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March 2017

SportsTurf

SPORTS FIELD AND FACILITIES MANAGEMENT

FIELD UPGRADES ARE AVAILABLE!

ALSO INSIDE:

- Finding internships and attracting interns
- Using polymer coated urea
- Maintaining pitching mounds
- Dr. Grady Miller on field use hours

green media

SportsTurf MANAGERS ASSOCIATION

OFFICIAL PUBLICATION OF THE SPORTS TURF MANAGERS ASSOCIATION

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STARTING LINEUP

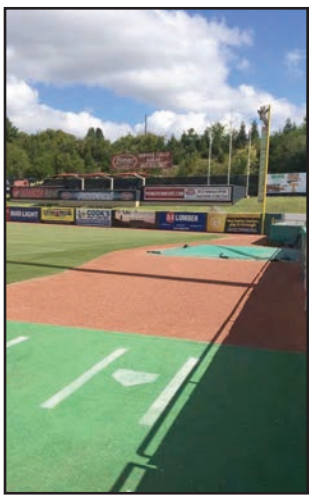
March 2017 | Volume 33 | Number 3

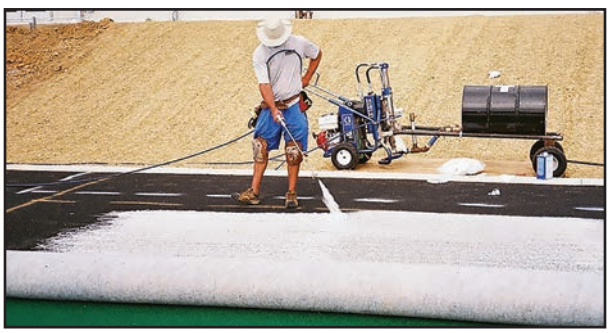
FEATURES

DEPARTMENTS

ON THE COVER:

Commercial member Steve Bush, CSFM, led the effort to renovate the field at Busch Stadium in St. Louis. The cover photo shows the crew installing pea gravel.





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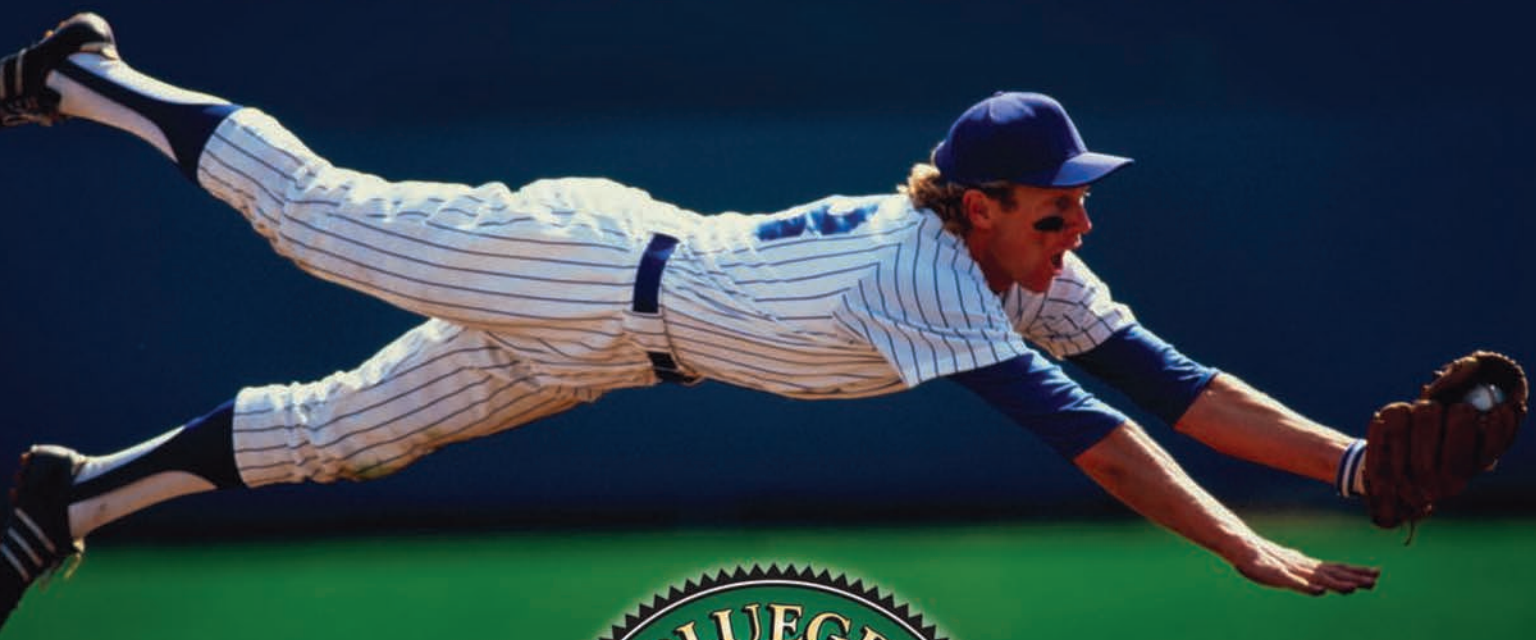

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Eric Schroder
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PERCEPTION IS PRIMARY

Laura Katen livened up the lunch crowd at STMA's 2017 Annual Meeting in Orlando with her keynote presentation on the importance of perception in business. She demonstrated how body language can show what you *don't* do can create perceptions about you. "How you conduct yourself is directly related to career success," she told the crowd. "Do you appear professional?" she asked.

She said your credibility rests on communicating confidence, which made it that much more fun as Katen moved through the audience, asking several members to participate in her examples (I was one straining to avoid eye contact with her!). One that stood out was re communicating confidence was a study that showed how someone perceives you is 55% nonverbal, and 38% is your vocal delivery or *how* you say something. The last 7% is the actual words you use! Choosing the wrong words can quickly reverse your success with the first two, she said.

Katen included some reminders of what makes a good handshake as she got into body language, and shared some advice on how to thwart an unwanted hug from an associate: "Lock that elbow!"

Among other sins she listed as poor body language were not making eye contact, not smiling, bad posture, weak handshake, crossing your arms across your chest, or too many hand gestures.

She added that if attendees didn't know social etiquette, they should. "Do you know?" she asked, looking around the room.

Katen then showed the room the importance of interactions and building rapport. She emphasized how *sustaining* rapport with business associates is important, and shared two acronyms: BLOT, for Bottom Line On Top, meaning cut to the chase when you're interacting because everyone's time is valuable; and WIIFT, What's In It For Them, because that's what people listen to.

As part of her closing, Katen shared this from poet Maya Angelou, which I'd heard before and remembered. "I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel."

NUMBERS FROM STMA ANNUAL MEETING

- 2,700, STMA members, up 100 from last year
- 211 Certified Sports Field Managers with more testing @ Conference
- 12 Certified Environmental Facilities, with 18 more now in program
- 34 Chapters, including newest one, Mid-Atlantic
- 27 Committees, a testament to member participation

STMA MEMBER OF THE WEEK

Please reach out to Tomas Silvani at STMA's PR arm, Buffalo.Agency, if you are interested in being STMA Member of the Week or perhaps identified as the Stadium of the Month. tsilvani@buffalo.agency or 703-635-0233.

CORRECTION

From our story on disasters in February issue, we misidentified Murray Cook on page 33. He is president of BrightView Sports Turf Division, not The Brickman Group. Our apologies for the mistake.

SportsTurf
SPORTS FIELD AND FACILITIES MANAGEMENT

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LIFE IS TOO SHORT

Disney's Coronado Springs played host to another record-breaking attendance figure for the 2017 STMA Conference. The conference was a huge success and was very well attended by practitioners from all over the world. I believe there were 18 different countries represented, a number that I still have not gotten past. The trade show was sold out with multiple companies on a waiting list to display their goods or services. The technology displayed within that trade show was simply amazing. From monster pieces of steel, to laser or GPS guided equipment, to new and improved products—all designed to help athletic field managers be more successful—and with a common goal of field safety!

The STMA Conference for me is always my starting line for the new season for a hypothetical marathon. Like many who have lined up on a start line for a marathon, you are ready, fresh, and hopeful for the things that the race will bring. You have put in the training (conference), you have selected a pace to run (tentative maintenance schedule), and now you are simply waiting for the gun to go off. My gun officially goes off March 24 for our first outside event of the spring. I know many of you are already playing games, so for you, your race simply began before mine! There will be easy miles, hard miles, impossible miles, but somehow we always manage to finish the marathon.

The past few months I have been constantly reminded of a recurring truth. This truth has come true in my personal life and my professional life. This truth is known by all, scary to some and embraced by others. This truth does not miss, and far too often it hits us unexpectedly. The simple truth I am referring to is, "Life is Short." I am not just talking life and death, but life in everything is short: the life you have to be a parent, spouse, employee, or friend. As you go about your "day-to-day," do not lose perspective on this life and all the possibilities you have to make it better for others.

The best people I have ever met put themselves second, not because they want to, but because they know it's better for them. Another phrase that I repeat to myself when I lose perspective on this life is, "Days are long, but years are short." That phrase reminds me to enjoy the days that are hard—the days that you just want to be done. I challenge you to enjoy each day, no matter the circumstances!

> **Let us make an impact, an impact on our families, workplace, and community.**

Let us not waste this year. Let us make an impact, an impact on our families, workplace, and community. The STMA is dedicated to helping each of you reach this year's goals. If there is anything that you need from our Board of Directors, Headquarters, or myself, please let us know. We are all here to serve the members and commercial partners. Good luck with the start of your year.

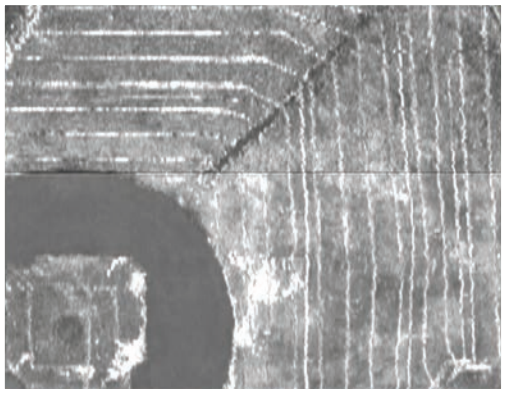
@cycloneturf

Derek York checking elevation.

"THERE ARE UPGRADES AVAILABLE": TIME TO UPDATE YOUR FIELD TO 20.17

BY **STEVE BUSH, CSFM**

The old rootzone at Busch Stadium in St. Louis.

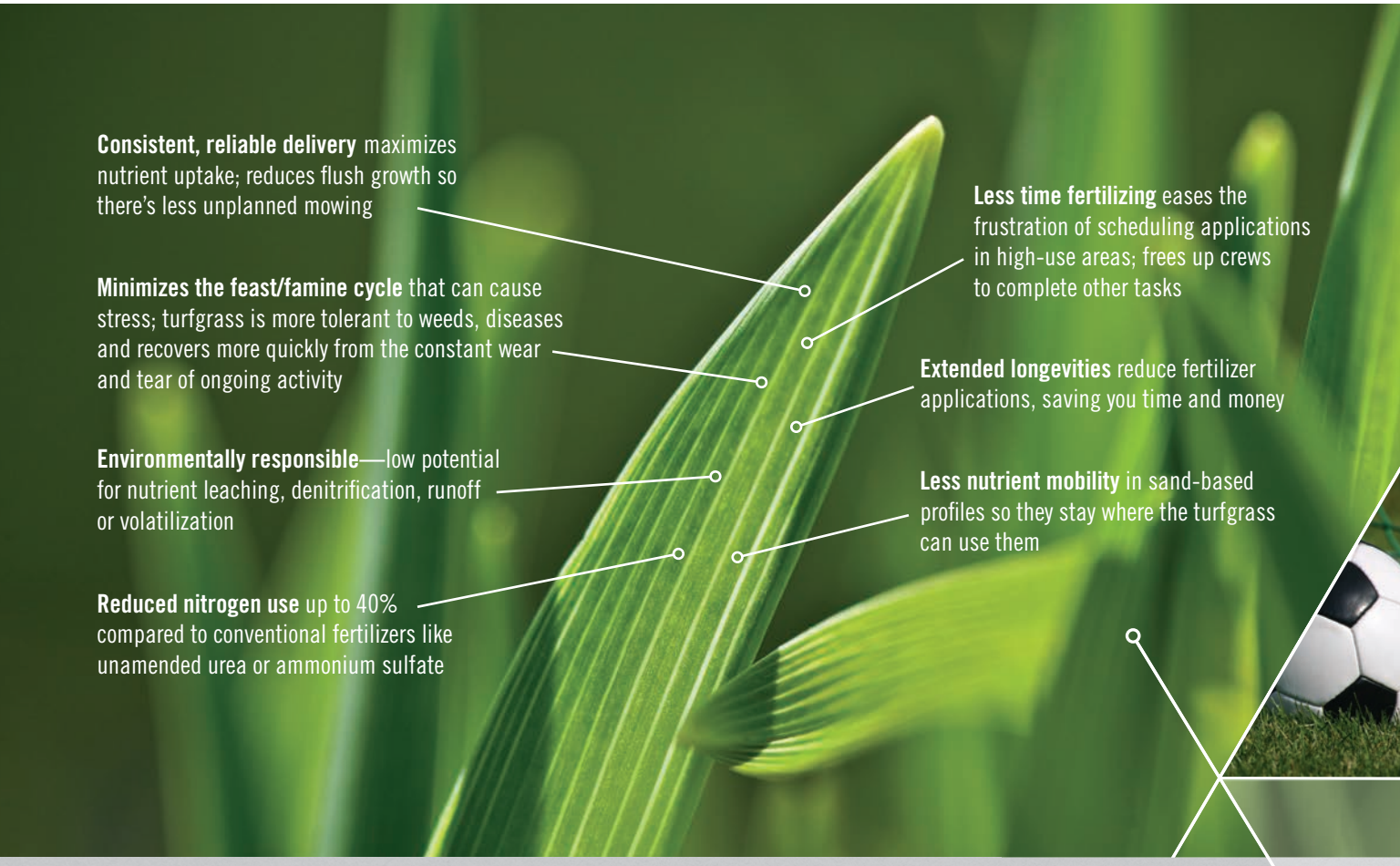


Bird's eye view; drainage lines show up as white because they hold water.

