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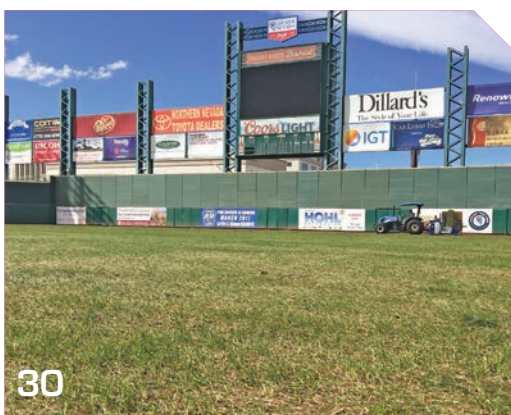
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ON THE COVER

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On the cover: We tracked the development of the Outcross 9060 from Toro in a series of articles last winter; the tractor/utility vehicle that's light on its feet finally went to market last month. We rarely feature equipment per se on our cover but thought this new category of machine deserved the attention.

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FROM THE SIDELINES

Changing of the guard



Eric Schroder / Editorial Director / Eschroder@epgmediallc.com / 763-383-4458

DID YOU REALIZE the oldest folks in the 20-year generation called millennials are turning 38 this year? Born in 1999, my college freshman counts as a millennial. So if you recently discovered that you are in your 50's and not as hip as you once were, welcome to the older generation!

No surprise there are generational differences; if you are a late boomer like me, chances are good your first boss could have been described as "crusty" whether he (and it probably was a he) was likable or not. Men were men and all that. I remember in 1983 working for some guys who still wore hats to the office and had since the 1950s. I was 24 years old so we didn't have much in common.

Lots of data (and opinion) is available on the topic of millennials in the workplace. One Gallup poll reported 60% of millennials said the opportunity to learn and grow on the job is extremely important while only 40% of boomers felt the same way, for example. Research from ad agency Moosylvania has shown that both older and younger millennials share some attributes such as loving their gadgets; positive attitude; being self-directed; and, of course, always on the cell phone. They spend a half hour to 2 hours creating or posting content every day that report said.

In most workplaces today everyone has a smart phone so the gap between a 21-year-old's using all the phone's capabilities and the boss with his flip phone is gone. Everyone is tech-friendly, to varying degrees at least. And tech certainly has its advantages. All jokes aside about people being on their phones constantly, and most of us are unfortunately, loving tech also means remaining connected to work.

At the Keystone Athletic Field Managers Organization's annual conference recently, during a presentation on working with younger generations, Tim VanLoo, CSFM, told the crowd, "I don't do that well with presentations on touchy feely topics, historically. But I've done some research on younger generations, partly because I work directly with students."

VanLoo said technology has its positives, weather apps at your fingertips, for example, and email, your music, ESPN updates, etc., all of which creates a time-saving portable office.

But of course there are some negatives to the cell phone staredowns, VanLoo said. "It can give the appearance that work is not important or that your focus isn't on the task at hand."

Another downside can be that workers never get away from work, or their personal lives when they are at work. And that can affect us all. "Does anyone sit on an email for 24 hours now?" he asked. "I can work from my tree stand; is that really getting away?"

VanLoo offered some advice for those managing the younger generation: "Allow them to make mistakes; watch mistakes happen and let them struggle to make it right," he said. For the younger attendees, VanLoo asked that they "start listening and stop assuming. Be patient and pursue mentors."

The Gallup research also reported that millennials "like to feel capable and confident in their jobs." They are confident they will contribute from day one. That matches what VanLoo said about the newer generation: "They hate hearing about 'paying your dues.'" **/ST/**

SportsTurf

// April 2018

EPG Media & Specialty Information
10405 6th Ave. N., Ste 210
Plymouth, MN 55441

The Official Publication Of
The Sports Turf Managers Association

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& Specialty Information, Or Preference Over
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SportsTurf (ISSN 1061-687X) (USPS 000-292)
(Reg. U.S. Pat. & T.M. Off.) is published monthly
by EPG Media & Specialty Information at 75 Pike
Street, Port Jervis, NY 12271. POSTMASTER:
Send address changes to Sportsturf, PO Box 2123,
Skokie, IL 60076-7823. For subscription information
and requests, call Subscription Services at (845)
856-2229. Subscription rates: 1 year, \$40 US &
Poss.; 2 years, \$65 US & Poss.; 1 year, \$65 Canada/
Foreign Surface, 1 year, \$130 Airmail. All
subscriptions are payable in advance in US funds.
Send payments to Sportsturf, PO Box 2123, Skokie,
IL 60076-7823. Phone: (847) 763-9565. Fax: (847)
763-9569. Single copies or back issues, \$8 each
US/Canada; \$12 Foreign. Periodicals postage paid
at Port Jervis, NY and additional mailing offices.
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PRESIDENT'S MESSAGE

Preventive medicine



Sarah K. Martin / CSFM / sarah.martin@phoenix.gov / @neongrapefruit

AS APRIL ROLLS IN, I am reminded that summer is right around the corner; where I am in Arizona, it feels like it is already here!

I encourage all of you to take a moment to think about your health. Make sure that you have plenty of sunscreen, hats and clothing with extra coverage while you are at work as well as for play. Drink water throughout the day, and stay hydrated. I make it a rule that every time I go back to my car, I get a drink of water. I may not be getting as much as I should, but it keeps me from getting dehydrated, or worse, heat stroke. Heat stroke is extremely dangerous and can even be deadly. Symptoms range from headache, dizziness and nausea, to rapid heartbeat, disorientation and even the loss of consciousness. Action needs to be taken immediately if any of these signs are present. Get the person to a cool area and apply cold compresses, and administer water slowly. Always call emergency help if a person loses consciousness or is acting highly out of character.

There is quite a bit of information out there that can be shared with our staffs to help keep them safe. Posting information in break rooms and offices might just be the reminder that someone needs.

I also recommend an annual trip to the dermatologist. Working outside it is important to make sure we are getting ourselves checked out, and an annual appointment can save you some traumatic experiences down the road.

As turf managers, I believe we put all of our energy into work and family, but we forget that to be our best, we must also take care of ourselves. Finding a work/life balance that keeps us fortified on both fronts can be a challenge. Good nutrition is also essential to our health. Eating a balanced diet provides us with energy and nutrients and is an important part of leading a healthy lifestyle.

Quite often we put everyone and everything else first, and then are surprised when we find ourselves sick, down, or frustrated. I challenge you to take a few moments before the summer arrives in earnest and make a plan to keep yourself healthy, safe, and sunburn free.

A few places to look for more information:

- www.cdc.gov/cancer/skin/basic_info/sun-safety.htm
- www.medicinenet.com/heat_stroke/article.htm
- www.webmd.boots.com/a-to-z-guides/heatstroke-symptoms-treatment-sunstroke
- <https://www.hhs.gov/fitness/eat-healthy/importance-of-good-nutrition/index.html>

I'll leave you with this: "To keep the body in good health is a duty... otherwise we shall not be able to keep our mind strong and clear." - Buddha **/ST/**



[Above] The remnants of Hurricane Ivan dumped 7" of rain in central Pennsylvania September 17-18, 2004 including on City Island, which sits in the middle of the Susquehanna River. The island is home to the Double A Harrisburg Senators and this is their stadium, now known as FNB Field, deluged in 13 ½ years ago.

WHAT'S YOUR TITLE?

[Left] We asked via online survey "What's your title?" and offered 40 choices, from assistant groundskeeper to turf supervisor, including of course, "other," which was clicked by 123 of the total 529 respondents, more than any other choice. Next most popular was athletic director, 34, followed by director of facilities & grounds, 29, and 23 each for groundskeeper and head groundskeeper.

Four titles had only 1 respondent: athletic field director, director of athletic facilities, director of field operations, and field operations supervisor.

Sports turf manager, turf management specialist and superintendent had more than 20 responses; others making double digits included: athletic field manager, athletic field supervisor, coach, grounds lead, grounds manager, grounds supervisor, parks maintenance supervisor, parks superintendent, and turf manager.

QUITE AN IMPRESSION

During STMA annual meeting in TX, Tomás Silvani of STMA PR arm BuffaloAgency shared some numbers from 2017, including that STMA had received 319 total publicity hits, with a 604% increase in impressions (impressions are when a form of digital media renders on a user's screen). Silvani said STMA had 10.2 billion total publicity impressions, and a 57% increase in Facebook likes.

The campaign around the MLB Little League Classic game in Williamsport, PA, played on renovated historic Bowman Field between the Pittsburgh Pirates and St. Louis Cardinals last August resulted in 31 media placements reaching 783 million people.

[Right] Beauty shot of historic Bowman Field before last year's MLB Little League Classic in Williamsport, PA. The 2nd-oldest minor league park in the country, Bowman hosted a Pirates vs. Cardinals game last August.





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WHAT IS STMA'S WOMEN'S FORUM ALL ABOUT?

In blustery Fort Worth last January during the STMA Conference, the 10th annual STMA Women's Forum attendees enjoyed lunch, a presentation on effectively communicating, and also walked out with a new book. In response to one attendee's sharing with the crowd that a male friend asked her if men were allowed, we decided to shed some light on the event.

In the beginning

Lynda Wightman, industry relations manager for Hunter Industries, said that she, Abby McNeal, CSFM, who was an STMA Board member at the time, and STMA CEO Kim Heck came up with the idea. "Kim had previous experience with this type of event from her time with GCSAA. We all agreed it would be very valuable to the women AND men who represent our sports turf managers. Our first event we had 12 attendees. Yep, we've come a long way!"

Wightman said that the event is meant to assist women, who might be having problems within their workplaces, in meaningful thought processes and communications. Nearly 60 people attended this year's Forum.

"There is a perception that we are a 'special' group that gathers at Conference and receive something others don't, and you have to be a woman to participate," McNeal said in an email. "And that's not the case."

Ohio State's Pamela Sherratt, one of the prominent women in the industry (see p. 50), said men are welcome to attend. "It certainly isn't an us versus them event. It's a very important event for a small demographic, not dissimilar to first-time attendees or students, who feel like they have their own little community support group at the larger conference."

"Women sport turf managers, academics, commercial vendors, students, and wives of industry professionals gather each year to grow themselves in ways that men might not understand but, they need to know that they can attend, too," said McNeal. "We all 'get by with a little help from our friends' and I would like to think that the Forum has helped to create the start and continuation of friendships between the women within the industry."

McNeal says the number of women STMA members has grown since 2009. "I remember having a discussion with Lynda about creating a block of time for women who attended conference to gather, meet each other, and learn. I felt like I needed to champion helping to get that with the conference committee. The late Bob Campbell was STMA President at the time and I had to assure him that this wouldn't be a bashing session but one



The 10th annual Women's Forum at the STMA Conference has grown from 12 attendees in 2009 to more than 60 in Fort Worth.

that would build and support, and that anyone was welcome. I think that has been accomplished. It has grown from a track at Conference to a lunch as the program's focus has shifted, along with the industry to being more receptive to women."

Sherratt said, "The question might be, instead of having our own event, why don't we all just network at the Welcome Reception or during the Conference proper? But we're all so busy and many of us don't feel comfortable approaching strangers. Having a dedicated women's event takes all that pressure away and allows for women to get together and form this little community of support and knowledge."

"One of the most important things we can do as a community is to encourage other women to join this industry. Young girls may be more inclined to give this career a chance if they see women who have been successful. I met two new women at the event this year that I immediately made a connection with and I know I'll have lasting friendships with them. We'll learn from each other and support each other. You can't beat that," Sherratt said.

Wightman said, "I truly believe we cover topics of discussion that pertain to any individual who is in our industry, but especially women. We talk about mental and physical health/wellness, communication skills, interpersonal skills, and much more. Everyone in the room participates in some form. We also give a book to each attendee that pertains to the topic at hand."

"Women make up around 6% of the attendees at STMA Conference and about 3% of the membership," Sherratt said.

"Many of the women who come to the Forum are first-time attendees who don't know anyone, women who work in sports turf, but may not be a field manager and so feel like this is their only event at the Conference. Students and young women are looking for female mentors in the industry, and people like me who've been coming for years enjoy a good lunch with amazing friends, look forward to meeting new women, and learning something new and inspiring.

"Lynda has always been the champion of helping women within the industry gain the confidence they need to feel like they belong, and this Forum does just that," McNeal said. "We still have struggles, as an industry, to get that seat at the table to help in the decision process for fields and being a woman does make it harder to get that seat. Too many times women are passed over for opportunities just based on the fact that they are a woman; nothing about qualifications, more like assumptions that they can't do the work of their counterparts.

"The Forum has provided speakers and relevant topics to help foster building relationships of support and confidence within each attendee. Each year it has grown dramatically along with the growth in membership, and I would like to think it has to do with fact that more women are being given the chance to be sports turf managers," McNeal said.

"If you can be open to seeing someone based on their abilities and not their gender first then this wouldn't be an issue. Society has not always helped with the image that women have in a male-dominated industry. Can you imagine what it would be like if it were reversed? There are career fields that have the reverse problem. Women kept this country going through world wars and now many big businesses have women executives, who keep their businesses running because they have the passion and drive and support to do what they have a 'calling' for," McNeal added.

