sod is harvested at the farm, the bumpier it feels on the field. Also, if the farm native soil has high clay content, and you place over a drainage system, vertical drainage can be negated. When it does rain, the result can be a muddy, unstable surface. So the challenge became to develop a sod with a smooth uniform thickness, dense root system, a vertically draining root zone, and withstand 300-pound guys digging in with their cleats.

ENTER SOD GROWN ON PLASTIC (SOP)

I am actually not sure who came up with the idea of growing sod on plastic. It sounded crazy to me at first when I heard of a company in Georgia growing bentgrass

on plastic for golf greens. The product was about ½-inch thick and basically looked like a grass floor mat. From there I heard of versions of sod grown on plastic being used for some NFL teams as opposed to traditional thick cut, but supplies were scarce, if non-existent.

In 2009 my athletic field construction company, Carolina Green Corp., was asked by The University of Virginia to provide a full field replacement following an in-season U2 concert. The damaged stadium field was replaced following the concert and ready for immediate play (to view time-lapse video of field replacement log into <http://www.cgcfields.com/CarolinaGreenWebcam.asp> and click on UVA Stadium Turf Replacement).

We opted to partner with a sod farm to produce that field, and from there developed Game-On! Grass, a sand-base bermuda sod system designed for immediate play situations. Since then the product, grown at our farm in NC, has been used for in-season turf replacements by Philadelphia Eagles, Washington Redskins, Tennessee Titans, University of Tennessee, University of Kentucky, University of South Carolina, Florida State University, and the University of North Carolina.

Most of these clients are able to plan for their sod needs months in advance, therefore much of the Game-On! Grass is reserved and grown under contract. In addition to those orders, we try to speculate on emergency needs and keep product on hand for smaller orders that pop up such as soccer goal mouths, position areas and in front of mound on baseball, lacrosse creases, and anywhere there is need to keep the games going. So the market is growing, and the result is that much more product is available for venues other than the NFL stadiums.

THE ROOT BOUND EFFECT

The basic principal in sod grown on plastic is exhibited in a pot-bound plant. When you pull the plant out of a container after it has been there too long, all you see is a mass of roots that can hardly be broken. The same thing happens with mature sod grown on plastic. The roots have nowhere to go and as a result form a dense mat. Topdressing is used to build the sod layer up to desired thickness. With our product we aim for 1.5-inch thickness which provides approximately 17 pounds per square foot total weight. One important characteristic of it is that we use sand-base sod as an initial base, and then add topdressing sand typical for sand-base construction, therefore producing a sod that vertically drains and can be left in the field profile without impeding vertical drainage or contaminating the profile.

In growing this market we have had to overcome the perception that sod on plastic was a product that would have to be removed and replaced with regular cut sod after the “emergency” was over. Since most installations were in the fall/winter months, questions were raised if the grass would survive and root into the field the following year once the bermuda breaks dormancy. This was probably the experience with early thick cut products with heavy soils and much less total root mass. What we have found in all cases is that

Game-On! Grass is the best grass on campus the following spring. It is thicker, greener, and quicker to break dormancy, and usually makes the grass beside it look inferior. The ability to control the rootzone profile of seems to be the difference both short term and long term with performance and survivability. In fact, a mid-field replacement in football practice field situation can usually be effective for an entire year cycle, making the additional cost more justifiable. We also have license agreements with patented protected grasses so we can provide a specific bermuda variety of Game-On! Grass to customers if requested.

COMPARE COSTS

No doubt SOP is more expensive than regular cut or thick cut sod, possibly anywhere from 2 to three times the cost. Freight costs are three times that of traditional sod due to SOP weighing at least three times that of traditional sod. The material and labor inputs at the farm are intense. Imagine growing anything on plastic in the summer with 1.5” soil layer. Not much margin for error, and no holiday time. So does that make it just an NFL product?

Here are some cost justifications I hear from customers. It keeps the field open year round for practice and play. In a situation where there is no additional space or no down time in the program, they can remain open with a few hour delay with SOP. They already

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have significant investment in a facility with lights, parking, bathrooms and such, so why not use the facility to maximum potential? It is the same argument used for considering synthetic turf. The alternative is build additional fields, go synthetic, provide fewer programs, all of which cost money. I would suggest compare cost of a new synthetic field annually over an 8-year replacement schedule compared to annual replacement with SOP down the center of the field along with additional goal mouth and lacrosse crease SOP replacement. Then ask your players what surface they would prefer to play on throughout the year.

This is not an answer to all situations, just a consideration. But having an alternative resource for intense-use natural grass field with minimal down time is a tool every field manager needs in the bag. The key to incorporating SOP into a turf management program is to plan ahead and secure a source. The supply of sod grown on plastic is limited, but we have seen several new vendors in the marketplace. Several of our clients have already ordered our product for fall/winter of 2014. We currently ship the product 12-15 hours from our farm, and are looking at possible satellite locations. So just coordinating trucking can sometimes be the biggest challenge. You also need a good prep and install plan for handling the turf. The equipment is similar to traditional sod replacement, but the added weight to move and manipulate the product creates an additional challenge. Removing turf from a field a few days before a big game involves a significant level of trust in the sod supplier and in the installer. For smaller jobs such as goal mouths, installing SOP in-house is a good option. Just remember if you are bringing in 1.5 inch, you need to remove 1.5 inch. That is a lot of soil.

BREAK OUT THE WAR PAINT— UNIQUE APPLICATIONS

In December 2011, WFI Stadium Inc. (FedEx Field) was faced with the task of logo replacement between games when they hosted the annual Army Navy Game less than 24 hours before Washington hosted the Patriots. The solution? Paint the



▲ Replacing the turf at the University of Virginia's David A. Harrison III Field at Scott Stadium.

sod before its harvested. This had to be an historic first in the field replacement industry. The sod for the NFL game was pre-painted before being cut, transported and then installed. Before the install, the grounds crew came to Carolina Green's sod farm in Indian Trail, NC to paint the midfield logo and end zones game. The sod was harvested, each roll numbered and logged, then transported to FedEx Field to await install. Management elected to only replace the in-field logos between the games and leave the Army-Navy end zones in tact as a tribute to the armed services. After the NFL game the end zones were replaced with the pre-painted sod as well.

The "overnight success" of the WFI-Carolina Green field replacement industry milestone at FedEx Field was reasonably assured because the key sod grown on plastic component had already been field tested by the Philadelphia Eagles and declared a winner. Over the past 3 years the Eagles have used the product to replace just the sod between the hash marks and end zones of Lincoln Financial Field. Tony Leonard, the Eagles' director of grounds, reports, "The sod on plastic grown by Carolina Green provides us with a solid and stable playing surface in the middle of our field. We had to get through six games in November and this was the best choice for us to match up our existing bermuda grass." ■

Carolina Green Corp. is a North Carolina-based Certified Field Builder. They operate two Bermuda grass sod farms and employ 35 full-time employees and travel throughout the south & eastern United States constructing and renovating natural and synthetic athletic fields for professional, college, high school and recreation level use. The company can be viewed on the web at www.cgcfields.com. Chad Price, CSFM, CFB can be reached at 866-753-1707 or cprice@cgcfields.com.



▲ The sod for an NFL game was pre-painted before being cut, transported and then installed.