It seems every other day there's a newer version of technology available or another update to download: phones, computers, cars. We update and upgrade so constantly without a second thought. But what about sports fields? Aren't those "one & done?"

Hardly.

Good managers know how much work is involved in keeping fields up-to-date. And when there are superior technologies or materials available, it's vital for the quality of the sports that take place on those fields to take advantage of those upgrades.



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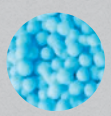

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Removing the old field and grading base.

Data from Busch Stadium on Steve's handheld unit.

When we began field renovation talks with the St. Louis Cardinals, we had our work cut out for us. We were essentially taking the field from "iPhone 4" status to "iPhone 7" capabilities. We collaborated with Cardinals' head groundskeeper Bill Findley, his assistant Justin Scott, and head of operations Joe Abernathy to determine what could and should be upgraded: management technology, materials and equipment.

At first glance, Busch Stadium didn't appear to need repair. But just like with a phone, there comes a time when updates and improvements are inevitable. Some of the best in the world, Busch Stadium's staff were eager to correct all known problems that had accumulated over the past 11 years to make the field easier to maintain, optimize play on the field, and install the most cutting-edge tools, technologies and materials.

The Cardinals were going to host the NHL Winter Classic, which gave us a perfect opportunity to combine the renovation with work to be done for the classic. However, the timeline would be tight, so planning was vital. We could not start the project until the Cardinals' season ended. This meant that all plans needed to be solidified well in advance.

Several issues that needed to be addressed were:

The hydrophobic rootzone. The sand had become hydrophobic over time, and infiltration rates had decreased to the point that standing water remained on the field after a rain. The rootzone depths and gravel layer also varied throughout the field, making it hard to manage cultural practices and moisture levels.

The inconsistent irrigation system. The irrigation system didn't give head-to-head coverage in some areas, and would also experience unpredictable pressure fluctuations.

The infield's slope caused runoff. The height and slope of the infield and foul territory created runoff that washed out the warning track.

Asymmetry of warning track edges. Due to years of changes to the field the track edges were asymmetrical and no longer matched the wall.

To get to the root of how to optimize the field in our short timeframe, we needed to identify and plan for as many conditions and corrective actions as possible beforehand. Without substantial as-built drawings, we did an in-season, non-disruptive survey of field conditions with Ground Penetrating Radar (GPR). GPR uses radar to generate 3-D imaging of what's below the surface. It's like taking an X-ray of the field to a specific depth: in our case, 4.75 feet. The data can be displayed, rotated and sliced into 2-D and 3-D images of what's beneath the turf to better understand the underground construction, geology and hydrology.

What the GPR images look like:

- The bird's eye view shows the location and size of the drainage tile and trenches
- Irrigation and any other lines show up as white because they contain water
- Areas of the field that hold water show up as bright white

Using the Ground Penetrating Radar system.

- Areas with lesser concentrations of moisture show up as a gray-to-black
- Cross-sectional images of the field provide depths of sand and pea gravel layers
- Cross-sectional images show depths and size of drain lines, drains' slopes and whether or not they hold water

These images helped us determine subgrade adjustments, depth of materials to replace, and areas that needed drainage work. For example, we saw rootzone depths varied from 9-14

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Trenching through concrete left over from old Busch Stadium.

ADS Advantage piping was used for conflicts with irrigation.

Grading with Robotic Total Station.

inches across the field, as did pea gravel depths. Thanks to the images, we saw exactly where to look for grade and drainage problems even before removing grass. We identified the drainage lines, finding some that had settled and needed repairs, plus areas that held water and should be checked during excavation.

INITIATING UPGRADES FROM THE ROOTS UP

Since rootzone failure was the main reason for the field renovation, designing, sourcing and blending a quality rootzone was top priority—the controlling element of the planning process. We wanted to create a stable mix, with a coefficient of uniformity between 2.5 and 4.5 that was free draining and cost-effective. To achieve this, the Cardinals and our staff spent countless hours contacting suppliers, collecting samples for analysis and evaluating the data. We brought on consultant Norm Hummel to aid with the design and evaluation of test data, with testing done at multiple labs to compare and verify the results.

After several attempts and eliminations, we finally reached a perfect mix: a 90/10, produced by Madison County Sand, which combined Dakota Peat and a blend of two sands that had run through the classifier together. The rootzone's uniformity coefficient was 2.6 and its infiltration rate was 22 in/hr. We tested and tweaked during the production process to stay within tolerances and, when installed, the final product performed exactly as we'd hoped.

Field design and construction with the 3-D Robotic Total Station. We used a Topcon Robotic Total Station unit for the entire project, from design to completion. The unit collects three-dimensional data so every point on the field has a longitude, latitude and elevation (x, y, z coordinates). We surveyed existing field conditions and input them into design software.

Using the data we collected and the wish list from the grounds crew, we made changes to the field, which could be adjusted as

Continued on page 36

SAFE FIELDS FOR ALL

that's the root of our mission

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50% IN KIDS UNDER THE AGE OF 15

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Sources: Centers for Disease Control and Prevention (www.cdc.gov) & The American Academy of Orthopaedic Surgeons (www.aaos.org)

Starting the process.

PHOTO COURTESY OF MICHAEL BOETTCHER, MILWAUKEE BREWERS.

MAINTAINING PITCHING MOUNDS

Editor's note: *We asked those who would know about improving and maintaining pitching mounds; here's their advice:*

ZACH RICKETTS, HEAD GROUNDSKEEPER, HO HO KAM STADIUM, SCOTTSDALE AZ

The main component to how long a mound will last after rebuilding is what your regular maintenance is after player use. If you take the time after each use to repair it correctly, you can keep it in good condition for at least a month or two. If you do build it correctly the first time, your daily maintenance will always be less and the mound will last longer.

When choosing your soil for a mound the clay content is key. You can buy different mound-specific clays in bags, but if you are looking for a cheaper alternative there are a lot of native soils with high clay content that would hold up well. Another option would be to use native soil for a base layer and then add the mound specific clay on the top 2-3 inches.

If you know that your mound area is close to level to the plate, you could put a 4-inch brick layer underneath your 6-inch rubber and then start packing your dirt around that. Another method to finding your 10 inches is putting a stake behind home plate and attaching a string 10 inches above the plate. Once your string is attached you can pull it tight to the rubber and put a small level on the string that shows when it is at 10.

The most important post game task for anyone managing a mound area is filling in the holes and adding the correct moisture. If you don't have the staff or materials to pack new clay in the holes every day, it is best to at least rake over the holes and give it a good shot of water when it is dry. If possible, it is always good to cover the mound up with a tarp or rubber mat to hold the proper amount of moisture in the mounds.

BRITT BARRY, SPORTS TURF MANAGER, DAYTON DRAGONS

SportsTurf: Once you have a mound built the way you want it, and regularly maintain it, how long do you expect it to last before you have to start over? Or is the idea to build it right at the beginning so you rarely have to rebuild the entire mound?

Barry: If you correctly build a mound the first time, you shouldn't need to rebuild unless you're switching materials or need it removed for a special event. In the worst-case scenario, you may need to dig down a few inches and replace an area of clay brick by the rubber or landing area, but with new mound clays advancing the durability, the need for this would be very rare.

SportsTurf: Are there any alternatives to clay-based soils (bricks) for mounds that will hold up to regular use?

Barry: I feel like bricks are still the best base in the high wear areas, but consistent repair work and patching with quality bagged mound clay should eliminate the need to replace them regularly.

SportsTurf: Are there any relatively quick and easy steps a K-12 or Parks/Rec turf manager can take to get his mounds to the correct height with proper slope?

Barry: A mound gauge can be easily made with cheap materials. This is the easiest way to check the slopes of mounds in an efficient manner, identifying high and low spots and easily being able to address them quickly. The height of the mound should not change much throughout the year if the clay around the rubber is kept level. Measure it a few times a year, but daily upkeep and repairing will save time on larger repairs later in the year.

SportsTurf: What's the most important post-game task that managers at lower levels can do to keep mounds

Jamie Mehringer, president, J&D Turf

See Jamie's blogs on slope boards and regular repair of batters boxes:
Slope: http://janddturf.blogspot.com/2012/11/tricks-of-trade-slope-board.html
Home plate repair: http://janddturf.blogspot.com/2016/11/how-do-you-repair-batters-box.html

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safe/in compliance with standards?

Barry: Patching mounds after the game, watering and covering is very important for us to keep moisture levels consistent in the mound. Having a good, deep moisture base in the mound increases playability, and minimizes patchwork after the game. The less patching you do, the less clay you use, the more money in the budget for other projects!

MIKE MORVAY, DIRECTOR OF GROUNDS, LAKEWOOD BLUECLAWS

SportsTurf: Once you have a mound built the way you want it, and regularly maintain it, how long do you expect it to last before you have to start over? Or is the idea to build it right at the beginning so you rarely have to rebuild the entire mound?

Morvay: With normal maintenance practice and up care of mound it should last you the whole season. Normal packing on clay in the holes after each use and behind the rubber if needed will keep the mound in great shape. I like to flip my pitching rubber around the All-Star break. With that said we will re-slope the mound with clay and infield mix and roll it tight. I try to rebuild my mound in fall for the upcoming season allowing it settle over winter.

SportsTurf: Are there any alternatives to clay-based soils (bricks) for mounds that will hold up to regular use?

Morvay: I don't like the bricks because they are not easy to repair with. I prefer to use mound clay.

SportsTurf: Are there any relatively quick and easy steps a K-12 or Parks/Rec turf manager can take to get his mounds to the correct height with proper slope?

Morvay: The most accurate way to set your distances and heights is to use a transit with a laser. If this isn't possible, you can also run string between steel spikes and use a bubble level clipped on to the string. The third alternative is to build and use a slope board. You can also use a 2 x 4 as slope gauge.

Build the mound in 1-inch levels, establishing the desired degree of moisture in each one to ensure each level adheres to the next. Use a tamp to compact each level as you build. To make it easier to tamp down each level, put down plastic or wrap the tamp with a towel or piece of landscape fabric to keep it from sticking to the clay. The key is building the mound in layers and using a slope board.

SportsTurf: What's the most important post-game task that managers at lower levels can do to keep mounds safe/in compliance with standards?

Morvay: The most important tip is to repair it after every use. Repairing after all games are over. Keeping up on the maintenance is key. ST

John Mascaro's Photo Quiz

Answer on page 31

John Mascaro is President of Turf-Tec International

Can you identify this sports turf problem?

Problem: Hedge taller on one side

Turfgrass area: Home lawn

Location: Chicago, Illinois

Grass variety: Yew hedge

BACKGROUND ILLUSTRATION COURTESY OF ISTOCKPHOTO.COM

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USING POLYMER-COATED UREA FOR AESTHETICS WITH LOW ENVIRONMENTAL IMPACT

BY JOSHUA LEMONTE, PHD, BRYAN HOPKINS, PHD, & VON JOLLEY, PHD

Nitrogen is an essential plant nutrient in the biosphere but is also a common pollutant in the atmosphere and hydrosphere. Nitrogen can be lost from soil to the atmosphere as NH3 or N2O gases or to the hydrosphere as NO3. Polymer coated urea (PCU) is a fertilizer that uses temperature-controlled diffusion for controlled N release to match plant demand and mitigate environmental losses. The objective of this study was to compare the losses of N2O, NH3, and NO3 from PCU (Duration 45CR) and uncoated urea applied to cool season turfgrass over the entire PCU N-release period.

Studies were conducted on established turfgrass sites with Kentucky bluegrass and perennial ryegrass in sand and loam field sites comparing 0 kg N ha-1 (control) to 200 kg N ha-1 applied as either urea or PCU. Statistically equivalent amounts of NH3 and N2O were volatized from the control and PCU treatments at both locations.

In contrast, urea fertilization resulted in significantly greater NH3 and N2O losses at both locations, ranging from 1.2 to 2.1 times more loss compared to the control. Both N sources improved growth and verdure compared to the control, with PCU giving further improvement over urea the following spring. There were no significant differences in leachate NO3-N among treatments. This improvement in N management to ameliorate atmospheric losses of N using PCU will contribute to conserving natural resources and mitigating environmental impacts of N fertilization in turfgrass.

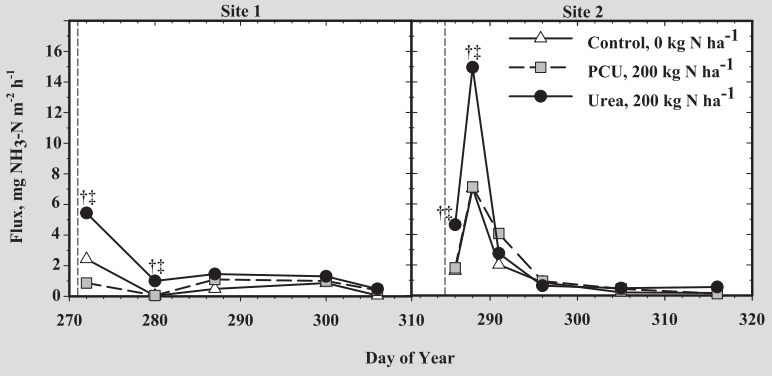

Fig. 1. Ammonia emissions measured over multiple individual days for two Kentucky bluegrass/perennial ryegrass study site locations fertilized with 0 (control) or 200 kg N ha-1 applied as either uncoated urea or polymer coated urea (PCU). Significance for comparing fertilizer source were determined by ANOVA with mean separation using Tukey honestly significant difference and on a given day is indicated by † (urea greater than control) and ‡ (urea greater than PCU). The absence of significance symbol(s) indicates no statistical difference among treatments on that day. Vertical dashed lines indicate date of fertilizer application at a given site.

In addition to the environmental impacts of excess N, manufacturing N fertilizer uses natural gas and other non-renewable resources. Thus, minimizing N losses and maximizing plant utilization are beneficial in conserving non-renewable resources and environmental quality.

Effectiveness of N uptake and utilization by plants is defined as nitrogen use efficiency (NUE). Optimizing N fertilizer rate, source, timing, and placement are all essential to reach an ideal balance between grower profitability and NUE. One tactic to increase NUE is use of controlled-release or slow-release N fertilizer. These sources release N into the soil over an extended period of time to ideally matching plant needs and possibly reduce or eliminate labor-intensive, costly in-season N applications.