"You can ask me 1,000 times what it's like and what are the hurdles for women within this industry, and you'll get the same answer: I like the industry, I have a true passion for working to create safer playing surfaces for all athletes, and I just want to be given the same opportunities at the career that men have. I want to find ways to not be judged based on gender but based on the ability to get the job done well. There are strong leaders, both men and women, within the association that support one another and help constantly build the confidence in us that women can do it and we have done it. I appreciate those leaders regardless of the gender," McNeal said.

"I truly appreciate Lynda and all that she has endured throughout her career and her true passion to help grow and support the women in the industry. She and others have made it easier for other women to feel comfortable and welcomed," McNeal said. "The perspective that the event is just for women needs to be changed; anyone can attend but know that for once, if you are a man, you will probably be the minority in the room. It is about being inspired by one another. It's about being a better you and knowing that there is a network of people that you can call on to help you be better.

"I love seeing how the female student attendees get excited to see a room full of passionate women who are industry leaders. With the decline in the number of turfgrass students, it's important to find ways to support women students and show them they can achieve great things in this industry," McNeal said. **/ST/**

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PREVENTING SEXUAL HARASSMENT

How to create a respectful workplace

// By PHILLIP M. PERRY

Yesterday Jake complimented Sarah on her “sexy” new hairdo. Today he patted Marianne on the shoulder and thanked her for wearing a “revealing” new outfit. As for Deborah, the regional vendor rep: Jake has been pressing her for a date to “get better acquainted.”

Maybe Jake is a top-performing employee, and maybe the women always seem to play along with his chatter. But the fact remains that Jake is a ticking time bomb. His comments are creating a hostile work environment that can affect morale and lead to a costly sexual harassment lawsuit. The recent nationwide headlines about misdeeds in high places should remind everyone that a toxic workplace can threaten the bottom line.

“Ignoring the issue of sexual harassment can lead to disaster on many levels,” says Joseph P. Harkins, a Shareholder in the Washington, DC office of San Francisco-based Littler, the world’s largest employment law practice representing management. “Businesses can be subject to costly financial settlements, damaging morale issues and negative publicity.”

Beware the risk

People often think of sexual harassment in terms of quid pro quo: a supervisor offers someone a job or a raise in return for a sexual act. But in today’s workplace most sexual harassment stems from a much more insidious problem. “Statistically, most complaints in recent years are not for quid pro quo harassment but for environment claims such as inappropriate comments and jokes,” says Harkins. That’s why Jake, in our opening scenario, poses such a threat.

The issue has become more acute as employees have become more willing to speak up about people like Jake. “We have come

to a tipping point in society where people are starting to believe individuals who say they were sexually harassed,” says Valda Ford, CEO of Omaha-based Center for Human Diversity. “And that’s a good thing. Before, it was too often a case of ‘he said, she said.’ But now people will no longer deal with these indignities.”

Costly lawsuits

The financial cost of sexual harassment lawsuits is top of mind for many business owners. And the cash involved can certainly be substantial: While federal law caps compensatory damages at \$300,000, most state laws have no such ceiling. “It is popular for plaintiffs to sue under state law for the unlimited damages,” says Harkins. And the financial costs don’t end there, he adds: “Most statutes include fee shifting provisions, so a prevailing employee’s attorney fees are paid by the employer. It’s not uncommon for attorneys’ fees to come to a quarter of a million dollars, on each side.”

Moreover, transgressors can incur personal responsibility. “Some state laws extend liability for general sexual harassment to the individual,” says Bob Gregg, co-chair of the employment practice law group at Boardman and Clark LLC, Madison, WI. This is especially the case if the harassment involves touching and groping, which can be deemed assault and battery. “Individuals can also be held liable for defamation if they spread false information, or make mocking comments, about a person’s sexuality,” he says. Finally, individuals can be held personally liable for sexual harassment against third parties such as customers, suppliers, or public visitors to the workplace.

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Don't think only big employers are at risk. "Federal anti-discrimination law covers businesses with 15 or more employees," says Harkins. "And most states have similar laws which cover even smaller ones."

Beyond financial loss from lawsuits and settlements, an organization with unchecked harassment can suffer a costly loss in staff morale. "Sexual harassment is a form of bullying," explains Ford. And bullying, she says, can take a toll on performance. "Instead of being productive, a harassed individual becomes constantly afraid of encountering another comment, another inappropriate touch, another arrival of that creeping feeling of 'here we go again.'"

The harm can affect the employer's reputation. "Abused individuals will likely go into a protective stance when asked by a prospective employee about working at the company," says Ford. "They will try to find some way to alert the person about the abusive environment." In contrast, she adds, satisfied and secure employees are great recruitment tools. "There is no marketing better than someone saying, 'I love where I work.'"

Protect yourself

How can you protect your business? Gregg says an organization can mount a sexual harassment defense by showing two things: First, that it took reasonable care to prevent and correct harassment; and second, that the plaintiff did not take advantage of corrective opportunities the employer had established.

While those general guidelines are important, Gregg points to two exceptions. The first is any quid pro quo act, such as an individual being promoted in exchange for a sexual favor, or being terminated for refusing one. The second is any act by a top-level executive. "If I am a top manager, then my acts are perceived by the courts to be those of the organization itself," Gregg explains. This exception is a particular danger to smaller businesses, where just about any manager or supervisor might be perceived as a top-level manager.

With those guidelines in mind, here are some practical steps recommended by attorneys:

Step 1: Create good policies. "The number one step for protecting your business is to write policies that prohibit sexual harassment and promote a respectful workplace," says Gregg. "And don't just bury them somewhere in your employment handbook. Communicate them in employee orientations and continually emphasize them in staff meetings."

Step 2: Establish a reporting procedure. "Designate properly trained individuals to whom complaints can be made," says James J. McDonald, Jr., managing partner at the Irvine, CA office of Fisher & Phillips. He warns against the common mistake of requiring complainants to report incidents to supervisors, who may not have the requisite training or may themselves be offending parties. And bear in mind that many people refrain from reporting incidents out of a fear of retaliation.

So who should play the role of reporting point? Larger organizations may assign properly trained individuals in the human resources department. Smaller ones may contract with an independent HR service firm. But how about the very smallest businesses – those which can't afford the full-time services of an outside organization? "Some human resources consultants provide fractional services for smaller clients," says McDonald. "They might, for a reasonable fee, provide an individual on site for two days a week, and offer availability by telephone hotline on other days. That resource can make all the difference when an incident occurs."

Step 3: Train your personnel. The most carefully designed policies will only work if supervisors are trained to identify and respond appropriately to incidents of sexual harassment. "We all have to be educated," says Ford. "Plenty of people make mistakes from simple ignorance. They just do not know what they are doing."

All levels of personnel need training on company policies and on the established channels for reporting incidents. And everyone needs to understand they are expected and encouraged to come forward with complaints. "Plenty of people encounter sexual harassment but hesitate to take action," says Ford. "That's because they have always lived in an environment where saying something about the problem makes you a coward, or not able to keep a stiff upper lip."

Step 4: Respond quickly to complaints. Take prompt action when individuals report harassment. "One of the biggest errors employers make is not listening when people raise issues," says Gregg. "Employers often don't take reports seriously."

Your business benefits when quick responses to complaints help establish credibility in your prevention program. "People are more prone to utilize internal resources to resolve problems if their employer has a record of prompt and effective action when harassment is reported," says McDonald. "On the other hand, if an employer has not taken sexual harassment reports seriously, people are more likely to use outside attorneys to sue when harassment occurs."

Involve the complainant

Investigate each complaint thoroughly, interviewing any third-party witnesses. And find out what corrective action the complainant deems appropriate. "While you don't want the complainant to decide what action is taken, you do want to get that person's input on whether termination or a lesser remedial measure is appropriate," says Harkins.

Complainants may have any number of reactions to what they have experienced. "Sometimes they say the harassment was not severe but they reported it because they just wanted the organization to know about it," says Harkins. "Sometimes they just want to have a discussion, or just have the person counseled. And still other times they ask that a person be terminated for making a single, unfunny joke."

If the remedial action does not satisfy the complainant, Harkins suggests involving the person in any new training that the company will be introducing to the workplace. That can help to provide a broader base of knowledge so that focus is taken off the individual and put onto a general improvement in the environment.

Communicate your seriousness about the issue by actively monitoring your workplace for violations. "Don't just wait for complaints to be filed," says Gregg. "Be proactive." Make sure all supervisors realize they have a duty to take action when a questionable event occurs.

Such monitoring should include behavior that might not yet be illegal but that has the potential to escalate, says Gregg. "When a person is nasty, surly, and engaged in behavior that is disruptive and abusive, speak up and say you expect the individual to be civil."

Indeed, attorneys recommend being alert to any activity that reflects a disrespect for others or creates a hostile working environment. That includes making crude comments or reinforcing gender stereotypes.

A proactive stance may require a change in basic mindset. "Most supervisors are reactionary," says Ford. "They are not accustomed to working on creating an environment where if something inappropriate

is said there is an opportunity to discuss what happened, why it is inappropriate, and then move on to improving behaviors.” Result? “Things get worse because management has issued an unspoken ‘okay’ to bad behavior.”

Beware fraternization

Supervisors need to understand the risks involved in blurring the line between business and personal relationships. “Managers and supervisors can have friendly relationships with subordinates, but they should not be friends with subordinates,” says McDonald. Failure to maintain professional distance, he says, can lead to situations that may not appear initially as harassment but could result in such charges down the road.

What are some signs of danger? “The subordinate may start to feel he or she can take liberties such as texting the manager after business hours about personal problems,” says McDonald. “Or the subordinate may ask for advice on relationships or financial issues, or ask to borrow money, or invite the supervisor to a social outing with a friend. These kinds of liberties can create situations that backfire on the manager.”

Backing off in such instances is a wise idea. And so is a reluctance to go one step further and engage in a dating relationship with a subordinate. (For more on this topic, see the sidebar, “Workplace dating: yes or no?”)

While a conscientious employer can go a long way toward creating a respectful workplace, it’s easy to let the ball drop in the rush of daily business. “Employers tend to make several common errors,” says Harkins. “One is not repeating training frequently enough. Sometimes they will do a large training session and then ignore the issue for five or ten years.”

A second mistake is not escalating complaints high enough in the chain of command. “Higher level people, including those in human resources or in the legal department for those businesses which have them, should review every reported incident.” Smaller organizations should have top executives handle the complaints.

A third mistake is giving a harasser too many chances. “Sometimes a second chance is in order,” says Harkins. “Perhaps an ordinarily well-behaved person commits an aberrational infraction, or there are some questions about proof.” Other times a complainant will ask that a person not be fired for a single infraction. “In such cases an employer might take other remedial action,” says Harkins. “But if there is a second incident of harassment the employer should move to termination.”

While every business wants to avoid the financial penalties resulting from sexual harassment, there’s more at stake than simply avoiding costly lawsuits. “People are often concerned about the legal liabilities for sexual harassment, and that aspect of the problem has certainly been making the headlines recently,” says Gregg. “But legal liability should not be what drives the topic. It should be the realization that a respectful workplace leads to higher profitability.”

Employees are more productive when they are not sidetracked by the need to protect themselves from sexual advances, says Gregg. “Create a respectful workplace not because the law makes you do it, but because it’s to the benefit of your organization and your employees.” **/ST/**

Philip Perry is a freelance writer based out of New York City.

SportsTurf

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STMA PLAYING CONDITIONS INDEX (PCI) FOR NATURAL GRASS FIELDS								
Sports Turf Manager:				Date: XX/XX/XXXX				
Facility Name:				Location:				
Facility Type:								
1 = Park & Recreation								
2 = Schools K-12								
3 = College/University								
4 = Professional								
5 = Other								
Facility Information:								
1. Head groundskeeper experience								
1 = 1 to 2 years								
2 = 3 to 4 years								
3 = 5 to 6 years								
4 = 7 to 8 years								

HOW MUCH IS TOO MUCH?

A look at STMA's Playing Conditions Index

// By BRAD S. FRESBURG, PHD

In 2016, STMA received an Innovation Grant for the purpose of determining "At what point does a sports field surface become unsafe for the young and amateur athletes who use it?" STMA wanted to look at the feasibility of developing an algorithmic-based app to answer this question. STMA determined the greatest need for this type of information is for turf managers at high schools and at parks and recreational facilities across the country.

The National Center for Education Statistics indicates more than 14,000 public school districts with approximately 24,300 secondary schools, most of which have sports fields. The National Recreation and Park Association reports there are more than 7,500 park districts. Each year, more than 715,000 sports and recreation injuries occur in school settings alone and no one really knows the total sports-related injuries on a national basis. An application to determine the safety red flags of sports fields could benefit sports turf managers in the documentation and implementation of maintenance practices to provide safe and playable sports surfaces.

The results of several regional STMA committee meetings suggested using a modified Playing Conditions Index (PCI) previously developed by another STMA committee. The original PCI was

a downloadable form from the STMA website that allowed sports turf managers to evaluate playing conditions through a series of questions. Point totals at the end of the evaluation determine the playing conditions of the field being evaluated. What the original PCI lacked was an electronic format and the capability to store hard data points, such as hardness, compaction, soil moisture, etc. This new PCI format allows the turf manager to store field information more easily and create a database that could be shared by STMA.

When all is complete, STMA should have a PCI for natural grass fields and a PCI for synthetic fields. They have been developed as protected Excel spreadsheets with a series of similar questions to the original PCI for determining field playing conditions. Both PCIs will have entry points for specific hard data such as hardness, compaction, infill depth, soil moisture, etc. and both will automatically tally points for determining playing conditions. The electronic format will allow use on smartphones, iPads, laptops, etc.; it only requires the Excel app to operate. Both PCIs will simultaneously create a data line based on the manager's entries into the PCI. If the PCI is sent to STMA by email, then this data line can be placed into an accumulative database for future statistical analysis by STMA.

The only drawback to these PCIs will be the lack of testing equipment (Cleggs, penetrometers, soil moisture meters, etc.) available for managers at schools and parks. However, a PCI without these hard data points is still a valuable source of information in the development of a national database. But more importantly, it serves as a tool for field managers to document and repair any safety concerns that may develop.

We would entertain any thoughts or discussions on how to best fill that gap for lack of testing equipment among schools and parks. Some of our local chapters talked about purchasing equipment for membership to use. We are open to hear other suggestions.

As you use the PCI, do not hesitate to let us know if you find something that does not quite work or if you have a suggestion; we would welcome those for consideration. Development of these PCIs into Excel spreadsheets may not be the best approach, but it is a start and perhaps in time, a more sophisticated app can be developed, for that was an objective of the original Innovation Grant. **/ST/**

Dr. Brad Fresenburg is director of specialization & research, Perfect Play Fields and Links, Belleville, IL and recently retired from the University of Missouri Extension.



JOHN MASCARO'S PHOTO QUIZ

JOHN MASCARO
IS PRESIDENT OF
TURF-TEC
INTERNATIONAL

////////

ANSWER
ON
PAGE 37

CAN YOU IDENTIFY THIS SPORTS TURF PROBLEM?

PROBLEM:

Sod on motorized cart

TURFGRASS AREA:

Area behind stadium

LOCATION:

Reno, Nevada

GRASS VARIETY:

Bluegrass/
ryegrass mix



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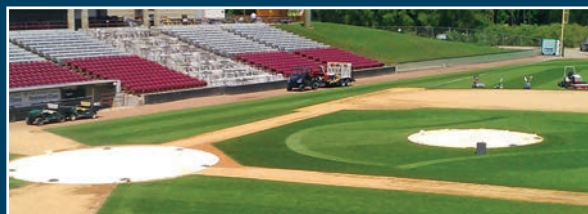
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DISTRIBUTORS: KEY PLAYERS IN TURF INDUSTRY

// By ERIC SCHRODER

After my oldest son took an aptitude test in high school one of the careers recommended was “supply chain management,” which probably pays great and all, but we still laugh about how boring it sounds.

To follow up on a series we published last winter on product development, now that our targeted product, Toro’s new Outcross, is for sale, we thought we would find out its supply chain – what role do distributors play?

We exchanged emails with Turner Revels, CEO of Revels Turf and Tractor, Fuquay-Varina, NC: “With John Deere there is no middle chain supplier. We are considered a JD dealer though some call us distributors because we cover a larger geographic area than an ag and turf dealer [normally] does. And early on in some cases we may sell to or through another dealer. But for the most part our customer is the end user in golf and sports turf,” Revels said in a message.

“Sports turf has become an important customer base to our company and we have seen good growth over the past 5 years. I see more growth opportunity in sports turf than I do golf for the next 5-10 years. The demand and requirement for higher end sports turf fields is becoming the norm and not the exception. That not only applies to high schools and small colleges but also high-end municipal fields, private athletic associations, and sports fields operated by private firms. In my opinion this increase in quality of playing surfaces that is happening across our area and the country is a very positive atmosphere for sports turf and those involved.

“We are very active supporting the associations and companies in our area involved with sports turf and our plans are to continue dedicating resources to that area.”

Anonymous distributor

Our sister publication, *OPE*, a magazine for outdoor power equipment dealers, features

a regular column from its “Anonymous Distributor,” anonymous so he can discuss sensitive industry issues. Here’s what he told us recently:

The Anonymous Distributor (AD) says his central distribution company is “serious about engines and parts.” He said 15 years ago there were central distributors and service distributors but today the latter are mostly gone, leaving parts distributors and equipment distributors. “In most cases where there is a service distributor, they are there because of logistics and relationships with the customers. We have three left in our

business because of those reasons.”

“The service distributors are going away within 5 years,” he predicted. “They can’t be subsidized much longer.”

AD says distributors help dealers in several ways, including through co-op marketing programs’ advertising materials and assistance in dealing with local media, and with technical service, helping dealer techs troubleshoot an EFI engine problem, for example, he said.

There are also schools and dealer update sessions, where distributors might enhance an existing program from Kohler, AD said. “We

FIRST NATIONAL NETWORK

Toro’s first president, John Samuel Clapper’s establishment of a national network of golf distributorships was an industry first. When Toro first ventured into the golf business in 1918, it was evident the challenges in building a nationwide or international business from Minneapolis. Toro first tried a national sales representative contract with Carters Tested Seeds out of New York (part of a large enterprise from the UK), as they had a golf course design business, but that did not prove productive. Clapper was always a hands-on leader, but having the CEO travel from Minneapolis to New York to deliver and setup equipment was not a strategy for fast growth. Clapper envisioned a network of local distributors who could provide a ready supply of product and, more importantly, immediate expert service to golf course customers as a better approach than trying to establish a national factory sales force like those of its competitors. Distributors offered more comprehensive coverage than any factory sales force could possibly deliver. Clapper was correct; as Ken Goit, then Toro’s national sales manager and eventually the Company’s third president put it, distributors quickly proved themselves to be “one of our main assets,” and a significant competitive advantage for Toro, not to mention a highly valued service by golf course superintendents. High quality, innovative product and superb customer service enabled Toro to become the largest manufacturer of golf course equipment in the world by 1925. As Goit also said, “There is one thing we feel the Company can be proud of and that is the class of people we have as distributors and their loyalty to the Company...We feel that the Company is very fortunate in having an organization of this kind.” The same remains very true today.



The annual Toro distributor meeting, October 14, 1929, just 2 weeks before the Great Depression started.

also offer a 4-day, Level I school once a year to teach basic engine repair. We create specific courses to educate about various topics.

"When a dealer cannot pay, we work with them on receivables. We floor plan our own items so we are the bank. Many equipment distributors use an outside source for funding those programs."

It's a 2-way street, AD said, because distributors listen to what the dealers say, especially about choosing what product lines. "Our sales guys ask dealers all the time about what we should bring in," he said, "though of course companies protect their territories."

"[Our distributorship] is a total extension of every factory we represent," he added.

Beware Amazon

One aspect of the distributor/dealer relationship that our AD says is changing is dealers' using distributors as a parts warehouse. "Dealers were saying I don't need to stock all these parts because the distributors have them. But this has to change; it's a luxury for dealers that is gone, even with being able to get a part the same or next day from a distributor. Their customers now can sometimes order the part from Amazon and never come back to the store," AD said.

"I called it 15 years ago when texting began; tomorrow's consumers are today's kids and when they begin to buy products they will check their phone for reviews and purchase without ever visiting a store. The question is 'Where are those products going to come from?'" AD said. "Are dealers going to be able to work with Amazon? I think the distributors will."

AD says lithium batteries is the next big thing for products, especially at the commercial level. "The problem now is there is no way to charge the batteries on the fly; but when someone figures that out it will change the way people buy equipment."

Scott Mackintosh and his co-owners at Atlantic Golf & Turf, Turners Falls, MA have been distributing turf products for 8 years in the greater New England region. They have 10 salesmen, each of whom have between 70 and 120 customers. Scott was driving to see one of those customers in central Massachusetts when we talked.

"Distributors buy product from

companies and then sell those products to customers," he said. "Dealers sell sideways. Major manufacturers like The Andersons or Lebanon Turf hire us to sell their products; there are no set territories, we cover an area that we feel comfortable with."

Mackintosh said his distributorship sells only "soft" products except for spreaders and nozzles, and told me something I didn't know about "agency products" that distributors sell. Using BASF as an example, Mackintosh said the manufacturer dictates that a box of Insignia fungicide sells for the same price everywhere. If Mackintosh tries to sell it for less, he's breaking his contract with BASF. "I have customers who call this 'price-fixing' and they're not wrong," he said.

Mackintosh said he doesn't face much competition from big box stores. "A customer might save, literally, \$1 a bag of pelletized lime for example from Home Depot but he still has to deliver it to his site. Consumers don't know how much they are getting gouged by these retailers."

When asked about changes might be coming in his business model, Mackintosh said he'll be looking at whether the number of his competitors will continue to increase. "Right now many of my customers have 13 other distributors they can choose from; will that number continue to grow?" he asked. "Some of these companies are hiring sales reps with no experience so I'm not sure how that's going to work out."

He said when the Internet started to boom in the 1990's, some distributors looked at a digital model, much like Amazon is today. "It didn't fly; customers like to solve problems together with us."

Mackintosh added that he does see changes in product availability coming. "For example, neonicotinoid insecticides, which reportedly have an environmental impact on honey bees, might no longer be available to turf managers. It's possible farmers might be able to continue to use them, for potatoes for example, because neonicotinoids are so important to that crop." **/ST/**

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TIM MOORE

This month in “The SportsTurf Interview,” we meet Tim Moore, CSFM, of GCA Services, an ABM company, where he is vice president of grounds management. Tim recently was named the latest Harry C. Gill Award recipient, the STMA’s highest honor. Cited as one of the most influential professionals in our business, Tim’s involvement in the profession has been immeasurable: committee service, chapter involvement, serving on the STMA Board of Directors and much more. Tim has been a champion for the Certification Program, becoming one of the first members to receive the CSFM designation. He has written articles that have advanced the professionalism of the industry, was a board member for the Mid-Atlantic chapter as well as the STMA Board and served on STMA’s Awards Committee and helped that program to mature to the level it is today. But Tim may be best known as serving as Master of Ceremonies annually at the STMA Awards banquets, a gig he’s enjoyed and excelled at since 1999.



Tim Moore, CSFM, GCA Services

SportsTurf: What different segments of the sports turf industry are you involved in? What does a regular working week look like, if such a thing even exists?

MOORE: I am currently involved with fields at the Parks, K-12 and NCAA levels. I have also had the pleasure of working on professional baseball fields on five different continents.

In my role as the team leader (and I have a fantastic team) for ABM Education Grounds Management, my primary responsibility is to make sure my team has everything they need to provide our 70+ clients across the country, the best service possible. So, a typical week may include travel to a current or prospective account, reviewing scope and developing programs for campus and athletic grounds. Visiting with grounds managers, touring their sites, being a sounding board and providing coaching in any way necessary. I work with our partner vendors to make sure we have the best products and equipment available to perform the scope our clients expect (and if I may steal George Toma’s line) “and then some.” I also work with HR and Safety to ensure our “boots on the ground” have a positive work experience. And then there is the finance end; making sure we are being fiscally responsible stewards of our clients’ and ABM’s resources.

ST: How did you get your start in this business?

MOORE: I caught the sports turf management bug back in high school. I

would jump at every opportunity to get out on the baseball field to help get it ready for practice and games. I also worked summers at the school taking care of the fields. Coach Hollaran was passionate about, and insisted our fields were meticulously cared for. That passion was passed on to me then, and it has never left me.

ST: What piece of advice do you wish someone had given you when you were starting out?

MOORE: Smile more, it makes you more likeable.

ST: What projects are you working on currently?

MOORE: My team is working on more than 70 projects right now ranging from fields at University of New Hampshire in the north to the University of Miami in the south, Buckingham County Schools in the east to Bastrop ISD in the west.

ST: What kinds of cutting-edge technologies do you currently employ?

MOORE: We employ the latest control products for pests, so that we can be the best stewards of the environments for which we are responsible. We also employ growth regulators, not only for turf but also for trees and shrubs. We have realized of significant increase in production as well as plant quality, using these products. As far as equipment

goes, we have the latest offerings from our “Iron” partners, like the newest WAM from Toro/Exmark. We also use drones to take field pictures to document seasonal changes and to gain additional perspectives and head off pest or water issues we might not see from ground level.

ST: What changes do you see coming for the sports turf management industry?

MOORE: I see the industry utilizing more and more cutting edge technologies and science to manage our fields. It’s not enough, anymore, to just be a good “grass guy or gal” or “dirt guy or gal.” We now have to understand the science behind what we do and to be able to communicate effectively up and down the line.

ST: You know a lot of sports turf managers. What are they saying are the biggest obstacles to overcome for them to be successful today?

MOORE: The biggest obstacles out there are the owners and users of the fields. With that, I mean, getting them to understand what is best for their fields to make sure they perform the way they have come to expect them to perform. Our communication skills are becoming more and more important. We have to be able to teach others in a way they will understand what goes into the proper management of their fields and what it takes to achieve their expectations.