By controlling the release of N from fertilizer, N inefficiencies and losses to the environment should be mitigated via increased N retention by the soil and uptake by the plant. The concept of controlled or slow release N fertilizers is not new, but success has varied across plant species and environmental conditions and expense has prevented wide utilization. More recently, cost of these products has become more competitive with traditional N sources and, as such, adoption is increasing.

Polymer-coated urea is one promising type of controlled release fertilizer that provides improved N-release timing. Soil temperature controls N release rate from certain

PCU products, which allows protection of N during cool periods when plants exhibit little or no growth and soils are often susceptible to N losses; followed by release of N as temperatures increase and plant growth and N uptake increase. Diffusion of N through the polymer coating is driven by an N concentration gradient, with temperature being the primary regulator under irrigated conditions. Some PCU sources steadily supply plants with N for longer periods of time following application than immediately soluble forms of N, thus enhancing NUE and leading to increased crop yield and quality. Hyatt et al showed that the slower release of N from PCU can improve economics by eliminating additional in-season N applications.

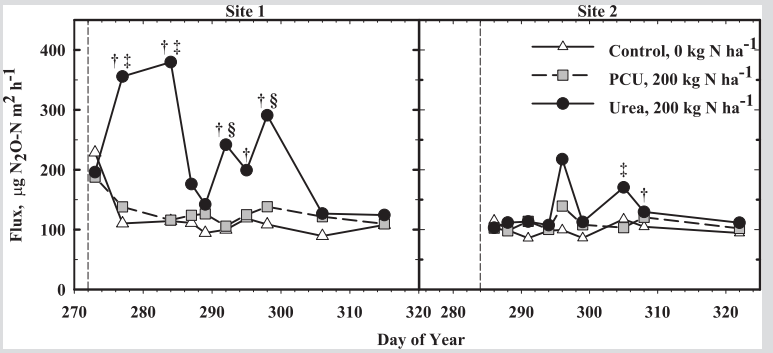

Fig. 2. Nitrous oxide flux measured on multiple individual days for two Kentucky bluegrass/perennial ryegrass study sites fertilized with 0 (control) or 200 kg N ha-1 applied as either uncoated urea or polymer coated urea (PCU). Significance for comparing fertilizer source were determined by ANOVA with mean separation using Tukey honestly significant difference and on a given day is indicated by † (urea greater than control), ‡ (urea greater than PCU), and/or § (PCU greater than control). The absence of significance symbol(s) indicates no statistical difference among treatments for that given day. Vertical dashed lines indicate date of fertilizer application at a given site.

Research has also demonstrated the ability of PCU to mitigate negative environmental impacts associated with N fertilizer. Polymer-coated urea was shown to decrease NO3- leaching, NH3 volatilization and N2O emissions. But most work investigating anthropogenic inputs to

the atmosphere from fertilization has been performed with intensive row crop agricultural systems [such as maize, wheat and potato]. Limited research has been done in grass systems despite N fertilizer having a major role for urban turfgrass and agricultural sod, seed, and pasture grass systems. Turfgrass occupies 1.9% of the total surface area of the US and is the leading irrigated species.

The objective of this study was to compare the losses of N2O, NH3, and NO3- from PCU and uncoated urea applied to cool season turfgrass over the entire PCU N-release period. Studies were conducted on established turfgrass sites with Kentucky bluegrass and perennial ryegrass in sand and loam field sites comparing 0 kg N ha-1 (control) to 200 kg N ha-1 applied as either urea or PCU.

METHODS

Two field studies were conducted at separate sites in Utah on established Kentucky bluegrass/perennial ryegrass mixed turf. Best management practices for growing cool season turfgrass were generally used at both sites. Site 1 in Provo is a sports turfgrass sod farm at Brigham Young University with manufactured sandy soil derived from commercially crushed quartz rock used for athletic field applications. Site 2 near Spanish Fork is a turfgrass area at the Brigham Young University experimental field research center with a Timpanogos loam soil (fine-loamy, mixed, superactive, mesic Calcic Argixerolls). At each site, 1 m x 3 m individual plots were established in a randomized complete block design with three treatments and six replications. Treatments included application of 0 (control) or 200 kg N ha-1 applied as either a conventional N source (urea; 46-0-0) or polymer-coated urea. Duration is engineered to release its N steadily and completely by about 45 days under normal temperatures conducive for plant growth. Treatments were uniformly surface applied by hand.

Plots were irrigated with approximately 2 cm water within 12 and 1 h after fertilizer application for sites 1 and 2, respectively. Irrigation was managed by monitoring soil volumetric water content using Watermark soil moisture sensors and logged using an AM400 soil moisture data logger. Soil temperature was monitored with a thermistor and logged using the same data logger.

Shoot samples were also taken 20 and 68 d and 31 and 55 d after fertilization for sites 1 and 2, respectively. Root samples were taken at the later sampling date only at both locations. Root (after rinsing) and shoot samples were immediately dried at 65o C, ground to pass a 1 mm sieve, and analyzed for total N. Verdure assessments were done weekly via visual ratings on a 1 – 5 scale, with 1 being a necrotic dead plant and 5 being a healthy green plant.

This study was conducted during the fall season to an established sod at a time of relatively low temperatures that steadily declined with time. Such late season fertilization of

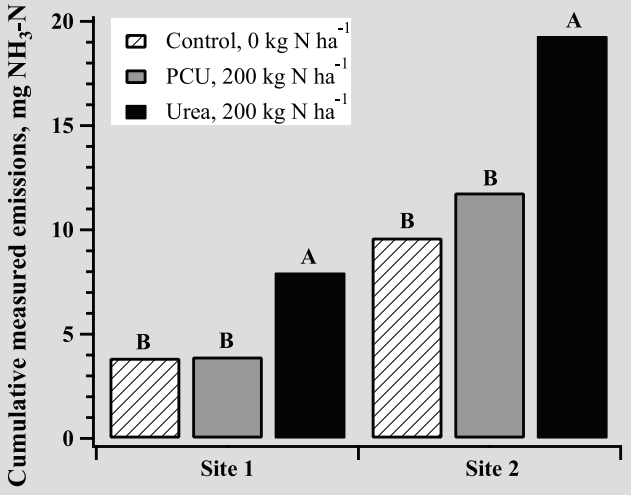

Fig. 3. Cumulative total measured NH3 emissions over 45 d studies at two Kentucky bluegrass/perennial ryegrass field sites fertilized with 0 (control) or 200 kg ha-1 N applied as either uncoated urea or polymer coated urea (PCU). Significance for comparison among fertilizer treatments for a given site with the same letter are not significantly different at P = 0.05, Tukey Honestly Significant Difference.

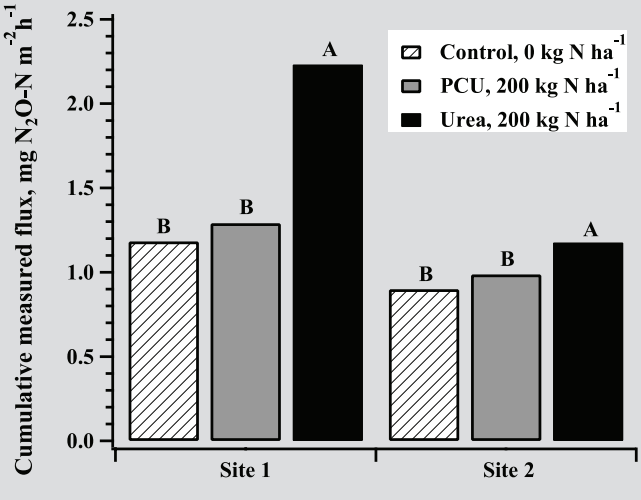

Fig. 4. Cumulative total measured N2O flux as collected during ten or nine sampling times at sites 1 and 2, respectively, during 45 d studies at Kentucky bluegrass/perennial ryegrass field sites fertilized with 0 (control) or 200 kg ha-1 N applied as either uncoated urea or polymer coated urea (PCU). Significance for comparison among fertilizer treatments for a given site with the same letter are not significantly different at P = 0.05, Tukey Honestly Significant Difference.

N is common and applying a majority of the N at this time is physiologically beneficial and a good management practice for cool season turfgrass species, which are the reasons for implementing the timing schedule in this study. Additional work is also needed to evaluate N2O evolution following PCU application to cool season turfgrass early in the growing season for both ramping temperatures in the spring and relatively high temperature throughout the course of the study during the summer season.

Although not different during the time period of the study, it is of great consequence to note that there were significant visual improvements for PCU>urea>control at site 2 early in the following spring with visual ratings of 4.2, 3.2, and 2.4, respectively. The results of our study show that PCU never performed worse than traditional urea applications and this visual improvement suggests that PCU may not only be superior over urea in terms of environmental parameters, but also with regard to visual improvement. Further work needs to be done to evaluate this potential long-term effect.

Specifically, N concentration in turfgrass was maintained significantly higher in the order urea > PCU > control. However, no other root and shoot samples taken at other times or sites were significantly different in N concentration. The lack of treatment effects at site 2 may have been related to a large relatively fresh N pool, high organic matter, and/or high CEC. It is also noteworthy that sampling occurred about 8 d later after fertilization at site 2 compared to site 1. A more rapid release of N to turf from urea compared to PCU explains higher N content from urea application at site 1, which difference disappeared at the last sample date.

CONCLUSIONS

Our findings indicate the health and appearance of the cool season turfgrass mixture of Kentucky bluegrass/perennial ryegrass can be maintained or improved by utilizing PCU in place of uncoated urea fertilizer; with the added benefit of mitigating environmental losses as N2O and NH3, and possibly NO3-N. Our research identifies no downside to PCU use under these conditions. Given the concerns for global climate change, reductions of the magnitude reported herein of the very potent N2O greenhouse gas deserve further investigation under various environmental conditions in all fertilized landscapes.

Joshua J. LeMonte, PhD is with the Dept. of Plant and Soil Sciences, University of Delaware; Bryan G. Hopkins, PhD, and Von D. Jolley, PhD are with the Plant and Wildlife Sciences Dept., Brigham Young University.

We thank Brigham Young University (BYU) for providing funding and the many BYU students that worked to assist on this research. We also thank Richard Terry and Bruce Webb, BYU Professors for technical assistance with this project. ST

List of references is available on www.sportsturfonline.com

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Hosting a field trip is a good way to attract interns.

FINDING INTERNSHIPS AND ATTRACTING INTERNS

BY **DOUGLAS LINDE, PHD**

A few years ago one of my students, Travis, had a summer internship with Tony Leonard at the Philadelphia Eagles. A few months later Travis attended the Keystone Athletic Field Managers Organization Conference to receive a scholarship and met Dan Douglas from the Reading Fightin' Phils. Dan wisely invited Travis to try a baseball internship the next summer and he accepted. This is an example of how a student landed an internship and an employer got an intern.

This article is intended to provide practical information for both sports turf managers and students in regards to internships based on my 20 years of matching students with employers.

THE INTERN MARKET

The marketplace for interns has significantly changed in the past few years. There is a big shortage of turf interns for both the golf and sports turf industries. The main reason for the shortage is fewer students have been enrolling in universities to study turf. From speaking with colleagues at other universities, the enrollment in turf is about half of what it was in 2008; however, the demand for interns is still strong. A result of this change in supply is that it's difficult for employers to find interns but very easy for students to land an internship.

One of my students recently had three internship offers and he used the offers to negotiate pay and benefits. From monitoring jobs sites like TurfNet, I noticed recently that employers in the golf industry have begun to increase wages and other perks in order to attract interns. In fact, in a quick search on TurfNet in January, I noticed the typical wage rate for golf course interns was $12-15 per hour plus overtime, and many courses offered free housing. So some interns are making $6,000 and $7,000 over the summer on a golf course. There is competition for interns between the golf and sports turf industries especially for students that are not sure which career path they want within turf.

HOW TO ATTRACT INTERNS

Given the low supply of students, it's even more critical to evaluate your intern program and try something new. A good intern program attracts more interns. These suggestions are also commonly found in good intern programs.

Have a formalized intern program. Formalized programs include things such as a detailed job advertisement, a wide range of tasks to be learned, and a sincere desire of the employer to train and mentor students. An email saying, "Doc, let your students know I'm looking for an intern" is not a formal program.

Provide free housing. This should increase the size of the applicant pool because it can draw students from across the nation and even internationally. Plus, they don't have to find or pay for housing, which is a huge benefit. Many golf courses offer this benefit.

Competitive wage. Many students studying turf don't come from wealthy backgrounds and they often need to make money in the summer to help pay for college. Although pay rate should not be the only selection criteria by students it often is an important one. I've had some students crossover from sports turf to golf for this reason.

Detailed job description. List as much information as

you can such as expectations, hours, pay, duties, benefits, and requirements. Also, list any selling points of your program such as location, housing, overtime pay, special events, projects, and educational and networking opportunities. These selling points can be the "icing on the cake."

Advertise. Create a professional looking advertisement flyer, brochure, or video. If you don't have that skill, find someone in your organization that does. Post it on your company website and others such as STMA and TurfNet. Other places to share the advertisement are conference job boards, university placement offices, and turf professors and advisors. Consider posting in early November. My students have to visit me in November for academic advising for the spring semester. I ask them about their work plans for the upcoming summer.

Another suggestion to get the word out is to invite a professor, turf class or club to visit your site if you are near a turf university or another similar institution. They get an educational tour and you may get an intern. Tony Leonard from the Philadelphia Eagles regularly gives tours for my class and has hired interns from those classes.

Remember that "word-of-mouth" by former interns can be a great way to advertise assuming you gave them a good experience. However, "word-of-mouth" can kill your program if you gave them a bad experience.

Be professional in your communication. Applicants will have more respect for you and your organization. Respond promptly to phone calls and emails from interested students. Inform applicants if they did not get the job. Simply write an email saying, "Thanks for applying. Another applicant was chosen." It gives closure to the student. Be honest with pay rate and hours expectation. If you expect them to work 70 hours per week for $1,000 per month make sure they know it. One of my students quit his internship after 3 weeks because the expectations were not made clear.

Don't make them work 70 hours per week on a $1000 per month salary; that's $3.60 per hour.

A counter argument could be made that this formula results in only the most dedicated and passionate people in the industry. Thus, weeding out students that may be less dedicated and passionate to the sports turf industry. I've had quite a few students that had the passion yet crossed over into the golf or lawn care industry for higher pay. Travis, who interned in professional football and baseball, was one of my better students that had a passion for sports turf took a job with a landscape

Hosting special events can help attract interns.

company upon graduation and now works in the lawn care industry.

I know it can be difficult to find more money but do what you can to do something. Use this article to help justify an increase to your supervisor or owner.

Give them some days off and predictable quitting times. Are you hazing interns with excessive hours? This means making them work long hours with few days off because that's what was done to you. The millennial generation is less willing to make big sacrifices for their career like previous generations. I first ran into this a few years ago with a student named Dan. He was one of my better students academically and a campus leader. I encouraged him to work for an employer that worked the interns long hours. After the summer, Dan told me he couldn't see himself working those kinds of hours as a career and left the turf industry for an environmental science job.

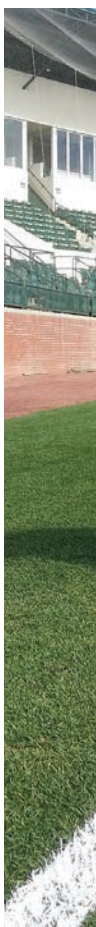
One of my top employers of students in the golf industry said to me about 5 years ago, "Doc, these kids don't want to work." At first I was concerned that I sent some type of message to my students that created this work ethic. But after hearing similar comments from other employers and reading about the generalizations of millennials, I learned it was a shift in work philosophy. If you fight it, you may not attract and/or retain millennial employees.

HOW TO LAND AN INTERNSHIP

Although this has become easier given the high demand for interns, there are various things a student should consider when trying to land an internship. A great place to begin is to read the STMA Internship guide by Raechal Volkening, CSFM.

After reading the guide, it's time to list your goals. First, list some of the key skills you already have in regards to sports turf management. Then make a list of skills you need or want to get from the internship. Share your thoughts with your advisor or a past employer to get their input.

Then consider desires such as location, pay, hours, housing, prestige of employer, and number of interns at the site. If you're a junior, you might want to consider working for an employer that has a history of hiring interns upon graduation. Lastly, and possibly most importantly, do you want to work for an employer that has a history of a good intern program? Advisors, past employers, past interns, and fellow students are great resources for learning which employers have a good program.



Once you have an idea of your goals and desires, it's time to look for some internships that may meet as many of those goals and desires as possible. Search the intern postings on STMA and TurfNet. You have to be a member or know a member of STMA to see their postings. TurfNet is free but doesn't usually have many sports turf intern postings. Other sources include advisors, students, field managers, conferences, and college placement offices.

One last way to find some opportunities is to directly contact a facility and ask to speak to the head field manager to see if there are any openings. One of my more assertive students, Emma, lived near the Lehigh Valley Iron Pig's baseball stadium and simply cold-called the field manager. She explained she was studying turf in college and was looking for a summer job. She happened to call at the right time and was hired.

Before applying for any internship, make sure you have a resume and cover letter and they look and read perfect. The turf industry prides itself on attention to detail so why would a field manager hire someone with a sloppy resume. For example, I had an employer tell me he rejected one of my students for an internship because he had a few spelling mistakes in his resume and they needed someone that paid attention to detail.

Then it's time to apply for two to four positions. Positions start to be posted in November. That's the time of year to start looking. If you wait until April, you may have missed out on the ideal internship for you. When you get an interview, take some time to read about how to prepare for an interview. College placement offices may offer interview practice sessions for you to gain confidence. Or ask a parent or friend to interview you. Whether you get an interview or not, send a thank you note or email.

LAST WORD

For sports turf managers, it can be difficult to attract interns to your facility in today's intern market. Evaluate your program and try some of the suggestions I mentioned. As for students, you should take advantage of all the opportunities that are available by making sure you follow some of the suggestions. That way you can get the most out of your internship experience. ST

Dr. Doug Linde has been a professor of Turf Management at Delaware Valley University, Doylestown, PA since 1996 and specializes in preparing college students for a career in the turf industry. He is the academic and career advisor for all turf students and teaches seven classes related to turf management.

Sports turf managers pay attention to detail and so should students in their resume.

MATT EGGERMAN OPENS THE BALLPARK OF THE PALM BEACHES

STMA member **Matt Eggerman**, director of field operations at the brand-new The Ballpark of the Palm Beaches, answered questions ahead of West Palm Beach facility's debut last month. The Houston Astros and Washington Nationals, with the help and support of Palm Beach County and the City of West Palm Beach, built the two-team facility with a 6,500-seat stadium as its centerpiece. The Astros and Nationals training areas each feature a six-field layout. The 160-acre campus includes a city park featuring basketball courts and a 1.8-mile walking trail available to the community daily.

SportsTurf: Were you (or John Turnour, the Nationals' head groundskeeper and/or Dan Bergstrom, the Astros' senior director of field operations) consulted before a field construction company was hired? If so, what kinds of input did you give?

Eggerman: Both teams had representatives to consult in the early stages of the project to ensure they had components integrated into the construction plans that would best fit their team's needs. I was brought on board later in the process, while field construction was ongoing, to help ensure that field specifications were followed and begin assembling the maintenance crew for field takeover.

SportsTurf: What's the composition of the rootzones on the fields, and did you have some say in that?

Eggerman: All fields have a 10-inch, 93-7% blended sand rootzone over 4 inches of gravel and subsurface drainage on 15-20 foot spacing.

SportsTurf: Who did build the fields, and what type of grass was chosen? Why was it chosen? Same grass for all fields? Is there any synthetic turf at the complex?

Eggerman: Sports Contracting Group was the field contractor for the project and was responsible for all sports fields, artificial fields, and bullpen installations.

The teams selected Platinum Paspalum TE for the playing fields. This is the same turf that is used at the Astros' home field, Minute Maid Park. The practice fields were sprigged and the stadium field was sodded with turf from Pikes Creek Turf Farm in Adel, GA.

Each team has an artificial agility field just outside their clubhouse

SportsTurf: And what was your role, if any, during the

actual field construction?

Eggerman: During construction my role was to act as the team's representative in all things pertaining to the grounds. There were several coordinating issues pertaining to these areas, such as fencing, irrigation, landscape, equipment, water management, etc., that all needed to be properly laid out for the teams when they arrive.

SportsTurf: Any major problems during construction?

Eggerman: When ground broke on this project late in the fall of 2015, everyone involved knew the timeline for this project was very aggressive to be prepared for the opening of spring training in 2017. There certainly have been days when things don't always go as planned, but everyone here has had the same goal in mind throughout, do what it takes to be open for spring training 2017 and we fully expect to meet that goal.

SportsTurf: Are you in charge of all complex fields?

Eggerman: I am in charge of all of the complex fields as well as the surrounding grounds and landscape.

SportsTurf: How many crew members will you have?

Eggerman: We will have a full-time staff of around 20 and will have additional labor force at our disposal during peak times of spring training and other events throughout the year.

SportsTurf: Will the teams' crews assist during spring training or are you going to have your own guys year round?

Eggerman: With 160 acres to maintain, we will have our own staff year round. But we always appreciate extra hands of experienced groundskeepers and look forward to a few team personnel making trips down to assist.

SportsTurf: Are you planning on doing anything out of the ordinary regarding maintaining the fields, given their newness and/or high profile?

Eggerman: This first spring training our main focus will be on establishing and developing our programs and protocols and getting our staff and team representatives acclimated with the new complex. Once we get through our first year we can evaluate what worked best and what changes need to be made here and there to improve. We certainly look forward to soon transitioning out of construction mode and into full-time maintenance mode to provides the best conditions for our players. Once that occurs and when Opening Day finally arrives all the long hours and hard work put in by so many folks will all be worthwhile. ST

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FIELD BUILDER STRIVES FOR SAFETY

Editor's note: *This article was provided by Sports Turf Company, Inc., Whitesburg, GA.*

Gilmer County High School became the first school in the Southeast to play on the AstroTurf Golden Series synthetic turf system. After much deliberation over what synthetic turf product would best suit their needs, the Bobcats, nestled in the North Georgia Mountains, chose a high-density, short length fiber pad and ZeoFill infill turf system, commonly referred to as DT32, Gilmer County embarked on their journey to revolutionize their field before graduation.

With California leading the way in new synthetic turf technology. AstroTurf invested in a new alternative infill design for Los Angeles Recreation and Parks that has now been installed across the nation at high schools, municipalities and Division I fields. Driving the product was a desire to create consistency in safety utilizing a pad, a "no fly-out" infill system, and high durability with lots of fiber that had already been proven in the field over decades with lowering field temperatures. Simply stated by Jimmy Newsome of LA Recreation and Parks, "We had a table full of turf samples. After reviewing the products one by one and eliminating the ones that did not fit our needs, we had an empty table." This drove the city to develop its own product alongside AstroTurf. Since that moment, AstroTurf has installed over 4 million square feet nationally.

> **"We absolutely love the new field and track!**
> ***– Principal Carla Foley***

THE FIELD

Gilmer High School's football stadium was a project awarded to Sports Turf Company, Inc. through a competitive proposal process. Construction began in February 2015 working through North Georgia's unpredictable winter weather.

Sports Turf Company began by excavating down to subgrade to remove all materials from the previous natural grass field and laser grading. A 6-inch porous stone base was installed accompanied by a full underdrain system to allow a minimum of 60 inches an hour to drain successfully from the new synthetic turf field. Exterior field drainage was installed inside the track to ensure water wouldn't travel back across the track surface.

The Brock SP15 pad was installed over the stone base followed by the Golden Series DT32 system; in another industry first, Gilmer's end zone lettering and football numbers were prefabbed in a climate controlled warehouse facility before the carpet even arrived for installation. A typical field has 398 inlays plus logos and end zone lettering. By cutting these with a robotic water jet, every one is guaranteed to be the most crisp. Gilmer's prefabbed field meant the most precise installation, no rain complications and the field was ready on time for graduation. The last step of field construction, 1.5 pounds of sand per square foot was incorporated into the synthetic turf system as a ballast before the ZeoFill was groomed into place.

Sports Turf Company's certified track builders evaluated Gilmer High School's stadium and found widening the field to allow for a regulation soccer field would not eliminate a

lane of the track based on where the home grand stands were built. The orientation was redesigned shifting the field towards space on the home side to best suit Gilmer High School's needs and allow for a regulation soccer field. The entire field was enlarged, the distance between the measure lines for the track were changed, and the straightaways were shortened. The curves were made longer and wider to accommodate the new wider field and maintain 6 lanes on the track.

Track construction began with installation of a 4-inch stone base and 3-inches of asphalt. A Sports Track ST-50 13 mm black latex track surface was installed and the track lined for GHSA competition.

The Golden Series carpet replaces rubber infill with ZeoFill, a brand of Zeolite. ZeoFill is an all-natural mineral, able to absorb 81% of its weight in water and release it slowly to create an evapotranspiration effect, thereby cooling the field.

The turf in the DT32 system packs 80 ounces of fiber per yard into 1.25-inch tall pile, with each row spread apart only 3/16 of an inch. The increase in fiber density compared to conventional competition turf systems with only 36 ounces of fiber means it is twice as heavy as those traditional commodity systems and four times as dense.

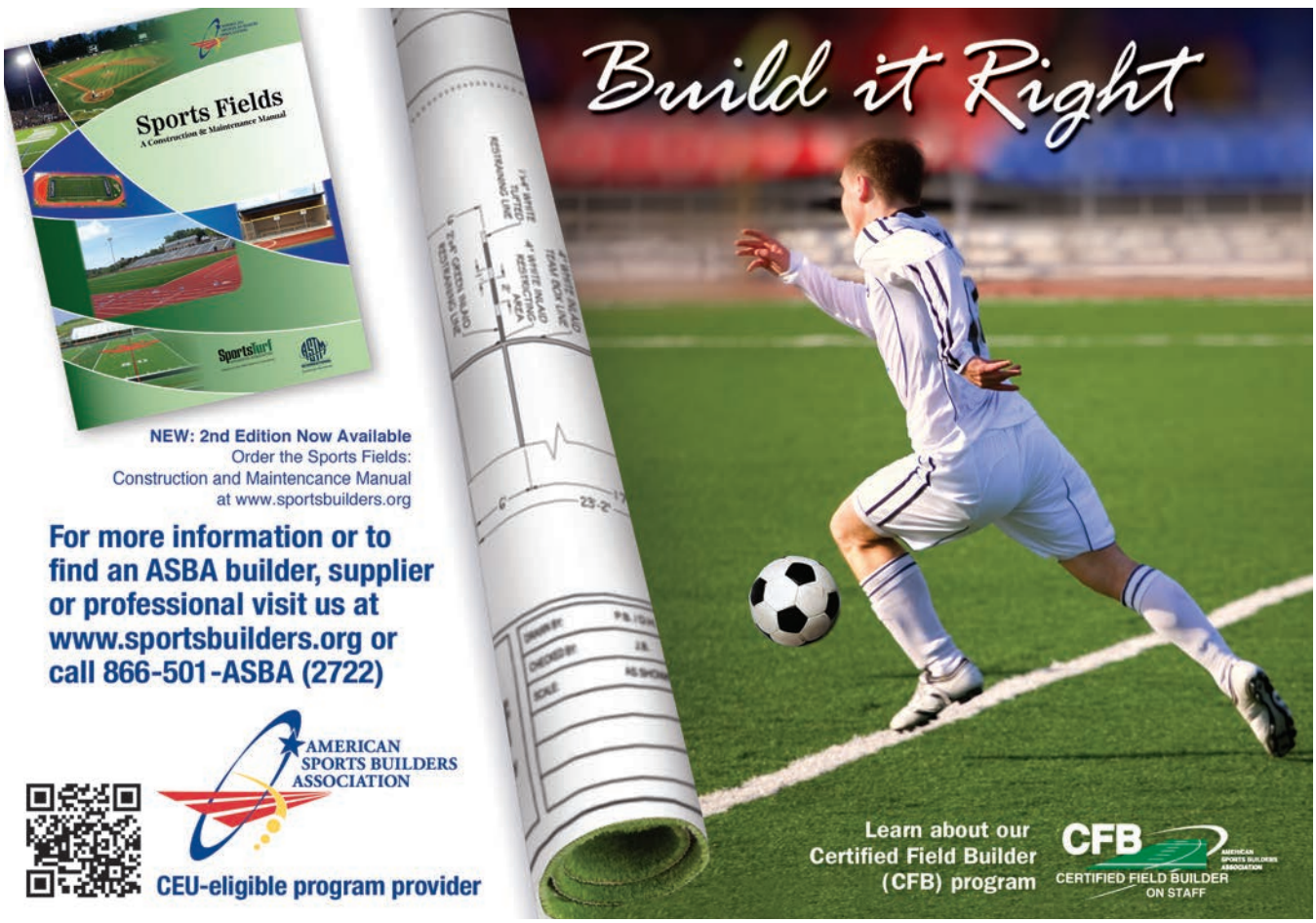
The Brock pad system consisted of small beads of polypropylene molded under pressure into a certain design, and allows the system to maintain a low stable force reduction rating, aka Gmax.