ST: How has your career benefitted from being a member of STMA?

MOORE: Being a part of STMA is why I am where I am. The relationships I have developed and the people that have mentored me, have given me the exposure and credibility to become a “trusted advisor,” and to be in a position to make a difference in other people’s lives. Without STMA, I would not be where I am today.

ST: What is your mantra?

MOORE: It is never the right time to do the wrong thing and never the wrong time to do the right thing. Always do the right thing.

ST: What are your passions and interests outside of work?

MOORE: I enjoy home improvement projects and wood-working. I also enjoy swimming, boating, diving off island cliffs, and boating. **/ST/**



Tim leading a logo painting training session

A smartphone screen showing the STMA mobile app. The app displays the STMA logo, the text 'Sports Turf Managers Association (STMA) @FieldExperts', and buttons for 'Contact Us' and 'Message'. Below these are icons for 'Like', 'Follow', 'Share', and 'Save'. At the bottom, it shows 'Organization • Lawrence, Kansas' and a '5.0 ★★★★★' rating.

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Sports Turf Managers Association

Weed control

for highly trafficked bermudagrass

// By JOHN BREWER AND SHAWN ASKEW, PHD

In the United States, there has been an increase in the use of bermudagrass for athletic fields and municipalities due to improved recuperative potential during summer, better cold-tolerant cultivars, and the need to reduce management budgets. This increase has occurred more so farther north and into the transitional climate zone, while areas in the southern US continue to have a high percentage of bermudagrass athletic fields. The transition-zone growing season is short and has less heat units than areas farther south. This may alter herbicide options for managers farther north compared to the southern areas since they have less time to recover from herbicide induced injury. Also the severe damage, loss of turf vigor, and reduction in the turfgrass canopy on highly trafficked areas limits herbicide options even more and makes weed management more difficult.

The most substantial limitation to weed management on trafficked turf is the loss of residual herbicides. Residual herbicides are the “backbone” of most weed management programs because they prevent germination or establishment of seedling weeds for several months during the growing season. But they also inhibit rooting of creeping stolons and prevent seeding or sprigging of damaged areas. These issues related to turf establishment into trafficked turf increase dependence on herbicides that have no or short-lived residual in the soil.

Pre-emergent annual bluegrass herbicides: If you are overseeding bermudagrass areas in the fall, this section of the weed management plan is not applicable to your program. For minimum-wear areas and depending on region, you may begin applying preemergence herbicides for annual bluegrass in late August to October before air temperatures drop below 70F consistently, but timing may be dependent on seasonal play. For trafficked fields, we recommend waiting until the last game of the fall sports season before applying annual bluegrass herbicides to prevent any further injury or stress on the field. Two suitable herbicides for this application are simazine (Princep Liquid) or flumioxazin (Sureguard). These herbicides can control young annual bluegrass plants that have already germinated and suppress germination for the rest of the fall and winter season. They also can control many winter annual broadleaves as well. If you are in a more southern region of the US, you may already have populations of annual bluegrass resistant to herbicides like simazine or atrazine. These Deep South areas also seldom have completely dormant bermudagrass suitable for flumioxazin or nonselective herbicides like glyphosate. Flumioxazin will turn semi-dormant bermudagrass completely brown but does not delay green-up the following spring. If winter color is not important, it may be an option for bermudagrass weed control in the Deep South just as it is in areas further north.

Root inhibitors like indaziflam (Specticle FLO) or prodiamine (Barricade) control annual bluegrass, but they can cause problems with

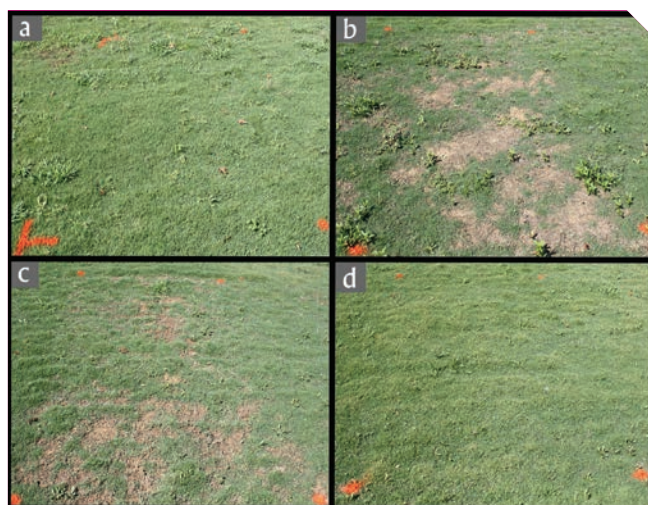


Figure 1. 'Latitude 36' bermudagrass sprig grow-in 9 weeks after sprigging comparing nontreated plots to plots treated with prodiamine a few days before sprigs were row planted alone or with activated charcoal applied immediately before sprigging. Images shown are: (a) nontreated, (b) 48 oz/A prodiamine, (c) 24 oz/A prodiamine, (d) 24 oz/A prodiamine plus 200 lb/A activated charcoal.

bermudagrass recovery in highly trafficked areas the following spring (Figure 1). We only recommend using them in areas that are out-of-play or have very low traffic requirements, but these may be the only viable options for managers farther south who have resistant annual bluegrass populations. In multiplex facilities, these herbicides are great options for areas between fields or general areas that have proven over time to receive little wear. By applying more economical root inhibitors in zones that get minimal traffic, budget can be freed for more costly postemergence herbicides or shoot inhibiting preemergence herbicides on wear areas.

Post-emergent annual bluegrass herbicides: When bermudagrass is mostly dormant, you can apply non-selective herbicides like glyphosate (Roundup, Glypro, etc.) or glufosinate (Finale). Simazine or flumioxazin will also offer post control of annual bluegrass. Glyphosate may be used in combination with oxadiazon (Ronstar FLO), simazine, flumioxazin, or other residual herbicides in January or early February, depending on region, to give residual crabgrass control into the late spring/early summer. Glyphosate + simazine will improve winter annual broadleaf control but simazine will not offer much for crabgrass and goosegrass in the coming season.

	Herbicide Product	Active ingredient	Rate/A	Approx. Price/ A ¹	Surfactant type	Time to weed death (d)
Annual Bluegrass Post: <i>1. Nonselective:</i>	Roundup® Pro Con. ²	glyphosate	20 to 40 fl. oz.	\$5 to \$10	None	14 to 40
	Finale® ²	glufosinate	96 to 192 fl. Oz.	\$42 to \$84	None	5 to 25
	Sureguard® ²	flumioxazin	12 oz. wt.	\$112	None	10 to 20
	<i>2. Selective</i>					
	Monument®	trifloxysulfuron	0.53 oz. wt.	\$139	NIS ³	14 to 40
	Revolver®	foramsulfuron	17 fl. oz.	\$104	MSO ³ + ammonium sulfate	14 to 40
	Katana®	flazasulfuron	3 oz. wt.	\$164	NIS	14 to 40
	Negate®	Rimsulfuron + metsulfuron	1.5 oz. wt.	\$44	NIS	15 to 40
Annual Bluegrass Pre:	Kerb®	pronamide	40 fl. oz.	\$75	COC ³	30 to 60
	Sureguard®	flumioxazin	12 oz. wt.	\$112	None	PRE ⁴
	Princep®	simazine	32 fl. oz.	\$6	None	PRE
Crabgrass & goosegrass pre: <i>Best for worn/bare areas:</i>	Ronstar® G	oxadiazon	200 lbs	\$441	None	PRE
	Ronstar® Flo	oxadiazon	122 fl. oz.	\$133	None	PRE
	Sureguard®	flumioxazin	12 oz. wt.	\$112	None	PRE
	<i>Use only in out-of-play areas:</i>					
	Specticle®	indaziflam	4 to 6 fl oz.	\$44 to \$67	None	PRE
	Barricade®	prodiamine	21 fl. oz.	\$21	None	PRE
Smooth & large crabgrass post:	Dimension®	dithiopyr	32 fl. oz.	\$61	None	PRE
	Drive XLR8®	quinclorac	32 to 64 fl. oz.	\$27 to \$56	MSO	8 to 12
	Tribute® Total	foramsulfuron + thienicarbazone + halosulfuron	3.2 oz. wt.	\$170	NIS	20 to 50
Goosegrass post:	Tribute® Total	foramsulfuron + thienicarbazone + halosulfuron	3.2 oz. wt.	\$170	NIS	20 to 50
	Revolver®	foramsulfuron	17 fl. oz.	\$104	MSO + ammonium sulfate	20 to 50
	Speedzone®	carfentrazone + 2,4-D+MCP + dicamba	64 fl. oz.	\$34	None	8 to 12
	Pylex®	topramezone	0.5 fl. oz.	\$15	MSO	12 to 15
Broadleaf herbicide post:	MSM Turf	metsulfuron	0.5 to 1 oz. wt.	\$4 to \$8	NIS	20 to 40
	Speedzone® Southern	carfentrazone + 2,4-D+MCP + dicamba	64 fl. oz.	\$34	None	5 to 10
	Trimec® Southern	2,4-D+DMCP + dicamba	32 fl. oz.	\$17	None	5 to 12
	Drive XLR8®	quinclorac	32 to 64 fl. oz.	\$27 to \$56	MSO	8 to 12
	Other 3- & 4-way combos					
Yellow nutsedge post:	Monument®	trifloxysulfuron	0.53 oz. wt.	\$139	NIS	20 to 40
	Certainty®	sulfosulfuron	1.25 oz. wt.	\$73	NIS	20 to 40
	Celero®	imazosulfuron	10 oz. wt.	\$101	NIS	20 to 40
	Sedgehammer®	halosulfuron	1.33 oz. wt.	\$70	NIS	20 to 40
	Dismiss® Turf	sulfentrazone	8 oz. wt.	\$77	None	5 to 10

¹ These estimates are online consumer prices multiplied by 80%, not distributor pricing.

² Only spray these herbicides when bermudagrass is dormant (without green tissue).

³ NIS = nonionic surfactant; MSO = methylated seed oil; COC = crop oil concentrate

⁴ PRE = preemergence, weeds die before or soon after emergence

If no green leaves are evident above brown turf and digging in the canopy produces no more than 10 partially green leaves under hand, the area can be considered fully dormant for the purpose of nonselective herbicide treatment. As more and more green leaves break the surface, the glyphosate rate must be lowered from a high of 40 fl oz/A down to as low as 12 fl oz/A (Figure 2). If more than 5% of the turf has green leaves on the surface, prolonged delay in greenup can be expected, even with the lower rate. For selective options we recommend using foramsulfuron (Revolver), trifloxysulfuron (Monument), rimsulfuron plus metsulfuron (Negate), or flazasulfuron (Katana). All herbicides except foramsulfuron require nonionic surfactant (NIS) at 0.25% V/V (e.g. 0.25% V/V in a 10 gal tank equals 0.025 gallons (gal) or 3.2 fluid ounces (fl. oz.)), while foramsulfuron requires methylated seed oil (MSO) at 1% V/V and ammonium sulfate (AMS) at 1.5 lbs/A. These more aggressive adjuvants recommended on the Revolver label can also improve efficacy of trifloxysulfuron, rimsulfuron plus metsulfuron, and flazasulfuron. Pronamide (Kerb) is another herbicide that can be integrated into annual bluegrass control programs to delay or prevent resistance development. Among the selective herbicides listed above, all are safe to bermudagrass but try to avoid spraying during early greenup (0-50%) as some discoloration and stunting may occur.

Pre-emergent crabgrass/goosegrass herbicides: During spring, we typically see large and smooth crabgrass emergence from March - May with goosegrass emerging a few weeks after crabgrass. We recommend applying your pre-emergent herbicide from February to mid-April depending on location by using natural indicators or growing degree day (GDD) models. Turf managers from the transition zone to the Deep South can typically start applying preemergence herbicides for crabgrass between full bloom and full wilt of daffodils, between bud set and full bloom of dogwoods, and/or between full bloom and 50% bloom drop of Forsythia. A GDD model with base temperature of 55 F will prompt applications before reaching 70 units. This means every time your daily average of high and low temperatures is over 55 F, you accumulate GDD units and add them to a running total while ignoring any negative values. You will then need to apply your pre-emergent herbicide before an area reaches 70 GDD units at base 55 F. January 1 each year is a suitable time to start tracking base-55 GDD units.

A great preemergence herbicide option for trafficked bermudagrass areas is oxadiazon (Ronstar FLO or G). If you apply before greenup, you can use sprayable formulations, but after significant greenup has occurred, it is recommended to use granular formulations to reduce injury. Sprayable formulations of oxadiazon are more economical and offer better coverage than equivalent rates of granular formulations. Oxadiazon does not inhibit root growth of stolons or new sprigs, so it makes recovery of worn or winter-damaged areas much easier and faster. Flumioxazin can also be used in a similar manner but is available only as a spray formulation that cannot be used on actively growing bermudagrass and requires a short interval between spraying and sprigging. Thus, flumioxazin must be applied to dormant turf and will not last as long as oxadiazon.