Brock pads are guaranteed for two lifetimes of the field.

Todd Wiggins, VP at Sports Turf Company says, "The new field is unique in that young athletes play on the fiber like they would grass on a natural field, instead of playing only on the fill. We look for synthetic turf solutions, which closely mimic a high-performance sand rootzone natural grass field."

"We absolutely love the new field and track! It looks great and gave the students a real sense of pride to play on this fall. We are looking forward to using it for our upcoming soccer and track & field season."- Principal Carla Foley

"This is the second time I have been involved with a new facility. When I was an AD at another school, I was on the front end of all of the grading, installation etc. of our football field. Our new complex is top notch! Our whole community loves our new facility. It is first class…it makes our whole community proud…our players like playing on it…other teams really like it as well. It is a huge positive difference compared to our old field."-Athletic Director Terry Luck ST



WATER-DRAINABLE ARTIFICIAL TURF SURFACES

■ BY **NORRIS LEGUE**

Editor's note: *Norris Legue is a chemist and president of Synthetic Surfaces Inc. He invented the first successful urethane adhesive for synthetic turf installations. His peers have dubbed him the Guru of Glue®.*

Water drainable synthetic turf surfaces for athletic fields and playground surfaces are of growing interest and use, particularly in field hockey. While all easily withstand the attack from water, they are not acceptable for athletic activities, due to inadequate drainage when submerged in water.

Past attempts to prevent water build-up or to allow water permeability have been by partial glue-downs, such as perimeter gluing, strip gluing and spot gluing areas. These methods allow drainage where there is no adhesive or bond, but areas with no adhesive permits other problems such as turf wrinkling or bunching up under foot; moving (dancing) lines; or erratic ball roll which can result in both injury and aesthetically poor appearance.

The solution to the above problem (wrinkling under foot, dancing lines and erratic ball roll) is a smooth, uniform "pool table top" surface that is obtained by a total glue-down of a water drainable surface. This can be achieved by making a "sandwich" that includes:

A. The Top Layer, synthetic turf that is porous, such as knitted turf, loosely woven turf, or water drainable turf with drain holes punched through it;

B. The Bottom Layer, a shock absorbent base that is inherently water permeable such as elastic layer, water permeable shock pad, or shock pad with water drainable holes punched through it;

C. The Middle Layer, a special adhesive that joins the turf and pad layers together, but still permits water to permeate from the top through the bottom layers of the sandwich.

The best types of generic adhesives today are by far one-component, solvent-based, high "green strength", sprayable, moisture-cured urethanes. However, it's the critical "bells and whistles" as additional parts of the adhesive that makes the above type of urethanes necessary for water drainable fields. Examples are:

The sandwich

A superior water drainable field is not easy to prepare and install. It requires a water permeable "sandwich" comprised of a porous turf, water-permeable bottom layer, and an innovative sophisticated adhesive that is low-hazard because of negligible overspray and negligible airborne mist; sprays like a spider web and "stands up"' after hitting the surface; can be applied at any temperature the installer can work; and has outstanding long-term exterior durability.

The first and perhaps the most important picture is the one showing the adhesive being sprayed with a spider-web pattern. Note also in the picture that the black sub-surface telegraphs through the white-sprayed adhesive indicating there are numerous places for the water to penetrate through.

The second picture shows the adhesive being sprayed on a porous pad with holes drilled through for drainage. Note also, in the picture the spider-web pattern of the adhesive being sprayed.

The type of spray rig that is frequently used to install these types of fields. Note that the 55-gal. drum is mounted on a portable carriage, along with the airless spray unit, so that the adhesive can be moved as the job progresses without any great effort. It also shows the adhesive being applied.

■ Low Hazard Spraying. The adhesive should have negligible over-spray to prevent the adhesive from getting onto the skin, eyeglasses, clothing, equipment and other nearby objects without resorting to masking, even outdoors. The benefit of not inhaling an aerosol mist of sticky, durable adhesive is obvious.

■ Spray Pattern. The adhesive should spray like a spider web and "stand-up" when it hits the surface instead of flowing and clogging the surface's pores.

■ Application in Variable Weather. The adhesive should be able to be applied outdoors regardless of the temperature, whether it is freezing cold or intense desert heat.

■ Long Term Durability. The adhesive after cure must have exterior durability for the surface to last for a long time in all types of outdoor weather. Good durability after aging keeps the surface smooth and safer for athletic activities. ST

John Mascaro's Photo Quiz

Answers from page 17

John Mascaro is President of Turf-Tec International

This month I decided to have some fun with landscape maintenance contractors. A friend of mine shared this photo with me as well as the story. He lives in the Chicago area and he decided that he only wanted his hedge trimmed twice a year to save on costs. When his landscape maintenance company came out, as you can imagine, the hedge was fairly overgrown. The worker trimmed the left side of the hedge adequately as you can see, however he only trimmed one half of the hedge as he thought the other side of the hedge might be on the neighbor's property. Well it was not, when my friend came home, he was trying to figure out why only one side of his hedge was trimmed, and then he figured it out. The landscape maintenance contractor did return a few days later and evened it out for him. Photo submitted by Tom Herron, Chicago.

If you would like to submit a photograph for John Mascaro's Photo Quiz please send it to John Mascaro, 1471 Capital Circle NW, Ste # 13, Tallahassee, FL 32303 call (850) 580-4026 or email to john@turf-tec.com. If your photograph is selected, you will receive full credit. All photos submitted will become property of SportsTurf *magazine and the Sports Turf Managers Association.*

BACKGROUND ILLUSTRATION COURTESY OF ISTOCKPHOTO.COM

EUROPEAN MOWING TECHNOLOGY BEING IMPORTED

Earlier this year Cub Cadet expanded its presence in the sports turf market by acquiring Advanced Turf Technology (ATT), a UK-based company that produces cutting reel mowers and cassettes specially designed for sports field maintenance. ATT products include the TMSystem and the INFiNiCut, which have been proven by Premier League clubs and sporting facilities around the world. The INFiNiCut combines a lithium power source with user programmable frequency of clip rate and a return floating head. It can also convert to gas power if preferred. *SportsTurf* exchanged emails recently with John Coleman, the founder of Advanced Turf Technology:

SportsTurf: Is there a maintenance task that European groundsmen use but American turf managers don't?

Coleman: There's no hard or fast rule here but the intensity with which the top end European groundsmen manage the pitches can be quite extreme. For example, they would never mow a stadium field with a ride-on mower due to the problem of wheel marking and the stress on the turf when turning. The European groundsmen also use the Clegg Hammer regularly to help them manage surface firmness and keep it within acceptable limits. This is partly required due to the hybrid pitch constructions such as Desso Grassmaster that can result in a less compliant surface if not managed accordingly. These technical pitch constructions are one of the biggest differences between the high-end venues in the US and Europe, but they're heading your way!

> "Using a mower that has only a single factory setting implies that for most of the time the plant is being cut less than optimally."

SportsTurf: What are biggest differences between your technology and what's been available in the US?

Coleman: Our technology combines electrification with the ability to customize geometry of the cutting unit. This allows the groundsman to optimize the cutting action dependent on turf conditions on any given day. Given that the plant's physiology changes daily, using a mower that has only a single factory setting implies that for most of the time the plant is being cut less than optimally. The cumulative effect of this is a plant that is stressed regularly, leading to a weakened state and more prone to environmental stressors such as pathogen attack.

SportsTurf: How did your groundsman experience help you develop the cassette technology? Briefly explain how it works.

Coleman: Any groundsman will know that the grass sward is only ever in any two states: It is being managed to prevent deterioration, or it is being managed to repair deterioration. There is no middle ground I'm afraid. With this in mind we wanted to produce a produce a product that could facilitate both requirements. The versatility of an interchangeable cassette system allowed us to do that in a cost-effective way.

SportsTurf: Give some examples of how non-golf sports turf managers can use the INFINICUT technology to improve their fields.

Coleman: A good example would be the ability to change the reel rotational speed in relation to the rigidity of the plant. During periods of "soft growth" such as immediately post N application, the plant will tend to be less stiff. The rotational action of the reel can act like a "fan" and blow the softer plant over in front of the cut path and a poor cut ensues. There is a direct correlation between how clean and consistent the cut quality is with the contrasting difference between the light and dark stripes. Interestingly, this has nothing to do with how sharp the cut is (although that is very important for other reasons) it's more to do with minimizing light scatter caused by the leaves of the plant facing in different directions. Being able to gather the sward evenly in front of the bedknife/reel and cut the grass blades uniformly lines the leaves up more consistently and light scatter is minimized resulting in a more defined stripe effect. The INFiNiCut can be set to in several different ways to affect cut appearance. ST

TURF TANK ROBOT MARKS FIELDS

Denmark-based Intelligent Marking Ltd invented and manufactures a field-marking robot that is being distributed in the US by Turf Tank, Acworth, GA, www.turftank.com. Jason T. Aldridge, president of Turf Tank, says his company has been very involved in helping Intelligent Marking design the American football programming for the robot and develop an overall sales strategy for the US market. Aldridge answered some questions from *SportsTurf* ahead of the product's debut at January's STMA Conference:

SportsTurf: Can the robot be pre-programmed to paint a soccer pitch or football hash marks or must it always be run by an on-site operator?

Aldridge: The Intelligent One Robot has pre-designed templates for athletic fields and can be pre-programmed to paint any size soccer pitch or football field (outline, yard lines and/or hashes). The robot is controlled from an app on an Android Tablet, which comes with the robot. After each practice and/or game fields are loaded into the application, the robot will always know the precise location and measurements down to 1 cm accuracy to paint effectively. The operator can simply click a button on the app and launch a route plan. The robot will drive directly to the starting point and begin painting. For soccer complexes with multiple soccer pitches, the robot can be instructed to paint up to four, full size 11 v 11 soccer fields with one touch of a button. When running an American football route plan, the operator has the option to do either a full field or separate components of the outline, yard lines or hash marks.

SportsTurf: What's the learning curve for operators, in both running the robot as well as programming it for certain tasks?

Aldridge: The Intelligent One App is very easy to navigate and understand. Our Turf Tank staff will properly train every customer and provide support through phone, email, online forums and onsite visits if necessary.

SportsTurf: Does it require any kind of special paint or can operators use same paints they have been using?

Aldridge: The Intelligent One robot is a highly advanced computer with algorithms and timing mechanisms that correlates with the pump pressure and nozzle output. Intelligent Marking is offering a branded paint solution manufactured in the US. Customers will ultimately have to make their own choice of paint preference, and we will help them understand our paint products and navigate through any questions or options they want to explore.

SportsTurf: What is the initial cost of the robot, and what are costs in maintaining the robot?

Aldridge: Turf Tank has a creative business model for selling and supporting the Intelligent One Robot. Our goal is to provide an innovative product with our support at an affordable price to any customer. Turf Tank will sell the robot through a municipal lease with annual appropriations clause that is common for local or state governments. For non-government organizations, Turf Tank has similar commercial leasing options available that are affordable. This means any customer can gain title to the robot during the term of lease and gains free and clear ownership of robot at the end of term. Additionally, if the customer does not receive funding for that budget item for the next year, they can cancel the lease with no further obligation.

Turf Tank has different tiers of pricing based on number of physical site locations and number of fields. Our customer profile can be as small as a youth soccer club and private high school up to a large school district, college campus with athletic and student recreation fields, and large municipal parks and recreation departments with multiple campuses and field locations.

Turf Tank has approved municipal/commercial leasing terms from 36 to 72 months with customized payment options to best fit each customer. Our pricing tiers range from as low as $399 per month to $749 per month based on the customer's configuration and service level agreement. Additionally, Turf Tank offers discounts on multiple robot purchases and also provides creative consulting services to help raise sponsorship dollars for the robot. There is a required $960 annual GPS Satellite data plan for each robot that is billed separately each January by Intelligent Marking Ltd. in Denmark. ST

AERATING MADE EASIER

Editor's note: *This article was written by Gail Trudeau, marketing manager at Billy Goat Industries, Lee's Summit, MO.*

Are you aerating your sports fields and high traffic grass areas often enough?

From sports fields, practice facilities to grassy areas that receive a lot of foot traffic, soil compaction can have a significant impact on the health of your turf, and aerating is the best and most cost-effective way of dealing with it. Aerating helps to get oxygen and moisture to the root bed of your turf, and it allows carbon dioxide to escape. These benefits will help keep your grass healthier and greener all season long.

Whether you're responsible for maintaining turf at city parks, schools, university or professional stadiums, aerating shouldn't be viewed as only a spring and fall activity.

As campus grounds supervisor at Penn State University, Matthew Wolf knows how important aerating is for turf health. "My philosophy is you can never aerate too much," Wolf explains. "In clay-dense and highly compacted areas, turf managers spend a bunch of time and money trying to produce healthy green grass. Unfortunately, a lot of these fixes are just temporary. A consistent schedule of aerating will often provide better results that last."

TROUBLE WITH EQUIPMENT

For many turf managers, there just is not enough time in the day to aerate as often as they would like to. For example, drum style walk behind or towable aeration can be slow and labor intensive.

"Drum aerators have been around for decades," says Pierre Pereira, director of sales, North America, at Billy Goat Industries. "They are a good option for residential work. However, turf managers can waste time going over a field multiple times to achieve the hole density they want. There are also inconsistencies in hole depth with these traditional units because they depend upon ground moisture to help the tines reach their maximum depth."

Better aerating options like high-end, deep tine aerators are typically found at professional sports fields. These units can be more expensive for many budgets and may not hold up as well under the normal ground conditions found on recreational fields and parks.

To meet the need for a better and more cost-efficient way of aerating, some manufacturers have introduced reciprocating aerators. This category uses a reciprocating camshaft that drives tines up and down into the soil, similar to what is found on deep tine machines at a more economical price point.

"Reciprocating aerators produce a denser hole pattern than drum units," says Pereira. "This means the operator can punch more holes in the soil on a single pass than they could in multiple passes using a drum aerator."

Wolf and his team made the switch from drum aerators to a reciprocating aerator in 2015. "I wasn't happy with the amount of labor and end results that our old walk-behind and pull-behind drum units were producing," he says. "When I had the chance to demo this reciprocating unit, I was immediately impressed with the results. It delivered the type of quality I used to get from common golf course aerators that I used as a golf course superintendent, but holds up better in harder and rockier soils."

"Unlike traditional aerators, the camshaft and drive speed are independent of each other on the Billy Goat reciprocating aerator," says Pereira. "This gives the operator the ability to vary the hole density at different speeds. For standard aerating, that unit produces 8 holes per square feet at 4 mph (typically 2x as dense as a drum). For thinning,

diseased or dead areas, the operator can feather back the speed and produce as many as 48 holes per square foot for rapid seed bed prep in a single pass."

Wolf said that his crews are now able to cover more ground in less time with their Billy Goat AE1300H aerator than they could using a combination of walk and pull behind aerators. "The reciprocating aerator is fast, and we can keep the tines in the ground while turning without damaging the turf," he says. "We're able to aerate in reverse, which is especially handy in confined areas. These benefits combined have allowed us to tighten up our typical spacing by almost three times as many holes per square foot without adding any extra time to the job."

HOLE DEPTH

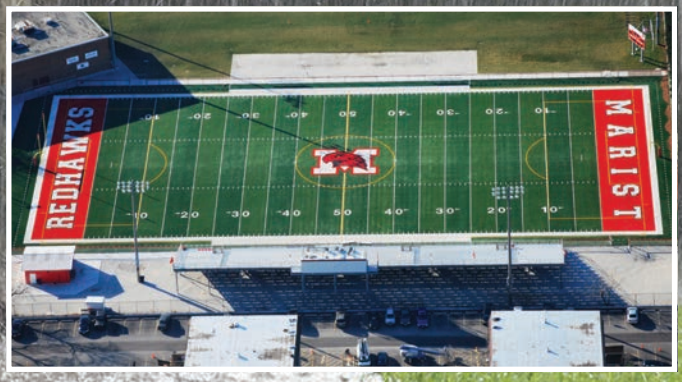
Traditional aerators rely on soil moisture to achieve maximum plug depth. The design of the reciprocating aerators is powerful enough to drive the tines deeper even in dry soil conditions. That means no longer have to plan aerating schedules around the weather.

Also, the front end of these units is light and has been designed to bounce when a tine hits hard objects like a rock. This feature, along with the Flextech arms on the AE1300H, help to absorb and dissipate impacts for increased arm and frame durability. As a result, there is a reduced chance of damaging the machine when contact is made with a solid object.

Wolf says there are a few event lawns on Penn State's campus that see a lot of activity. "Before an event, during and after an event; our event lawns get used a lot," says Wolf. "Utility vehicles will drive over them to bring in equipment for the event. During the event, there are always a lot of people in attendance, and then afterward, everything needs to be cleaned up again. We make it a habit to aerate after most events held in those areas. A lush green lawn is important for a successful event, and aerating helps make that happen."

New reciprocating aerators come standard with ejection tines, and have the option of using solid tines for sports fields or traffic areas where cores are not practical. ST

INDUSTRY'S FASTEST DRAINAGE SYSTEM



"As one of the longest running and most prevalent synthetic turf designers in the Chicago area, we are familiar with all brands of flatdrains. In addition, we also utilize flatdrains for natural grass drainage. We have found it to possess much better drainage parameters AND to be much more economical than other flatdrain products."

— Jason E. Green, PE
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Continued from page 12

needed throughout the project. For starters, we lowered the infield by 4 inches and made the warning track the same elevation around the entire field. We used software, which automatically adjusts all elevations to create smooth contours and transitions from the infield to all points around the warning track. We then loaded this data into a handheld unit we used to check field elevations and locations.

This was essential during demolition to make sure we took out enough material to accommodate the new pea gravel and rootzone depths. We used the handheld unit to verify the exact location and depth of the drain lines and irrigation as they were repaired or installed. The Total Station Unit is also used for all grading, paired with the grading tractor's on-board computer to control the box blade. So regardless of where the grading tractor is on the field, it knows both its own precise location, as well as the elevation it should be at.

While a laser box is 2-D, knowing which elevation to be at (but not so much where it is on the field), the 3-D box can go anywhere on the field and always be at the designed elevation. Therefore, the 3-D box grades the finish surface perfectly, reflecting both the subgrade and gravel layer. In fact, for future renovations or field repairs after events, the file can simply be loaded into a grading tractor to restore any point on the field to its designed elevation. The finished surface is as smooth and transition free as you can get.

Just goofing around!

Having taken images of the field with the GPR to show us what was beneath the surface, we removed the field without disturbing any more of the sub-grade than was necessary. We were able to salvage much of the drainage system and make repairs in any areas that weren't working properly.

We used a series of excavators and dump carts to remove the field, staying on top of the old field while removing to protect the drainage system and sub-grade. The total station was used to establish sub-grade elevations for excavation. The material was hauled to the parking lot and then loaded on semis to haul off site. The field removal took 5 days, totaling nearly 400 loads of material hauled off site. To get to the correct depth in some areas, we had to remove remaining pieces of the old Busch Stadium using concrete saws and excavators to break up the foundation. Since we were lowering the infield by 4 inches, we harvested and stockpiled the DuraEdge (engineered soil) during demolition. We removed 4 inches of base material, formed the infield, and then added the DuraEdge back to the infield, finishing the surface by working new material into the old.

REPAIRING THE DRAINAGE SYSTEM

Overall, the drainage system was in good condition. Areas the GPR detected that had potential drain line problems did need repair. Settled lines needed to be raised, some lines needed to removed and reinstalled to create positive flow to the collectors, etc.

After repairs, we re-introduced water to the lines to ensure everything worked and flowed properly. The stadium has a SubAir system that is currently nonfunctioning; therefore we checked all connections and repaired lines to facilitate future use of the system. We used the Total Station Rover to verify and document all lines and repairs.

When we removed the old field, one of the first things we did was uncover the zone lines as they come out of the stadium and onto the field. Based on what we uncovered, the irrigation system ended up needing a complete upgrade.

Busch Stadium has a single valve bank inside the stadium grounds crew shop, from which all the zone lines run to their respective field zones. We discovered all of these lines were 2-inch PVC or smaller. Based on design calculations, these should have been 2.5- to 3-inch lines to allow for adequate flow and adherence to 5 feet-per-second velocities.

So, we initiated the irrigation system upgrades, which included:

The break in winter weather allowed the field to be completed February 21.

- Increasing lines to the field from 2 to 2.5 or 3 inches
- Installing the new system in the subgrade to keep it below the gravel layer, cutting some lines with a carbide-toothed trencher and bedding them in sand to accommodate pieces of foundation in the subgrade
- Using new Hunter I-40 opposing nozzle and adjustable stainless steel heads throughout the outfield
- Installing Hunter stainless I-20s on the sidelines
- Placing Hunter MP Rotators around home plate to more precisely water this area, as well as around the warning track to reduce dust
- Reworking the valve bank with a 3-inch supply line using Hunter Brass valves
- Adding a Watertronics Booster station with variable frequency drive to eliminate the irrigation system's pressure fluctuations
- Installing a Baseline Base station 1000-control system to store system operations and field data in a cloud-based application
- Installing 12 permanent moisture sensors throughout the field to monitor infield, outfield and sidelines individually

Moving to the Baseline cloud-based system allows for monitoring of the field and operation of the irrigation system from any computer or mobile device. Whether you're standing on the field using your phone or half way around the world you are connected to your field.

FINISHING TOUCHES

With repaired drain lines and a complete irrigation system, we put everything back together. We formed the infield and warning track to proper elevations for the sake of accurate transitions and clean lines.

We set irrigation heads in position/to-grade using the Total Station Rover. We brought the subgrade to-grade, and then installed a 4-oz. geotextile to prevent subgrade contamination of the gravel.

With the Total Station System, we could grade the base, set the offset 4 inches higher in the computer to grade the gravel layer, then raise it 10 inches to grade the surface. Each surface will perfectly reflect the one below it, and material depths will be consistent throughout the entire field.

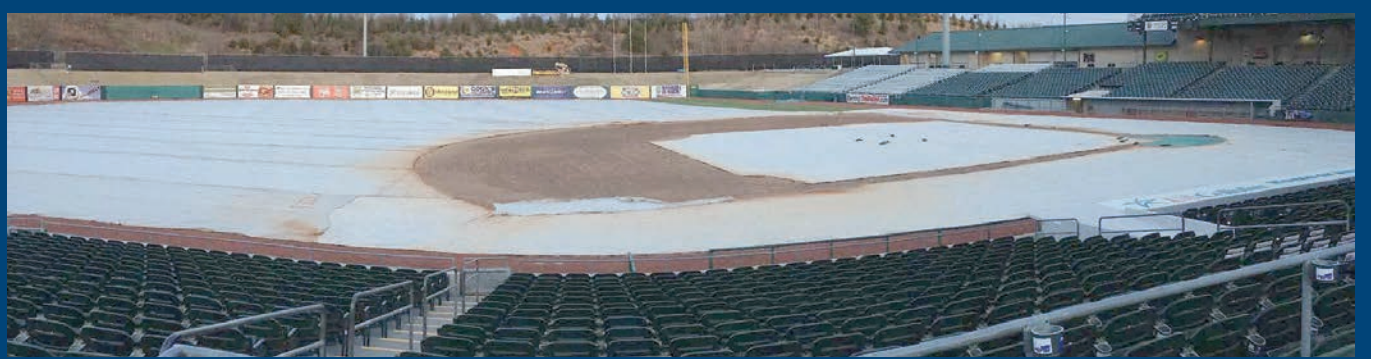
We added pea gravel to a 4-inch depth. The rootzone was installed at a 10-inch depth. The irrigation system was run constantly to moisturize and firm the rootzone. Once the field was to-grade, we installed a 6 oz. white geotextile to retain moisture and stabilize the sand rootzone during the Winter Classic.

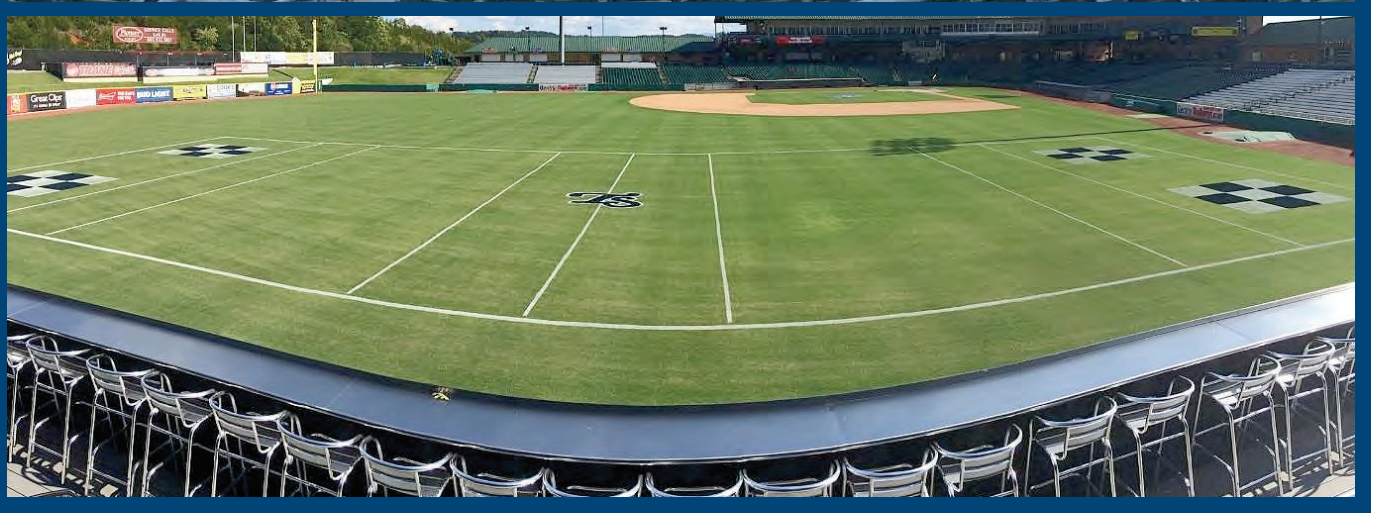
Final touches were put on the field in late February, and the field will be sodded using sand-based sod cut with a 1-inch profile. ST

Steve Bush CSFM, CFB, is owner of Bush Turf and an STMA Commercial member. Follow Steve on Twitter, @BushTurf.

SMOKIES PARK

Tennessee Smokies, Kodak, TN





Why STMA should consider your field a winner?

Hard work, dedication of my staff and personally being passionate about sports turf is what makes Smokies Park the best in professional baseball. I feel these attributes directly translated to the amazing field conditions we had this season. Like most sports turf managers, we faced daily struggles and adversities. However, we put trust into our plan and worked hard throughout the season.

One of the best examples of teamwork is during adverse weather. All of our game day staff and interns are trained at every position. So when we are in a rain situation I can pick one crewmember to supervise and coordinate the field tarp removal with the front office. This allows the rest of us to quickly attend to the field and get the game started. The cross training makes us an efficient team and we can have the field quickly ready and safe for the players.