If we normally see 4 months of residual goosegrass control from a high-label rate of oxadiazon, we will get about 3 to 3.5 months from the 12 oz/A rate of flumioxazin. The advantage of flumioxazin compared to oxadiazon is cost savings and postemergence annual bluegrass control. For a cheaper alternative to the shoot inhibitors, root-inhibiting

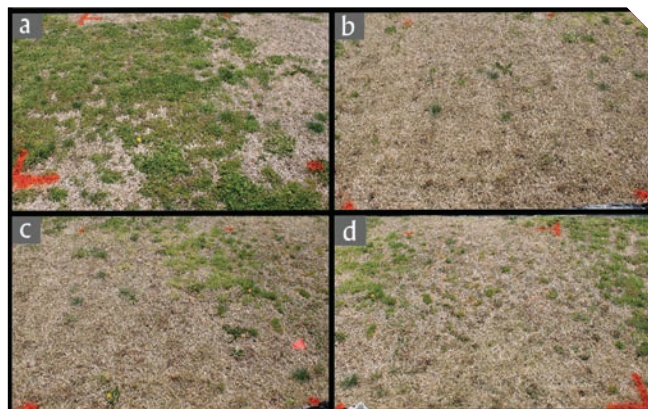


Figure 2. Early spring image of dormant 'Riviera' bermudagrass treated with glyphosate and simazine for [START ITAL]Poa control: (a) nontreated, (b) 32 fl oz/A simazine 4L applied Nov 15, (c) 32 fl oz/A simazine 4L applied Feb 15, (d) 12 fl oz/A Roundup Pro applied Feb 15.

herbicides like indaziflam, prodiamine, or dithiopyr (Dimension) can be used at half rates repeatedly in areas of the field that are out-of-play or get very low traffic/wear and are not at risk of winterkill.

Post-emergent crabgrass/goosegrass herbicides: The ideal herbicide for crabgrass and goosegrass control in highly trafficked bermudagrass will cause little injury or growth delay to desired turf. Since MSMA is no longer an option in athletic fields, our best approach is to catch the weeds when they have less than 3-tillers and treat with theincarbazone plus foramsulfuron plus halosulfuron (Tribute Total) or foramsulfuron. If weeds are over 3 tillers, quinclorac (Drive XLR8, Quinclorac 75DF) can be used at 0.75 lb active ingredient per acre for crabgrass control and topramezone (Pylex) at 0.15 fl oz/A + metribuzin (Sencor) at 4 oz/A can be used for goosegrass. The topamezone plus metribuzin programs were developed for Virginia, so areas farther south may need higher rates of topamezone (0.25 to 0.5 fl oz/A) to be effective on goosegrass.

Both quinclorac and topamezone may injure bermudagrass for up to 2 weeks and both require MSO adjuvant at 0.5 to 1% by volume. Speedzone has controlled small and medium size goosegrass in research trials, but requires using the highest labeled rates (2 qt/A) with multiple applications. These rates may injure bermudagrass and the 14-day interval found effective in research trials is off label. Labeled monthly treatments are less effective for goosegrass control but still of utility. When using topamezone in bermudagrass, there are a few things to note: 1) some bermudagrass cultivars like common bermudagrasses, 'Patriot' and 'NorthBridge' are typically more sensitive than hybrid varieties like 'Tifway'; 2) using just topamezone at 0.25 to 0.5 oz/A and 0.5% MSO will cause severe white discoloration but typically not more than 2 weeks of delayed growth; 3) adding chelated iron (Sprint 330) can reduce bleaching and slightly speed the recovery; 4) adding triclopyr (Turflog Ester) at 4 oz/A will eliminate white discoloration but increases delayed growth to 3 weeks; 5) our program of 0.15 oz topamezone + 4 oz/A metribuzin has decreased injury duration for some cultivars like Tifway but increased injury of Patriot in one trial; 6) recent reports by Dr. Bert McCarty, Clemson University, suggest rapid irrigation immediately after topamezone treatment can reduce bermudagrass

injury. These topmamezone programs are all effective on 3-5 tiller goosegrass and sometimes work well on much large plants.

Post-emergent herbicides for broadleaf weed control: In bermudagrass, broadleaf weeds can be controlled during dormancy with nonselective herbicides like glyphosate or with selective options when turf is actively growing. Most three- and four-way combo products that contain 2,4-D, dicamba, MCPP, triclopyr, carfentrazone, etc. (Speedzone, Trimec, etc.) can control common broadleaf weed species, but struggle on more hard-to-control weeds like Virginia buttonweed, ground ivy, and prostrate knotweed. Also products that contain 2,4-D or triclopyr can injure bermudagrass especially during greenup in the spring, so using the "southern" versions of these products for example Trimec Southern may be a safer option. The top recommended products for common and hard-to-control weeds in trafficked bermudagrass would be products containing metsulfuron (MSM Turf) or sulfosulfuron (Certainty), and they both require 0.25% V/V of NIS. Sulfosulfuron can also be used for grass and sedge control as well. Quinclorac is another herbicide that can effectively control both broadleaves and grass weed species. Newer products like thienclorac + dicamba + iodosulfuron (Celsius), penoxsulam + sulfentrazone + 2,4-D + dicamba (Avenue South), and halauxafin + florasulam (Relzar) may improve turf safety and broaden weed control spectrum.

Post-emergent herbicides for sedge and *Kyllinga* control: There are multiple herbicide options for sedge and *Kyllinga* spp. control and these options also change depending on the species such as purple or yellow nutsedge. Some of the better options for bermudagrass turf include trifloxysulfuron, sulfosulfuron, and imazosulfuron (Celero). Other options include halosulfuron (Sedgehammer) and sulfentrazone (Dismiss). Trifloxysulfuron and sulfosulfuron have the broadest spectrum sedge and *Kyllinga* control, which includes purple and yellow nutsedge and also different *Kyllinga* species, but will require repeat applications for purple nutsedge and *Kyllinga* species. Imazosulfuron, halosulfuron, and sulfentrazone are effective on both yellow nutsedge and green *Kyllinga*. All three will require repeat applications to control *Kyllinga* species effectively. All herbicides except sulfentrazone require 0.25% NIS at application. Trifloxysulfuron and sulfosulfuron also have activity on other grass and broadleaf weeds as well. Only halosulfuron, imazosulfuron, and sulfentrazone can be used in both cool-season and warm-season turf.

Remember to avoid root inhibiting preemergence herbicides (indaziflam, proflam, and dithiopyr) on highly trafficked areas but zone treat them where possible. Always read the product label before application to prevent any costly or damaging mistakes. Read the label and confirm if a product does or does not need a surfactant/adjuvant (Table 1) and is legal to use in the region and site desired. Failure to use surfactants can cause a significant drop in weed control for some herbicides. Always check the weather and don't apply herbicides if rainfall is imminent. Most herbicides need at least 4 hours drying time for best absorption into plants. We also recommend not mowing your treatment area for at least 2 days before and 2 days after application, and preferably 3 days before and after. Treat young weeds to improve effectiveness. Be mindful of the time required for certain herbicides to work effectively and schedule field use accordingly (Table 1). **/ST/**

John Brewer is a graduate research assistant, and Shawn Askeew, PhD, is an associate professor and turfweed specialist, at Virginia Tech.

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Early turf manager input valuable for successful field construction

// By ERIC SCHRODER

We caught up with Chris Franks, CFB, executive vice president for construction operations for SCG Fields, while he was in Kansas City for a regional meeting of the American Sports Builders Association in March (CFB = Certified Field Builder). Franks had a hand in building his first field in 2002 as a laborer while he was in high school and has been at it full-time for the past decade.

When we spoke the company was working on four projects totaling seven fields; Franks said SCG Fields targets to complete 50 projects annually. “Of course our biggest crunch is in the summer; the high school market is still really big for us, especially for football and soccer, and everyone wants their fields ready for August.”

Other projects for 2018 Franks mentioned include Allianz Field, home of Minnesota FC of the MLS, and the new Atlanta Braves spring training facility. And the company is the official field builder for the United Soccer League.

STMA and ASBA member Franks is on the road a lot, 3 days a week on average and more in the summer. “It’s challenging, yes, but we focus on customer service and satisfaction, which includes being as upfront as possible, especially if there’s a problem,” he said. “Face time is important. We work together with customers, and that doesn’t end when the contract is completed. The hardest part is being away from my family.”

While SCG Fields can do an entire project – design and build – with their in-house registered architect and multiple work crews, they also work with architects and contractors local to specific projects. Asked if SCG more often bids on contracts or has potential customers come to them directly, Franks said, “We find a combination of both, but most of our work is through relationships. We work regularly with a lot of national

architects and general contractors. We also perform a lot of design-build projects with private clients and work closely with them to deliver projects that meet both their needs and budgets. We take pride in our ability to get client referrals because it means we did what we said we would do – build an excellent field on time and on budget.

“We’re fortunate to have a successful track record working with professional teams on NFL, MLB, MiLB, MLS, USL and other high-profile projects, so a trust has been developed,” Franks said. “We don’t do a lot in the public bid market; those ‘low-bid’ scenarios don’t allow us to bring any added value to the process, which we feel is extremely important.”

We can’t get through an interview without a dumb question; for Franks, it was “Where do specs come from?”

“It depends on that project’s process; if the client already has an architect on board it’s different than if we are doing a design/build. If the latter, we start with asking the client for a pre-design ‘wish list.’ Do they have a concept in mind or perhaps an existing field that they would like to mimic? What materials do they want? What turfgrass species? From there we can use our template to develop the specs and price it out without knowing the budget. After that we work with the client to tailor their wish list based on available budget. Some things might have to be left out to get it to the price [they want]. It’s a balancing act but a transparent process.

“You can’t get cookie cutter specs from Google; we tailor ours according to the needs and wishes of the client. Every field is different, regardless if it’s the same sport. Existing conditions, ability to source the proper materials, geography, microclimate, and estimated use are a few of the elements that must be considered. Our drawings and layouts are all custom-fit for that particular client.”

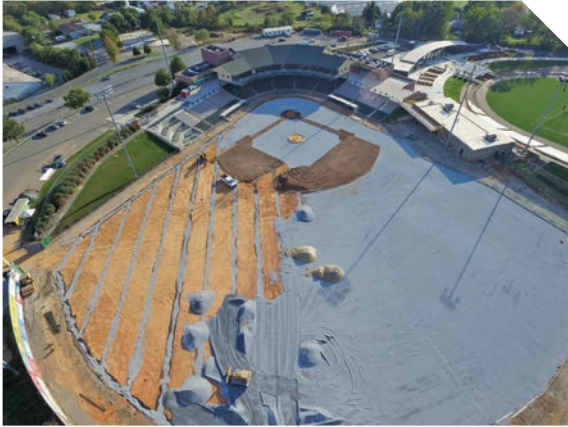


Chris Franks, CFB, SCG Fields

At what point in the process do you normally begin to work with a customer’s turf manager?

“As soon as possible. At the end of every project we build, we turn the “keys” over to the sports turf manager (or facility manager in some cases). Our most successful projects are a result of working side-by-side with the sports turf manager throughout the entire project,” Franks said. “We want to indoctrinate them on *their* field; where and how the field drains, what the material composition looks like between subgrade and finish grade, how the irrigation system is routed, how the sod was installed and the fertility plan used during initial grow-in.

“Having sports turf managers’ input is critical when it comes to how long the field will last. If it doesn’t last as long as expected it reflects poorly on both the turf manager and our company. Take the rootzone mix for another example; we want to tailor a project to how the turf manager wants to maintain the field. The turf managers are extremely valuable assets for us.”



Calvin Falwell Field, Lynchburg (VA) Hillcats, Carolina League

"When the sports turf manager knows how the field was built, experiences that process with our construction crews, and has input on initial fertility and grass management practices during grow-in to align with their post-establishment maintenance plan, they are more knowledgeable and better prepared to take it over and maintain the field," he said. "An issue we commonly run into is the sports turf manager being left out of the construction process, but to me that is one of the most important parts of the project. You don't want to get to the end of the project and be introduced to the sports turf manager."

In all reality, we want to build a field that is perfectly tailored to the manager's maintenance philosophy. The components of a properly built field can function well for decades, but only if it is properly maintained (our oldest professional field is in MLB and is going into its 25th season; only the grass, top layer of rootzone, and track surface has been replaced in that time.).

No construction or renovation project goes smoothly 100%; how does Franks

handle communicating with the customer about problems?

"There's probably a Top 10 list of common problems; most issues are relatively similar. We strive for upfront, open communication and honesty. Good news is always easy to share but bad news should be shared properly as well," Franks said. "We've honestly lost jobs before they started because we saw issues, expressed them to the client, and it wasn't what they wanted to hear. It's unfortunate but we have comfort knowing it was addressed upfront and not swept under the rug until construction started. We discuss the schedule every week either on site or in a conference call; if we're not on the published schedule we talk about why, and what the plan is to get back on schedule."

"For example, let's say we rip out an existing grass field and discover the subgrade is

not stable. No one knows that until you're there. So we'll get the entire project team on site and bring in a third party, perhaps an engineer, to give two opinions to the customer," he said. "You have to nip potential change orders in the bud. Ninety percent of our projects are on tight budgets so we need to provide a lot of information to the customer if they might need to come up with more money or adjust the scope of work."