Because of my team, I have been able to devote the time and energy necessary to accomplishing our goals and to stay on a budget. Crewmembers often work other jobs or attend school but every day give 100% when they show up. The crew, with the support of the Tennessee Smokies Front Office, has been the best this season. The GM at Smokies Park is very understanding as being in charge is not my only position. Taking care of the playing surface here in Tennessee is about 75% of my job. My other duties as assigned happen in the off-season.

This off-season was a busy one from attending the STMA conference and passing the CSFM test to traveling abroad. This year I had the privilege to provide grounds support for the MLB game in Cuba, Fort Bragg and the Premier 12 tournament in Taiwan. Cuba was one of the most challenging events because the game was 3 weeks before the Smokies' season and I made two trips totaling about a month on the island. Fortunately, my intern, Sam Turner, was a rock star this year. Because of the Cuban/American restrictions, we only had one working phone in our group so I had to help Sam along through email when he had questions.

I feel my reputation and work would represent STMA in a positive way because I believe in giving back to the community. My team and I hosted a field day for area sports turf managers and renovated a softball field for a local American Legion Chapter. This was our second time on both and learned a lot from our first year. We had over 30 local sports turf managers and coaches attend our field day.


Anthony DeFeo

Lastly, the front office at the Smokies has been supportive of our vision. The field has gone from worst in the league to one of the best in my sort time here. If selected for this award, I will share this honor with my crew. Without them this award is not possible.

SportsTurf: What attracted you to a career in sports turf management?

DeFeo: Several moments in my life attracted me to become a sports turf manager. One, my grandfather used to paint the local football fields and would let me tag along. I would help move string lines and watch him mix paint. The second moment came in Little League, where I was always more excited watching the guys getting the dirt prepped than playing the game.

SportsTurf: What are your biggest challenges in providing excellent playing surfaces? And how do you approach those challenges?

DeFeo: Staffing is probably my biggest challenge. Our budget only allows for the hiring of seasonal employees and a lot of training is involved every year. By the time we get rolling as a team the season is sometimes halfway over. When the season comes to an end we have to let our well-trained assistants and interns go. Some come back but most seek more stable employment and move on. So we usually have to start the process all over again.

SportsTurf: What changes if any are you considering or implementing for the winning field in 2017?

Category of Submission: Professional Baseball
Sports Turf Manager: Anthony DeFeo, CSFM
Title: Head Groundskeeper
Education: Bachelor of Science and Sports Turf Certificate
Field of Study: Communications and Sports Turf Management
Experience: 15 years as a head groundskeeper
Full-time staff: None
Part-time staff: Sam Turner, Kyley Dickson, Theodore Hooper, Duncan long, Keary Nease, Matthew Purcell, Alec Ryon and Nathaniel Greer
Original construction: 2000
Rootzone: Loamy sand, 90% sand, 10% shag peat
Turfgrass variety: Latitude 36 bermuda
Overseed: Tri-blend of Aquarius, Patriot and Laredo perennial ryegrass at 6 lbs. per 1000 sq ft
Drainage: Modified USGA with no stone layer, extra sand was added as a perched water table.

DeFeo: More testing for playing surface. I have seen a lot of small portable equipment coming onto the market that will give you instant data on your soil and turfgrass. Traditional methods have been taking physical samples and sending them to a lab. Now technology has evolved to give instant data on site to sports turf managers. I will also be working with a European company that measures field playability. I'm looking forward to putting more quantitative data on how the field is playing.

SportsTurf: What's the greatest pleasure you derive from your job?

What's the biggest headache?

DeFeo: My greatest pleasure in sports turf is working with the local coaches and helping them on their fields. Secondly, I have the pleasure of being a part of Murray Cook's traveling grounds crew; I have met many great individuals across the globe.

Really no headaches. I truly enjoy what I do. Sometimes extra events are hard, but I try to understand that my job is just one position on the team. It takes an entire front office to be successful.

SportsTurf: What's the best piece of turf management advice you have ever received?

DeFeo: It's not your field!

SportsTurf: Are you yet involved in "sustainable" management practices? If so, what are you doing?

DeFeo: I try to be as sustainable as possible. We have our own nursery to replace wear in position spots. With warm-season grasses we can rotate usage within the nursery and grow back what we used during the season. I also have an ET manager and base irrigation run times off of this data. Lastly, we aerate as much as possible to promote healthy turfgrass and less demand on chemicals.

SportsTurf: How are using social media at work?

DeFeo: Social media has been great to me. When I first started I only new a handful of local turfgrass managers. With social media I am able to connect with people in our industry on a global scale.

SportsTurf: How do you see the sports turf manager's job changing in the future?

DeFeo: Our industry is always changing, but for the good. Even with sports turf managers' having more responsibilities and events, I see better and better fields every year. The bar is constantly being raised and I'm seeing more minor league facilities getting closer to MLB standards. ST

Anthony with his son Tazio

Emily DeFeo, Tazio and Anthony pose with the Cubs' Commissioner's Trophy

Sod Solutions serves two FOY winners

Highlighted in this year's STMA Field of the Year winners are three Sod Solutions' turfgrass varieties: Latitude 36, RPR and HGT.

For the second time, Kevin White, athletic field manager of Merlo Field at University of Portland has received the honor for his soccer field that features HGT and RPR.

"We incorporated HGT and RPR into a comprehensive seeding program designed to improve our wear tolerance, recovery and decrease pesticide dependency." said White. "HGT and RPR are helping us achieve those goals while delivering safe, high quality fields to our students."

"I'm overly pleased with the performance of Latitude 36," said 2016 winner Anthony DeFeo, CSFM, head groundskeeper for the Tennessee Smokies. "Its cold tolerance has helped us get through some harsh Tennessee winters and it is easy to manage in the summer months," DeFeo said.

A panel of 11 judges independently scores Field of the Year entries based on playability, appearance, utilization of innovative solutions, effective use of budget and implementation of a comprehensive agronomic program.

Latitude 36 was developed by the turfgrass-breeding program at Oklahoma State University and is a top rated NTEP bermudagrass. With resistance to spring dead spot, Latitude 36 is one of the most cold hardy bermudagrasses on the market.

HGT, Healthy Grass Technologies, is an improved seeded bluegrass that stands up to its name by demonstrating unmatched toughness and disease resistance. HGT was developed in harsh climate conditions to specifically withstand diseases, pests and traffic. ST

The Field of the Year Awards program is made possible by the support of sponsors Barenbrug USA, Carolina Green Corp., Ewing, Hunter Industries, and World Class Athletic Services.

TOAST TO THE LATE DARIAN DAILY HIGHLIGHTS AWARDS NIGHT

The Sports Turf Managers Association (STMA) enjoyed record-setting attendance in late January at its 28th annual Conference & Exhibition in Orlando, with 1,300 attendees from 18 countries joining more than 175 exhibitors to connect with one another and strengthen the industry.

The 4-day event included the popular "Seminar on Wheels" tours to various professional, collegiate and youth sports complexes in the Orlando region. In addition, STMA offered more than 60 educational sessions, 8 hours of trade show exhibits, plenty of time for networking, and the association's annual business meeting.

SAFE, the association's charitable foundation, raised more than $45,000 during the Conference through its golf tournament, "Night of Bowling" and silent and live auctions throughout the week.

Next year's event will be held in Fort Worth, TX January 16-19, 2018; future sites include Phoenix in 2019 and West Palm Beach, FL in 2020.

FOUNDERS AWARDS

STMA's top honors, the 2016 Founders Awards, were presented at the Annual Awards Banquet January 27. These awards are given in a 'surprise' presentation to those who exemplify the leadership traits of each founder. The four founders are Dick Ericson, George Toma, Dr. William H. Daniel (deceased), and Harry C. Gill (deceased).

STMA's highest honor, the Harry C. Gill Award, was awarded posthumously to **Darian Daily**, Cincinnati Bengals. Harry "Pops" Gill exemplified this commitment by ensuring a still-young STMA would grow successfully as an organization for the betterment of all sports turf managers. Darian exemplified Harry's commitment. This was the first time STMA has given a Founders Award posthumously. Few people have had an impact on the profession like Darian Daily. He was generous with his time, open with sharing ideas and was a true professional. He was dedicated to his job at the Bengals, to his chapter, to the STMA, and above all, to his family. His memory will live on in all the things he touched—in so many articles, presentations, informational resources and most significantly, in people.

Darian passed away unexpectedly in August 2016. He was very active in STMA, previously serving on its Board of Directors and numerous committees.

Last year's winner, Dr. Mike Goatley, Virginia Tech University, presented the award, and the entire membership accepted it on Darian's behalf with a toast. Attendees were invited to raise their glasses and say, "cheers"—the typical way that Darian signed his emails and ended conversations—to honor all that Darian did for the industry.

Tom Nielsen, center, of the Louisville Bats, won the Dick Ericson Award, presented by the 2015 winner, Michael Buras, CSFM, Longwood Cricket Club, left, and founder Dick Ericson, right, the award's namesake.

STMA's highest honor, the Harry C. Gill Award, was awarded posthumously to Darian Daily, Cincinnati Bengals.

Bruce Suddeth, University of South Carolina-Upstate, was presented the George Toma "Golden Rake" award by the 2015 winner, Ben Polimer, Town of Weston, MA, left, and founder George Toma, right, one of two living founders of STMA.

Tom Nielson, Louisville Bats Baseball Club, received the Dick Ericson Award. Tom has been cited by his peers as someone who has had a great influence on the lives of others in this profession. Several of the criteria of this award focus on personnel management and being open to the skills and the abilities of their staff members. During Tom's 25-year career, no fewer than seven of his assistants have gone on to high-level positions, managing large and complex field operations. He has served on many committees for STMA and is a true ambassador for the industry. Tom has excellent technical skills and is a master at converting a baseball field into a soccer pitch up to 19 times per year. Tom also received the George Toma "Golden Rake" in 2011.

Bruce Suddeth, University of South Carolina-Upstate, received the George Toma "Golden Rake" Award. The Toma is known as the "and then some" award, because this honor goes to an individual who goes above and beyond what is required. Sticking true to this motto, Bruce was a founding member of the South Carolina Chapter and has volunteered hundreds of hours to insure its success, as well as inspired others to get involved in the chapter. Known as the "man behind the scenes" local members give him credit for all the goals the chapter has accomplished including the development and execution of a very successful annual conference. One letter of support states that without Bruce's vision, dedication and leadership, the SCSTMA chapter would not exist today.

Jason Kruse, PhD, University of Florida, received the Dr. William H. Daniel Award. Jason has the responsibilities of teaching core courses

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The 2017 STMA Board of Directors: from L to R, front row, Sun Roesslein, CSFM; Jeff Salmond, CSFM; Sarah Martin, CSFM; Nick McKenna, CSFM. Back row, Matt Anderson, CSFM; Tim Van Loo, CSFM; Boyd Montgomery, CSFM, CSE; Weston Appelfeller, CSFM; Jimmy Simpson, CSFM; Jody Gill, CSFM; Randy Price. Not pictured: Doug Schattinger and Beth Guertal, PhD

for the Plant Science degree program and conducting research. He serves as the academic advisor for undergraduate students, is an advisor to the turf club and mentors graduate students as they complete their programs to join the industry. His research is focused on answering the question about the inputs required to maintain a healthy turfgrass system under a variety of conditions. He has also has had an impact outside of the US, working on projects in the Bahamas and Puerto Rico. An associate professor, he serves as the Undergraduate Coordinator for the Environmental Horticulture Department for the University.

NEW BOARD OF DIRECTORS

The new Board officially assumed office at the Annual Meeting January 26. STMA's new President is Tim VanLoo, CSFM, Manager of Athletics Turf/Grounds for Iowa State University in Ames.

Other STMA officers elected to the Board include:

- President-Elect – Sarah Martin, CSFM, City of Phoenix, AZ
- Immediate Past President – Jeff Salmond, CSFM, Director of Athletic Field Management, University of Oklahoma
- Secretary/Treasurer – Jody Gill, CSFM, Grounds Coordinator, Blue Valley (KS) School District
- Vice President Commercial – Doug Schattinger, President, Pioneer Athletics
- Professional Facilities Director – Weston Appelfeller, CSFM, Director of Grounds, Columbus Crew

Directors fulfilling second-year terms are:

- Academic Director – Elizabeth Guertal, PhD, Auburn University
- Higher Education Director – Nick McKenna, CSFM, Baseball Field Manager, Texas A&M

Members elected to Director positions include:

- Schools K-12 Director – Sun Roesslein, CSFM, Manager, North Area (CO) Athletic Complex
- Commercial Director – Boyd Montgomery, CSFM, CSE, Regional Business Manager, The Toro Company
- Elected-at-Large Director – Matt Anderson, CSFM, Grounds Superintendent, University of Arizona

Members appointed to the Board include:

- Randy Price, Tri-Tex Grass
- Jimmy Simpson, CSFM, Town of Cary (NC)

GRANTS AND SCHOLARSHIPS

SAFE created the Leo Goertz Membership Grants this year to honor this long-time SAFE Board member who passed away unexpectedly last year. Made possible by a generous donation from Pioneer Athletics, winners of these inaugural grants included: Vince Brown, Columbus Clippers; Tim Fogelsong, Creston Community Schools; Ford Omori, City of Poway; and Connor White, Great American Ballpark.

Another highlight was the presentation of the Terry Mellor Continuing Education Grant, which was presented to Nicholas Lievense, Purdue University, by Terry's brother, David Mellor, Boston Red Sox. Terry passed

Dr. Jason Kruse, University of Florida, was presented the Dr. William H. Daniel Award by the 2015 winner, Mary Owen, University of Massachusetts.

away as a young man. SAFE has awarded the grant since 2009. Sponsored by Turface Athletics, it funds an STMA-affiliated chapter member's attendance to the conference.

The internship grant named in honor of Gary Vanden Berg, CSFM, who was the Director of Grounds at the Milwaukee Brewers until his death in 2011. This grant commemorates Gary's contributions to the industry in promoting internships and creating excellent learning experiences for our student interns. The winner of the 2016 Gary Vanden Berg Internship Grant was Amanda Folck from Ohio State University.

SAFE awarded 11 scholarships to 2-year, 4-year and graduate students. SAFE's top scholarship in a 2-year program is named after Fred Grau, the first turfgrass extension specialist in the US, and this year's winner was Gretchen Heimlich, Mt. San Antonio College.