"You have to be transparent when issues come up, you can't mislead the client. It's easier to explain what's happening upfront. We are open to a fault."

We asked Franks what turf managers should do before and during the actual project.

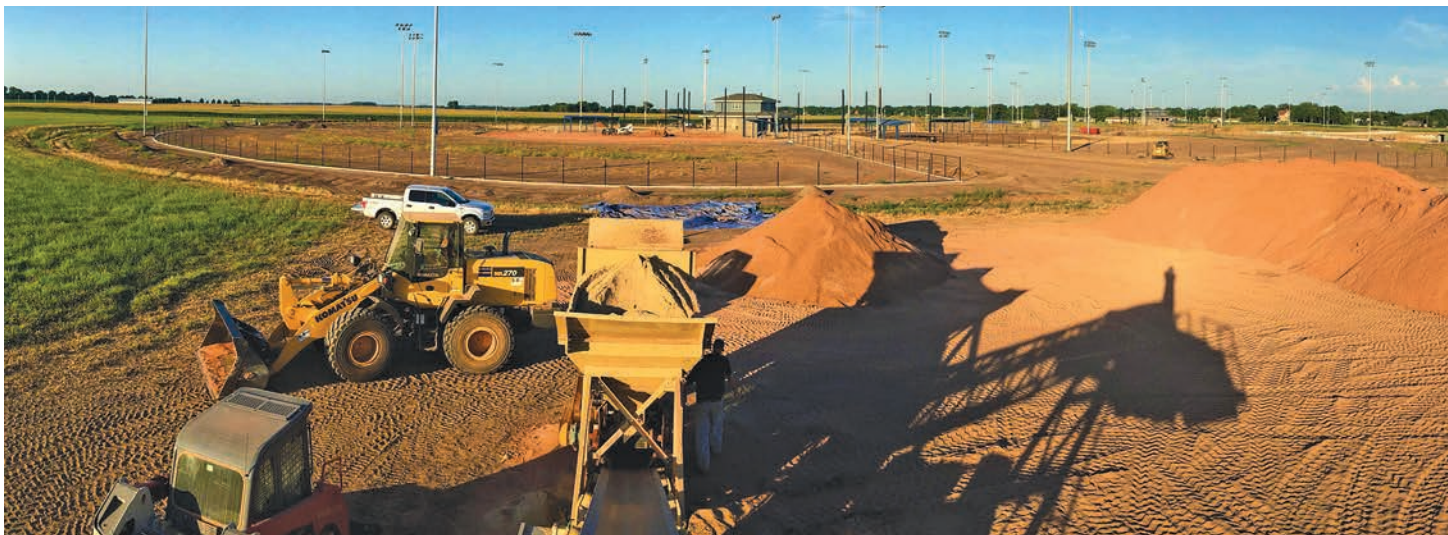
"Immerse themselves in the drawings/specs as to how the field will be built/renovated, and then ask a lot of questions. For example, the turf manager may want to slightly tweak the field to make maintenance easier on them and increase aesthetics. All of the little tweaks are simple to coordinate in the beginning of the project and 9 times out of ten don't add cost, but when the turf manager isn't brought on

until after the project, these tweaks to tailor the field to their liking gets expensive," he said. "I try to learn something new each day, and whether the turf manager has 30 years experience or 1 year, I feel they can always learn something new about field construction because they don't see it every day. In the same light, I don't perform field maintenance every day, so I try to learn new tips, tricks, and theories from every turf manager I've worked with, and it's of great assistance to my staff and me."

"My first question to a potential client (if not a sports turf manager) is 'has the sports turf manager been involved in this process so far?'" At the pro levels we hear from the turf managers upfront, but often at the university and high school levels, where we've negotiated the project through the athletic director, he or she tells us what they want. And this can be problematic, for example the athletic operations budget is not the same as the facilities operations budget, and you can have situations where one party isn't communicating with the other."

"Turf managers certainly want to be involved; at the pro level they are the decision makers but when you start working at the college, high school, and recreation levels, there are different departments involved that don't always communicate well with each other and it can get complicated."

"Hearing from the turf managers before we start the project is very important, especially to avoid the 'If only I would have known . . .' Getting small details right in the beginning eliminates the need for a big fix at the end. For example, there are different infield configurations (base path widths, base cutouts, umpire cutouts) in baseball – which is preferred? Do you want the grass round or square on the warning track at the outfield corners and arcs? Depending on the field access points and track width, this minor detail allows maintenance equipment to get in and out without having to drive on the grass constantly, and that makes a huge difference for a groundskeeper. Or, can we identify heavy wear or shade areas specific to the field and modify the construction to improve performance and reduce maintenance? Tweaks of details like these, at the behest of the turf manager, can make their jobs easier and are often hard to fix after the fact. **/ST/**



Blending infield mixes on site

// By ERIC SCHRODER

At this year's STMA Conference I stopped by the Southern Athletic Fields (SAF) booth to visit the quintessential "good ol' boy" Glenn Lucas (and I mean that in the hard-working, honest gentleman sort of way). While we talked, a video was playing nearby, showing SAF employing a pugmill blender to create a customized infield mix at the customer's facility. I hadn't seen that before.

Lucas said SAF decided to invest in a pugmill (not a cheap endeavor!) to provide on-site blending services for three reasons:

- To take a good mix, Mar Mix Infield material, which has been used for more than 20 years, and make it even better.
- To give our customers a consistent material each and every year, not depending on what can be found locally in the ground.
- To be able to take local mixes and make them better.

Lucas said SAF can take a mix that is high in silt and amend it by adding a mix high in clay and/or sand, or take a local sandy mix and blend it with silt and clay to get a great mix.

"It's not all about the sand, silt, clay of a good infield mix but also about the

sand particles that make up the sand. We can amend the sand sizes to improve the mixes," he added.

"We don't do much blending onsite; in order for it to come into play it would need to be a multiple field project/complex to justify mobilizing equipment, manpower, etc. By having the pugmill, it does give us the opportunity to stockpile more mixes in different areas around the country, which helps the customers with pricing, shipping costs, etc., to get the material that they want for their fields," Lucas said.

"At the end of the day, the sports turf industry continues to improve and requires better materials from the professional levels to the high school and parks and recreation levels. SAF felt that by investing in this pugmill, and providing the materials that we can now provide, we are only helping our industry to reach their goals."

There first

I also caught up with Grant McKnight, president of DuraEdge Products and Natural Sand, Inc. His company was the first to go on the road in 2011 with a pugmill, starting in Elizabethtown,

KY where James Bergdoll, CSFM, was building 14 new fields. He said they only do one or two on-site projects a season.

"Blending on site is becoming more popular, especially in new construction projects," McKnight said. "There are mitigating factors determining what projects it makes sense for; for example the volume of material needed and the proximity of the site to one of our 14 locations around the country where we produce material and stockpile it."

McKnight has two stationary pugmills, one in Pennsylvania and one in Michigan, but said building new pugmills is too expensive and a poor use of his assets. So he built his own that fits on one trailer (which doesn't include conveyors). "I worked with an architect to shrink the 'Duramixer' down and make it truly mobile."

"The whole purpose is to eliminate freight costs as well as lower our carbon footprint."

A big factor in determining which way a job goes is the cost of transporting finished material. "If you're hauling 1,000 tons at \$20 a ton, compare that cost with showing up on site with just 300 tons of clay and buying the sand locally; we can go there and set up shop. Each situation



is unique," he said. "It's a transportation game. How can we save on hauling costs? When we are bidding on jobs where the Duramixer might work there are 40 different input costs that must be factored in, worker per diems to material testing costs."

McKnight said there has been an unintended consequence from using local materials on these jobs. "There is a goodwill bump because the people involved appreciate that local materials are going into their fields."

McKnight spoke awhile about situations where facilities are spending

millions of dollars on new projects but don't always understand that "at the end of the day, your infield mix is going to make or break" the finished product. "If you build and maintain fields correctly, there is no need for synthetic turf." **/ST/**

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TURF MANAGER COMMENTS ON FRAZE MOWING

// By JERAD MINNICK

March 23 marked a birthday of sorts in the USA sports turf management industry. On March 23, 2013 at FC Dallas Park, fraze mowing made its debut in this country. *SportsTurf* featured the event in the August issue of that year (p. 26). During the past 5 years, fraze mowing has been used by a wide range of field managers on a wide range of fields.

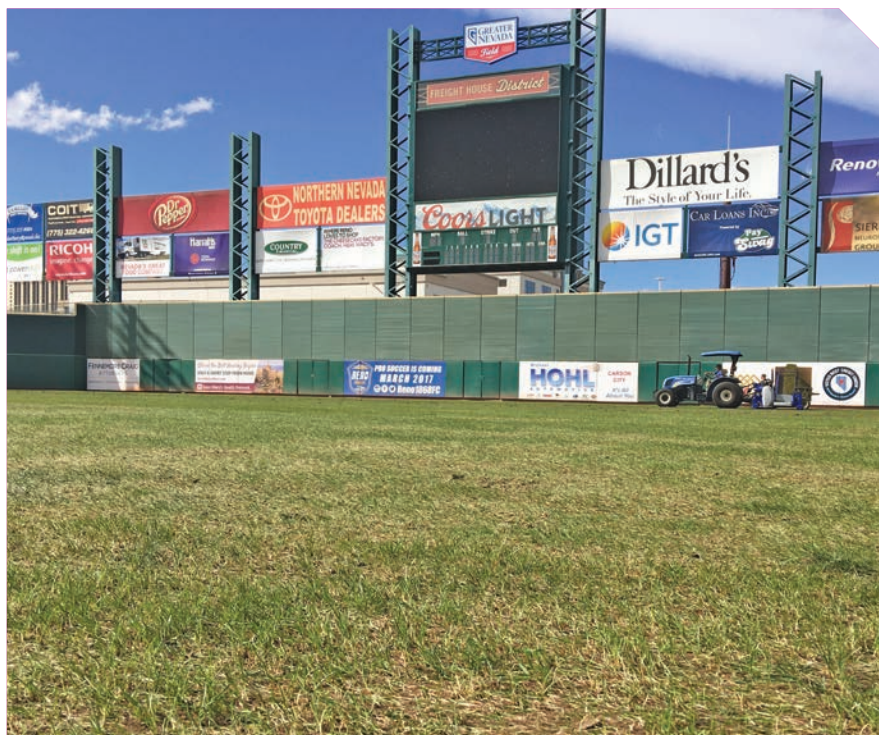
But still there will continue to be skeptics, as doubt is cast each day about such an aggressive change. A good amount of that doubt seems to be fueled by contractors not wanting to lose re-sod work and jockeying commercial companies needing to position themselves into the market. Those skeptics and that doubt are good for the continued evolution of field management in general.

Here are some more shared experiences:

Nick Lievense, Sports Turf Manager, Purdue University

In April 2014, Purdue University became the first Division 1 University with bermudagrass to utilize fraze mowing when they cleaned their soccer field. Ironically, Purdue is likely the most northern D-1 university with bermudagrass.

"When I first fraze mowed I was nervous! But I trusted the process, the ideas behind the process, and the people that had used it previously. So cautiously optimistic might be a better descriptor than nervous. As turfgrass professionals, we focus so much time worrying about "killing" grass that many times we miss out on being pro-active to improve conditions. We have fraze mowed 5x between soccer and football, and will be doing more in 2018."



40% of Kentucky bluegrass sward remains after being fraze mowed. Photo credit Joe Hill, Reno Aces.

Any surprises, good or bad?

"We expected the durability would increase," Lievense said. "And the durability has increased, as the field is vastly stronger than ever expected. But the biggest surprise is how well fraze mowing cleans out poa. In previous years without fraze mowing, the field would end up 50% poa by transition time in late spring. Now the only poa, or weeds at all for that matter, is in areas that the Topmaker cannot reach. The rest is gone.

"Do not let the fear of killing grass hold you back from trying new things. Ask your peers who have utilized it and had success with it. Currently I know of zero people who have looked back

and said we should have never done that. Those of us that have utilized the process are doing it again and again. We went from having 10 weeks off for the process down to under 4 weeks now," Lievense said.

Jordan Montgomery, Manager of Turf Operations, Sporting Kansas City

Only 4 months into a new job as sports field manager at the University of Portland, in April 2014 Jordon Montgomery became first to utilize fraze mowing on a cool season field in the USA. Upon his change to Sporting Kansas City, he has fraze mowed bermudagrass 2x and will be doing so again in 2018.



5 weeks re-generation of GN-1 bermuda at Loyola Marymount University during "June gloom."
Photo credit to Zach Dadenhoff.

"I wasn't really nervous about the process of fraze mowing itself. I did enough research and had a good understanding of how "simple" the approach really is," said Montgomery. "But I was nervous that I had never lived through a Portland spring. Obviously I was expecting a lot of wet and cold days. But we knocked it out with great success. Then the next year when we did it again, it was even so much simpler with the significant thatch layer removed the year prior and stronger grass varieties as the base of the field."

Montgomery said, "I was unsure at first how the surface would respond during the fall and into the winter during the wet and cold time in Portland. It surprised me how impactful we were even just the first time in eliminating the "sponge" layer that existed before. Portland is wet for such a long period of time in the winter, so any surface moisture is a nightmare for footing. Thankfully we had full control of surface moisture and no slipping at all. The overall

condition of the field stayed nearly perfect through the wet and cold period.

"So many times it seems that sports field managers do not trust their own judgment. Even after we grew in a field from re-generation and seed, just a few weeks post-fraze there were people and 'experts' that wanted to argue that it wasn't possible to do, especially on the Kentucky bluegrass we used in Portland. I kept hearing that I couldn't grow bluegrass in Portland. But we did. We cleaned it out 2 times while I was there. And I continue to know its best for the playability and footing on a field, which is why we do it here at Sporting on our bermudagrass," Montgomery said.

Nick Pappas, CSFM, Director of Sports Turf, GreenSource Inc.

Nick and his sports turf team in Broward County in south Florida with GreenSource have likely fraze mowed more fields than any other contracting company. Nick was the first to clean out seashore paspalum with fraze mowing as well.

"I was 100% confident in utilizing fraze mowing to clean out and increase the durability of fields that we manage. If you really understand bermudagrass growth habit, it just makes sense! But, because I had to "sell" fraze mowing to our clients I did start to get nervous," Pappas said. "Making promises of increased durability, decreased sod work, and increased use on the fields were pretty bold statements initially just because no one had done it in the area. In the end, we looked like heroes with the dramatic increase in durability and strength, yielding in fewer repairs. But the credit really goes to our clients who were open to trying new ideas and evolving away from the status quo," Pappas said. "They want solutions for better fields, not excuses."

Any surprises, good or bad?

"Weed suppression. 100%. Obviously thick, healthy grass is a huge help for reducing weeds. As is regular (2-3 days / week) mowing. But following the fraze mow, our weed challenges have nearly disappeared. Before we were locked in battle after battle with tropical signalgrass and goosegrass nearly year round. Now we spot spray as needed and have very few issues," Pappas said.

"My perspective is unique since I have worked for stadium grounds teams then changed to work for a contractor. I feel like so many people just want to cast doubts about new things or poke holes in someone's success simply because it didn't come from their school of thought. No one has the best of everything. So trust the process, trust the experience of those around you that have done it, and try to avoid finding a reason that fraze mowing just 'can't work' for you. It can." **/ST/**

Jerad Minnick is Lead Advisor for the Natural Grass Advisory Group (www.NaturalGrass.Org). Minnick, along with Simon Gumbrell (then of Campey Turf Care/Imants BV), pioneered the evolution of traditional fraise mowing into fraze mowing in the USA and worldwide. That evolution is publicly documented at GrowingGreenGrass.Net

STMA COMMERCIAL MEMBER SPOTLIGHT:

g2 turftools

Editor's note: Another installment in our continuing series highlighting STMA commercial members. This month we hear from Lindsay Romett, president of g2 turftools, Athens, AL. Eric Merkt, Lindsay's father, and his partner Clellon Downs, developed a new turfroller while working as sports turf contractors, the turfroller, as an alternative to the bulky, asphalt rollers normally used. They also developed the turffloat to replace drag mats in breaking up aerification cores or fill in low spots. The company was named STMA's Innovative Award winner in 2012.

Lindsay has Master's degree in graphic design and when g2 turftools began she was responsible for all branding and marketing. In 2010 she took over the business and sales side of the company as well.

SportsTurf: How do you develop relationships with turf managers?

ROMETT: Turf managers are at the core of our business, whether they are a customer or not. We can continually learn from each other, so I always try to treat them in that manner. Maintaining contact is at the top of my list, whether it's through face to face, email, or even through social media.

ST: Do you have any recommendations for customers on how to get the most out of their supplier relationships?

ROMETT: Communicate! I think whether you send a quick tweet, a lengthy email, or a phone call, the biggest thing is to communicate. Suppliers don't know what you need unless you communicate. Most of the time, I think suppliers (salespeople) are hesitate about reaching out because we know customers get bombarded with phone calls and emails, so if the customer needs something, definitely communicate those needs.

ST: How do you test your products?

ROMETT: What most people don't know about us is that we also have a construction company that initially built and tested our first four products. Those products were used for about 10 years prior to g2 turftools even being incorporated. Any new products are still tested with that company, but we also reach out to the turf community to get feedback on our products and to test in different situations.



Eric Merkt and his daughter, Lindsay Romett

ST: I'm working on an article on distributorships; how are your products distributed?

ROMETT: We sell everything direct. We want to be able to maintain relationships with our customers and we want them to know that they are able to reach out to us if they ever have any problems. There are limitations to our selling direct, but I think and hope the positives outweigh those limitations.

ST: What are your biggest challenges as a small manufacturer?

ROMETT: Our biggest challenge is probably sourcing components. We buy in much smaller quantities than a larger manufacturer, so sometimes it's hard to get components quickly.

ST: What are the benefits to being an STMA commercial member?

ROMETT: One of the biggest benefits to being a STMA commercial member is the network of turf managers we have access to. The educational resources and opportunities STMA provides are also huge benefits.

ST: Anything in the R&D process you can share?

ROMETT: We have a couple of new things in the works. Our next piece of equipment is still in the early stages of development, but hopefully we will be able to share in early 2019! /ST/





JOHN MASCARO'S PHOTO QUIZ

JOHN MASCARO
IS PRESIDENT OF
TURF-TEC
INTERNATIONAL

////////

ANSWERS
FROM
PAGE 17

////////

Why the sod is on this motorized cart might surprise you. It is not a handicapped employee's solution to transporting sod; it's actually a homeless person taking some of the leftover sod for a bed. The baseball stadium field was being used for a friendly soccer match between Sacramento Republic and Liverpool's U21 squad. The pitch layout fits on the field at an angle that allows them to play to the side of the mound and avoid removing it. The sod was installed on the infield skin and there was some leftover sod placed out by the dumpster after the installation was complete. Needless to say, this seemed like a great solution to this homeless person's sleeping situation, so he loaded some of the sod on his cart seat and wheeled off into the sunset. Reno has a large homeless population and it comes with a great variety of individuals. Surrounding the ballpark is a bus station, a homeless shelter, and a hospital. Because of those three locations, they had a lot



of traffic from many different types of people.

Photo submitted by Danny Losito, now head groundskeeper for the Columbia Fireflies in Columbia, SC. Photo is from when he was assistant head groundskeeper for the Reno Aces during the for 2016 season in Nevada.

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.

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TECHNICAL INFORMATION ON SETTING UP SPRAYERS

Editor's note: Thanks to TeeJet Technologies and Tim Stuenkel, global marketing communications manager, for providing this copyright protected content, www.teejet.com.

The following five pages provide a brief overview on the fundamentals of spray tips and spray application. In addition to proper nozzle selection, sprayer calibration is a critical part of a successful spray application. Over-application can be quite costly in terms of wasted product. Under application can lead to ineffective pest control and reduced turf health. Streaky application due to worn tips or improper boom height can lead to poor turf appearance. So, take the time to understand your spray tips and calibrate your sprayer; the payback can be significant.

- Page 35: Useful formulas, nozzle spacing, travel speeds, spray heights
- Page 36: Spray coverage information, including nozzle nomenclature
- Page 37: Spray pressure, flow rates, spray angles and coverage
- Page 38: How to measure areas, e.g., rectangular, circular, irregular, etc.
- Page 39: Steps 1 through 5 for sprayer calibration



Useful Formulas

$$\text{GPM (Per Nozzle)} = \frac{\text{GPA} \times \text{MPH} \times \text{W}}{5,940}$$

$$\text{GPM (Per Nozzle)} = \frac{\text{GAL}/1000\text{FT}^2 \times \text{MPH} \times \text{W}}{136}$$

$$\text{GPA} = \frac{5,940 \times \text{GPM (Per Nozzle)}}{\text{MPH} \times \text{W}}$$

$$\text{GAL}/1000\text{FT}^2 = \frac{136 \times \text{GPM (Per Nozzle)}}{\text{MPH} \times \text{W}}$$

GPM – Gallons Per Minute

GPA – Gallons Per Acre

GAL/1000FT² – Gallons Per 1000 Square Feet

MPH – Miles Per Hour

W – Nozzle spacing (inches) for broadcast spraying

– Spray width (inches) for single nozzle, band spraying or boomless spraying

– Row spacing (inches) divided by the number of nozzles per row for directed spraying

Nozzle Spacing

If the nozzle spacing on your boom is different than those tabulated, multiply the tabulated GPA coverages by one of the following factors.

20"	
OTHER SPACING (INCHES)	CONVERSION FACTOR
8	2.5
10	2
12	1.67
14	1.43
16	1.25
18	1.11
22	.91
24	.83
30	.66

Useful Formulas for Roadway Applications

$$\text{GPLM} = \frac{60 \times \text{GPM}}{\text{MPH}} \quad \text{GPM} = \frac{\text{GPLM} \times \text{MPH}}{60}$$

GPLM = Gallons Per Lane Mile

Note: GPLM is not a normal volume per unit area measurement. It is a volume per distance measurement. Increases or decreases in lane width (swath width) are not accommodated by these formulas.

Measuring Travel Speed

Measure a test course in the area to be sprayed or in an area with similar surface conditions. Minimum lengths of 100 and 200 feet are recommended for measuring speeds up to 5 and 10 MPH, respectively. Determine the time required to travel the test course. To help ensure accuracy, conduct the speed check with a partially loaded (about half full) sprayer and select the engine throttle setting and gear that will be used when spraying. Repeat the above process and average the times that were measured. Use the following equation or the table at right to determine ground speed.

$$\text{Speed (MPH)} = \frac{\text{Distance (FT)} \times 60}{\text{Time (seconds)} \times 88}$$

Speeds

SPEED IN MPH	TIME REQUIRED IN SECONDS TO TRAVEL A DISTANCE OF:		
	100 Feet	200 Feet	300 Feet
1.0	68	136	205
1.5	45	91	136
2.0	34	68	102
2.5	27	55	82
3.0	23	45	68
3.5	19	39	58
4.0	17	34	51
4.5	15	30	45
5.0	14	27	41
5.5	—	25	37
6.0	—	23	34
6.5	—	21	31
7.0	—	19	29
7.5	—	18	27
8.0	—	17	26
8.5	—	16	24
9.0	—	15	23

30"	
OTHER SPACING (INCHES)	CONVERSION FACTOR
26	1.15
28	1.07
32	.94
34	.88
36	.83
38	.79
40	.75
42	.71
44	.68

40"	
OTHER SPACING (INCHES)	CONVERSION FACTOR
28	1.43
30	1.33
32	1.25
34	1.18
36	1.11
38	1.05
42	.95
44	.91
48	.83

Miscellaneous Conversion Factors

One Acre = 43,560 Square Feet
= 43.56 1000FT² Blocks
= 0.405 Hectare

One Hectare = 2.471 Acres

One Gallon Per Acre

= 2.9 Fluid Ounces per 1000FT²
= 9.35 Liters Per Hectare

One Gallon Per 1000FT² = 43.56 GPA

One Mile = 5,280 Feet
= 1,610 Meters
= 1.61 Kilometers

One Gallon = 128 Fluid Ounces
= 8 Pints
= 4 Quarts
= 3.79 Liters
= 0.83 Imperial Gallon

One Pound Per Square Inch

= 0.069 bar
= 6.896 Kilopascals

One Mile Per Hour = 1.609 Kilometers Per Hour

Suggested Minimum Spray Heights

The nozzle height suggestions in the table below are based on the minimum overlap required to obtain uniform distribution. However, in many cases, typical height adjustments are based on a 1 to 1 nozzle spacing to height ratio. For example, 110° flat spray tips spaced 20 inches apart are commonly set 20 inches above the target.

		(Inches)		
		20"	30"	40"
TP, TJ	65°	22–24"	33–35"	NR*
TP, XR, TX, DG, TJ, AI, XRC	80°	17–19"	26–28"	NR*
TP, XR, DG, TT, TTJ, DGTJ, AI, AIXR, AIC, XRC, TTJ, AITTJ	110°	16–18"	20–22"	NR*
FullJet®	120°	10–18"***	14–18"***	14–18"***
FloodJet® TK, TF, K, QCK, QCTF, 1/4TTJ	120°	14–16"***	15–17"***	18–20"***

* Not recommended.

** Nozzle height based on 30° to 45° angle of orientation.

*** Wide angle spray tip height is influenced by nozzle orientation. The critical factor is to achieve a double spray pattern overlap.

Technical Information

Spraying Liquids with a Density Other Than Water

Since all the tabulations in this catalog are based on spraying water, which weighs 8.34 lbs. per USA gallon, conversion factors must be used when spraying liquids that are heavier or lighter than water. To determine the proper size nozzle for the liquid to be sprayed, first multiply the desired GPM or GPA of liquid by the water rate conversion factor. Then use the new converted GPM or GPA rate to select the proper size nozzle.