SAFE's other winner in a 2-year program is awarded a scholarship that honors Dr. James Watson. Dr. Watson, who was with the Toro Company for 36 years, is considered to be

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the catalyst for the development of the SAFE Foundation. That winner was Victoria Kramer, also from Mt. San Antonio College.

Due to the generosity of The Toro Company, SAFE is able to award three additional scholarships to honor Dr. Watson. The winner of the Graduate Dr. Watson Scholarship was Matthew Jeffries from North Carolina State University. The Dr. Watson undergraduate winners in a 4-year program were Kristin Burnett from Texas A&M and Nate Leiby, from The Pennsylvania State University.

Due to its strong fundraising efforts during the 2016 conference, SAFE was able to increase its scholarship amounts by $4,500. It awarded six additional scholarships to the top students at 4-year institutions, including: Mitchell Countryman, Iowa State University; Josh Gray, Penn State; Madison Mahute, Penn State; Curt Moore, Penn State; Brandon Reavis, University of Georgia; and John Thomas, University of Tennessee.

STUDENT CHALLENGE

Congratulations to all STMA Student Challenge participants for their exceptional performance on the 2017 exam. The Student Challenge is presented by SAFE, Founding Partner Hunter Industries, and supporting sponsor Ewing Irrigation. Nine 2-year teams and 26 4-year teams competed for $5,000 awards in each division.

Winning the 2-year competition was Mt. San Antonio College – Team 207. Penn State University – Team 208 took second place, and Mt. San Antonio College – Team 201 took third place.

Winning the 4-year competition was Penn State University – Team 422. Iowa State University – Team 416 took second place, and Virginia Tech – Team 409 took third place. See stma.org for a full list of results.

WOMEN'S FORUM

More than 50 women (and men!) attended the annual Women's Forum January 25. Hosted by Lynda Wightman of Hunter Industries, this event brings together women in the sports turf industry, attendee spouses, and STMA Presidents past and future. Besides a great lunch, those in attendance heard presentations from Disney's horticulture department as well as its wellness department.

"OUR WINNING GREEN SPACE" CONTEST WINNER

Project EverGreen, in partnership with Exmark Manufacturing, STMA and SAFE, announced the winner of the inaugural "Our Winning Green Space" contest, In Memory of Community Garden and the Warrendale Community Organization in Detroit, MI. These two non-profit organizations, headed by Joe and Barb Matney, work with the City of

Every STMA Conference is primarily about education. Here is a packed house to hear Ben Polimer talk about using plant growth regulators.

There was a waiting list to join the more than 175 exhibitors during 10 hours of trade show in Orlando.

New Ground Technology won the 2016 STMA Innovative Award for their Turf Printer technology. Posing on the STMA Trade Show floor were, L to R: Jason Zielke MTD/Cub Cadet, Pete Davis, owner/founder, and Kelli Pearson, marketing director. The Innovative Awards Program recognizes commercial company members that have developed a product, service, equipment or technology that substantially enhances the effectiveness of sports turf managers.

The Student Challenge is presented by SAFE, Founding Partner Hunter Industries, and supporting sponsor Ewing Irrigation. Nine 2-year teams and 26 4-year teams competed for $5,000 awards in each division.

Detroit to transform vacant city lots into community gardens and "pocket parks."

The contest gave municipal parks, recreation and public works departments and non-profit entities a chance to win an Exmark Lazer Z X-Series mower package valued at $15,000 and a "Healthy Turf. Healthy Kids." renovation project for their city. More than a dozen municipalities and non-profit organizations submitted entries in the contest.

"Project EverGreen is pleased to work with the Matnys and the Warrendale Community to bring vital green space to Detroit neighborhoods," says Cindy Code, executive director of Project EverGreen. "Turning a vacant lot into a place where kids can play, neighbors can talk and everyone can take pride in are essential to the well-being and security of any community."

"This valued partnership aligns with our mission of advancing the sports turf management profession through education, awareness programs and industry development," said Kim Heck, CAE, CEO of STMA. "The City of Detroit is well-deserving of this award and we look forward to working with local parents and athletes on the importance of maintaining a safe playing surface to prevent injuries." ST

STMA Affiliated Chapters Contact Information

Sports Turf Managers Association of Arizona: www.azstma.org

Colorado Sports Turf Managers Association: www.cstma.org

Florida #1 Chapter (South): 305-235-5101 (Bruce Bates) or Tom Curran CTomSell@aol.com

Florida #2 Chapter (North): 850-580-4026, John Mascaro, john@turf-tec.com

Florida #3 Chapter (Central): 407-518-2347, Dale Croft, dale.croft@ocps.net

Gateway Chapter Sports Turf Managers Association: www.gatewaystma.org.

Georgia Sports Turf Managers Association: www.gstma.org.

Greater L.A. Basin Chapter of the Sports Turf Managers Association: www.stmalabasin.com.

Illinois Chapter STMA: www.ILSTMA.org.

Intermountain Chapter of the Sports Turf Managers Association: http://imstma.blogspot.com/

Indiana - Contact Clayton Dame, Claytondame@hotmail.com or Brian Bornino, bornino@purdue.edu or Contact Joey Stevenson, jstevenson@indyindians.com

Iowa Sports Turf Managers Association: www.iowaturfgrass.org.

Kentucky Sports Turf Managers Association: www.kystma.org.

Keystone Athletic Field Managers Org. (KAFMO/STMA): www.kafmo.org.

Mid-Atlantic STMA: www.mastma.org.

Michigan Sports Turf Managers Association (MiSTMA): www.mistma.org.

Minnesota Park and Sports Turf Managers Association: www.mpstma.org
MO-KAN Sports Turf Managers Association: www.mokanstma.com.

New England STMA (NESTMA): www.nestma.org.

Sports Field Managers Association of New Jersey: www.sfmanj.org.

Sports Turf Managers of New York: www.stmony.org.

North Carolina Chapter of STMA: www.ncsportsturf.org.

Northern California STMA: www.norcalstma.org.

Ohio Sports Turf Managers Association (OSTMA): www.ostma.org.

Oklahoma Chapter STMA: 405-744-5729; Contact: Dr. Justin Moss okstma@gmail.com

Oregon STMA Chapter: www.oregonsportsturfmanagers.org oregonstma@gmail.com

Ozarks STMA: www.ozarksstma.org.

Pacific Northwest Sports Turf Managers Association: www.pnwstma.org.

Southern California Chapter: www.socalstma.com.

South Carolina Chapter of STMA: www.scstma.org.

Tennessee Valley Sports Turf Managers Association (TVSTMA): www.tvstma.com.

Texas Sports Turf Managers Association: www.txstma.org

Virginia Sports Turf Managers Association: www.vstma.org.

Wisconsin Sports Turf Managers Association: www.wstma.org.

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Q&A with Dr. Grady Miller

Professor, North Carolina State University

Questions? Send them to Grady Miller at North Carolina State University, Box 7620, Raleigh, NC 27695-7620, or email grady_miller@ncsu.edu
Or, send your question to Pamela Sherratt at 202 Kottman Hall, 2001 Coffey Road, Columbus, OH 43210 or sherratt.1@osu.edu

Expecting good field conditions

Q: I was in your seminar in Orlando [@ STMA Conference]. You showed a slide on hours of use on a sports field before seeing damage. Can I get a copy of that slide? I have a few sports fields that are starting to be over-used and I'm looking for information to give to the ADs that can may help to limit scheduling.
Andrew Love, Clover School District (SC)

A: The table relating field use to field conditions is probably my most requested slide after sports turf presentations. The origins of the table go back to conversations I had with Dr. Dave Minner in the 1990s. I took the concept of hours of use that Dave was using for football and soccer fields in his northern region and adjusted it using data from the southeast.

I used to think that as we got better at managing turfgrasses with better turf care products that I would need to increase the hours of use per year. But it seems that the use intensity (bigger and better athletes, more aggressive cleats, more practices, etc.) has offset some of the progress we have made with turfgrass management. In addition, I have also noticed that many user groups have increased expectations in field conditions. So for now it seems like the use estimates are still relevant for many of our football, soccer, lacrosse, and general-purpose fields.

As someone also once pointed out to me, there are gaps in my field use ranges. This was actually intentional. Predicting field conditions is not an exact science so the gaps provide for more variability in how a field may respond to use. The suggested ranges are intended to be starting estimates that should be adjusted based on the specific situations at each field site.

I would also note that these values assume that the field starts the year with good coverage and it gets at least moderate maintenance.

Table. Expected Field Conditions Based on Hours of Field Use per Year

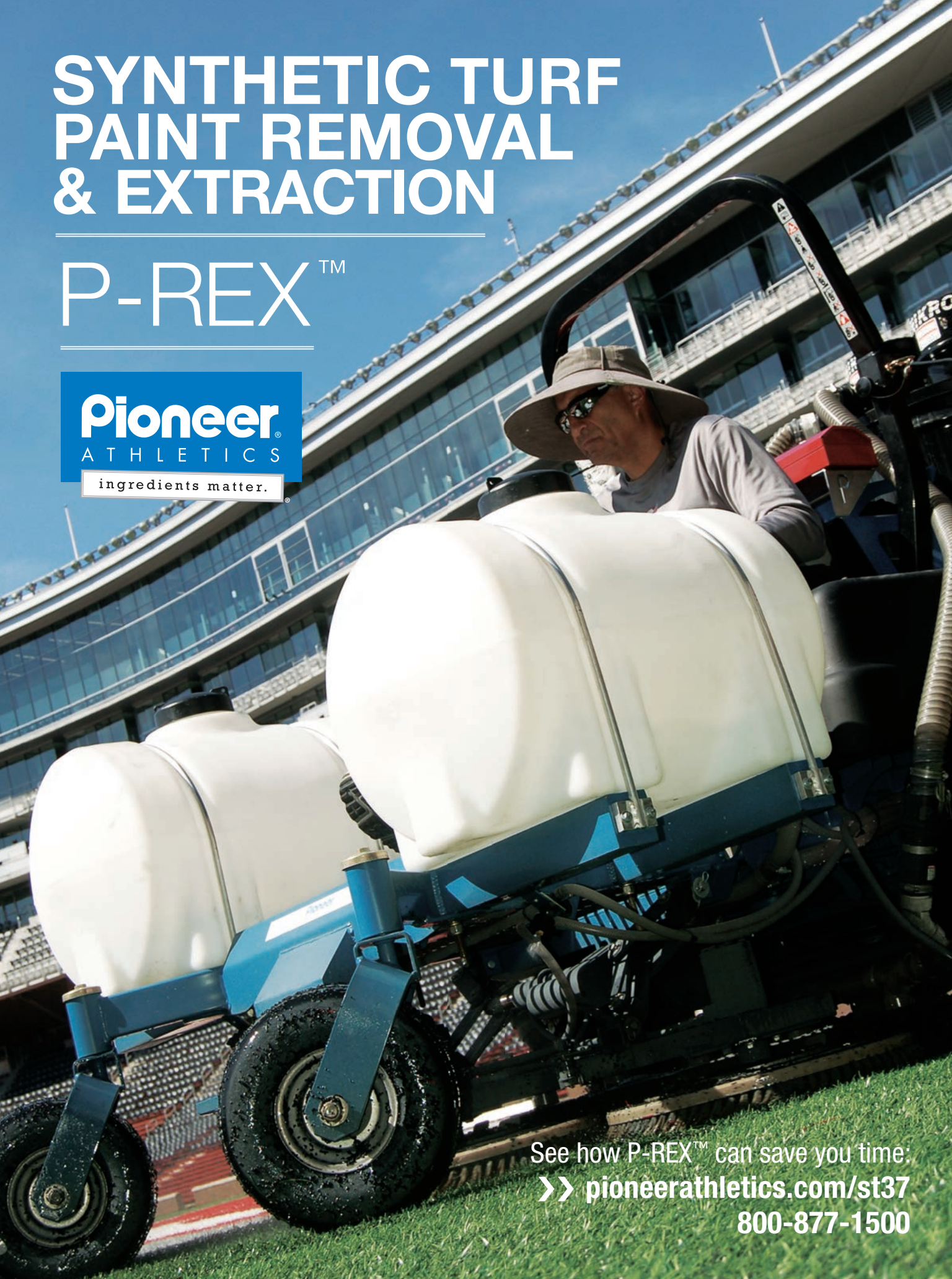
Field Use (Hours per year)	Expected Field Conditions
200 hours or less	Sustain good field conditions
400 to 600 hours	Good field conditions with some thinning of the turf and localized wear
800 to 1,000 hours	Fair field conditions, expect thinning and wear
More than 1,000 hours	Significant turf thinning, turf loss, field surface damage, increased risk of athlete injury

To be most effective at managing field wear, field use data should be collected. I have noticed that as demand for field space has increased that many parks and recreation departments began to centrally schedule field use. This allows them to maximize use with minimum conflicts among users. So computer software is often being used to track users and the time the field is in use. A field manager should have direct access to this data. The down side of central scheduling is that fields are often scheduled very intensely without adequate "down time." School systems that do not have as high a demand can often estimate field use based on the number of teams that use their fields during the season. The values should be based on all the events that occur on the field, including practices.

As I mentioned earlier, the turf conditions as a result of field use can be dramatically different from field to field. I have seen fields used in excess of 2,000 hours that were holding up pretty well and I have seen fields nearly destroyed with less than 200 hours of use. Use my table values as a starting point.

There are many characteristics of fields and field use that can influence field conditions. Two significant issues are drainage and soil type. Since these are primarily construction issues, they are not easily altered over a short-term period and it's the same with turfgrass. Some of our newer bermudagrasses have tested to be a bit more tolerant to traffic than some of the older cultivars. But how one manages their grasses is probably even more important. So apply the best techniques given the facilities budget and equipment. Develop a maintenance plan and scheduled recuperative periods for the field. Have a cancellation policy for fields that are too wet for play.

The number of events a field can handle will ultimately depend upon field construction, weather conditions during the season (especially just before and during games), maintenance practices, recuperative periods, and the time of the year. Once excessive wear and field overuse results in hazardous and unsafe playing conditions, a field may need to be closed to get it back into shape for safe use. Keep your ADs informed and hopefully they will fully support your efforts in maintaining the best fields possible. ST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