Example:

Desired application rate is 20 GPA of 28%N. Determine the correct nozzle size as follows:

GPA (liquid other than water) x
Conversion Factor
= GPA (from table in catalog)

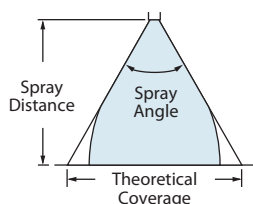
20 GPA (28%) x 1.13
= 22.6 GPA (water)

The applicator should choose a nozzle size that will supply 22.6 GPA of water at the desired pressure.

WEIGHT OF SOLUTION	SPECIFIC GRAVITY	CONVERSION FACTOR
7.0 lbs./gal.	.84	.92
8.0 lbs./gal.	.96	.98
8.34 lbs./gal.	1.00 – WATER	1.00
9.0 lbs./gal.	1.08	1.04
10.0 lbs./gal.	1.20	1.10
10.65 lbs./gal.	1.28 – 28% nitrogen	1.13
11.0 lbs./gal.	1.32	1.15
12.0 lbs./gal.	1.44	1.20
14.0 lbs./gal.	1.68	1.30

Spray Coverage Information

This table lists the theoretical coverage of spray patterns as calculated from the included spray angle of the spray and the distance from the nozzle orifice. These values are based on the assumption that the spray angle remains the same throughout the entire spray distance. In actual practice, the tabulated spray angle does not hold for long spray distances.

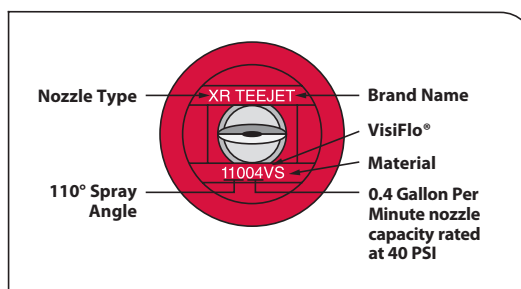


INCLUDED SPRAY ANGLE	THEORETICAL COVERAGE AT VARIOUS SPRAY HEIGHTS (IN INCHES)							
	8"	10"	12"	15"	18"	24"	30"	36"
15°	2.1	2.6	3.2	3.9	4.7	6.3	7.9	9.5
20°	2.8	3.5	4.2	5.3	6.4	8.5	10.6	12.7
25°	3.5	4.4	5.3	6.6	8.0	10.6	13.3	15.9
30°	4.3	5.4	6.4	8.1	9.7	12.8	16.1	19.3
35°	5.0	6.3	7.6	9.5	11.3	15.5	18.9	22.7
40°	5.8	7.3	8.7	10.9	13.1	17.5	21.8	26.2
45°	6.6	8.3	9.9	12.4	14.9	19.9	24.8	29.8
50°	7.5	9.3	11.2	14.0	16.8	22.4	28.0	33.6
55°	8.3	10.3	12.5	15.6	18.7	25.0	31.2	37.5
60°	9.2	11.5	13.8	17.3	20.6	27.7	34.6	41.6
65°	10.2	12.7	15.3	19.2	22.9	30.5	38.2	45.8
73°	11.8	14.8	17.8	22.0	27.0	36.0	44.0	53.0
80°	13.4	16.8	20.2	25.2	30.3	40.3	50.4	60.4
85°	14.7	18.3	22.0	27.5	33.0	44.0	55.4	66.4
90°	16.0	20.0	24.0	30.0	36.0	48.0	60.0	72.0
95°	17.5	21.8	26.2	32.8	40.3	52.4	65.5	78.6
100°	19.1	23.8	28.6	35.8	43.0	57.2	71.6	85.9
110°	22.8	28.5	34.3	42.8	51.4	68.5	85.6	103
120°	27.7	34.6	41.6	52.0	62.4	83.2	104	
130°	34.3	42.9	51.5	64.4	77.3	103		
140°	43.8	54.8	65.7	82.2	98.6			
150°	59.6	74.5	89.5					

Nozzle Nomenclature

There are many types of nozzles available, with each providing different flow rates, spray angles, droplet sizes and patterns. Some of these spray tip characteristics are indicated by the tip number.

Remember, when replacing tips, be sure to purchase the same tip number, thereby ensuring your sprayer remains properly calibrated.



Information About Spray Pressure

Flow Rate

Nozzle flow rate varies with spraying pressure. In general, the relationship between GPM and pressure is as follows:

$$\frac{GPM_1}{GPM_2} = \frac{\sqrt{PSI_1}}{\sqrt{PSI_2}}$$

This equation is explained by the illustration to the right. Simply stated, in order to double the flow through a nozzle, the pressure must be increased four times.

Higher pressure not only increases the flow rate through a nozzle, but it also influences the droplet size and the rate of orifice wear. As pressure is increased, the droplet size decreases and the rate of orifice wear increases.

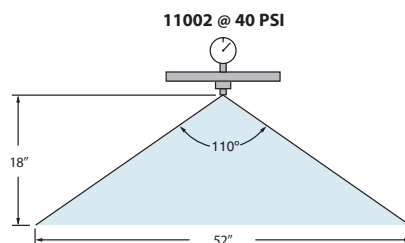
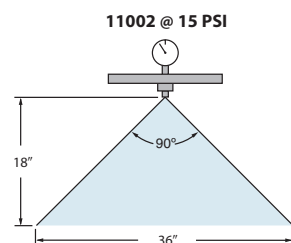
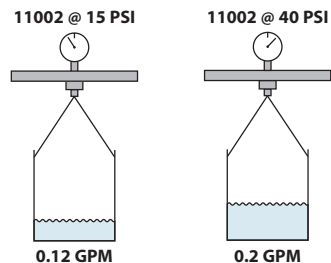
The values given in the tabulation sections of this catalog indicate the most commonly used pressure ranges for the associated spray tips. When information on the performance of spray tips outside of the pressure range given in this catalog is required, contact TeeJet Technologies or your local rep.

Spray Angle and Coverage

Depending on the nozzle type and size, the operating pressure can have a significant effect on spray angle and quality of spray distribution. As shown here for an 11002 flat spray tip, lowering the pressure results in a smaller spray angle and a significant reduction in spray coverage.

Tabulations for spray tips in this catalog are based on spraying water. Generally, liquids more viscous than water produce relatively smaller spray angles, while liquids with surface tensions lower than water will produce wider spray angles. In situations where the uniformity of spray distribution is important, be careful to operate your spray tips within the proper pressure range.

Note: Suggested minimum spray heights for broadcast spraying are based upon nozzles spraying water at the rated spray angle.



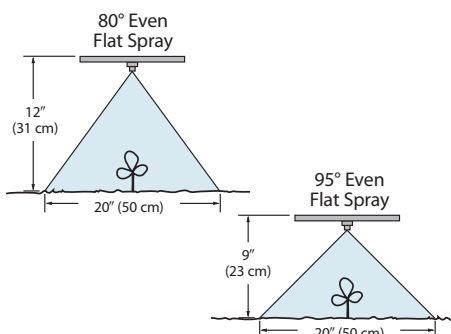
Pressure Drop Through Various Hose Sizes

FLOW IN GPM	PRESSURE DROP IN PSI (10' [3 m] LENGTH WITHOUT COUPLINGS)				
	1/4" I.D.	3/8" I.D.	1/2" I.D.	3/4" I.D.	1" I.D.
0.5	1.4	.2			
1.0		.7			
1.5		1.4	.4		
2.0		2.4	.6		
2.5		3.4	.9		
3.0			1.2		
4.0			2.0		
5.0			2.9	.4	
6.0			4.0	.6	
8.0				.9	.3
10.0				1.4	.4

Helpful Reminders for Band Spraying

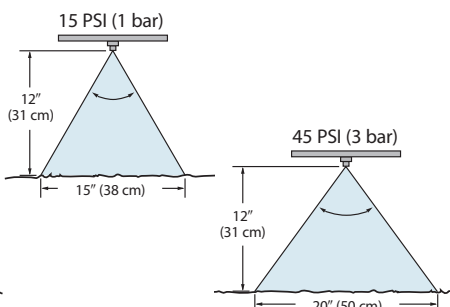
Wider angle spray tips allow the spray height to be lowered to minimize drift.

Example:



The spray angle of the nozzle and the resulting band width are directly influenced by the spraying pressure.

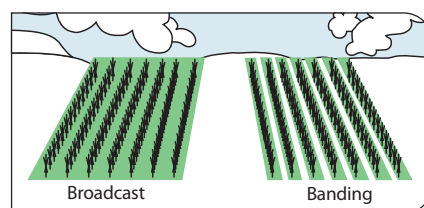
Example: 8002E Even Flat Spray



Use care when calculating:
Field Acres/Hectares vs. Treated Acres/Hectares

Field Acres/Hectares = Total Acres/Hectares
of Planted Cropland

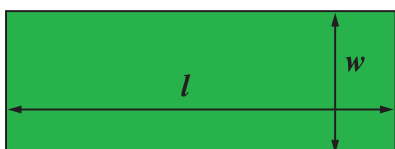
Treated Acres/Hectares =
Field Acres/Hectares X Band Width
Row Spacing



Area Measurement

It is essential to know the amount of area that you intend to cover when applying a pesticide or fertilizer. Turf areas such as home lawns and golf course greens, tees and fairways should be measured in square feet or acres, depending upon the units needed.

Rectangular Areas



Area = Length (l) x Width (w)

Example:

What is the area of a lawn that is 300 feet long and 150 feet wide?

$$\begin{aligned}\text{Area} &= 300 \text{ feet} \times 150 \text{ feet} \\ &= 45,000 \text{ square feet}\end{aligned}$$

By using the following equation, it is possible to determine the area in acres.

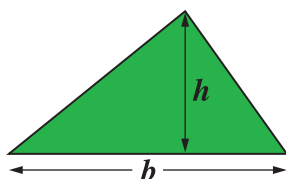
$$\text{Area in acres} = \frac{\text{Area in square feet}}{43,560 \text{ sq. ft. per acre}}$$

(There are 43,560 square feet in an acre.)

Example:

$$\begin{aligned}\text{Area in acres} &= \frac{45,000 \text{ sq. ft.}}{43,560 \text{ sq. ft. per acre}} \\ &= 1.03 \text{ acres}\end{aligned}$$

Triangular Areas



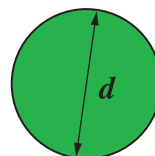
$$\text{Area} = \frac{\text{Base } (b) \times \text{Height } (h)}{2}$$

Example:

The base of a corner lot is 250 feet while the height is 50 feet. What is the area of the lot?

$$\begin{aligned}\text{Area} &= \frac{250 \text{ feet} \times 50 \text{ feet}}{2} \\ &= 6,250 \text{ square feet} \\ \text{Area in acres} &= \frac{6,250 \text{ square feet}}{43,560 \text{ sq. ft. per acre}} \\ &= 0.14 \text{ acre}\end{aligned}$$

Circular Areas



$$\text{Area} = \frac{\pi \times \text{Diameter}^2 (d)}{4}$$

$$\pi = 3.14159$$

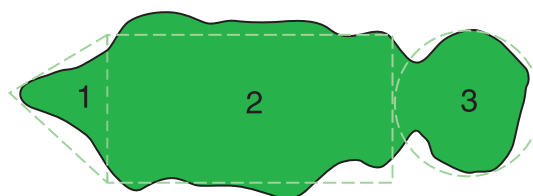
Example:

What is the area of a green that has a diameter of 45 feet?

$$\begin{aligned}\text{Area} &= \frac{\pi \times (45 \text{ feet})^2}{4} = \frac{3.14 \times 2025}{4} \\ &= 1,590 \text{ square feet}\end{aligned}$$

$$\begin{aligned}\text{Area in acres} &= \frac{1,590 \text{ square feet}}{43,560 \text{ sq. ft. per acre}} \\ &= 0.04 \text{ acre}\end{aligned}$$

Irregular Areas



Any irregularly shaped turf area can usually be reduced to one or more geometric figures. The area of each figure is calculated and the areas are then added together to obtain the total area.

Example:

What is the total area of the Par-3 hole illustrated above?

The area can be broken into a triangle (area 1), a rectangle (area 2) and a circle (area 3). Then use the previously mentioned equations for determining areas to find the total area.

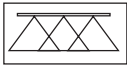
$$\text{Area 1} = \frac{25 \text{ feet} \times 30 \text{ feet}}{2} = 375 \text{ square feet}$$

$$\text{Area 2} = 25 \text{ feet} \times 475 \text{ feet} = 11,875 \text{ square feet}$$

$$\text{Area 3} = \frac{3.14 \times (45 \text{ feet})^2}{4} = 1,590 \text{ square feet}$$

$$\begin{aligned}\text{Total Area} &= 375 + 11,875 + 1,590 = 13,840 \text{ square feet} \\ &= \frac{13,840 \text{ square feet}}{43,560 \text{ sq. ft. per acre}} = 0.32 \text{ acre}\end{aligned}$$

Sprayer Calibration



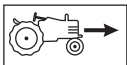
Broadcast Application

Sprayer calibration (1) **readies your sprayer for operation** and (2) **diagnoses tip wear**. This will give you optimum performance of your TeeJet® tips.

Equipment Needed:

- TeeJet Calibration Container
- Calculator
- TeeJet Cleaning Brush
- One new TeeJet Spray Tip matched to the nozzles on your sprayer
- Stopwatch or wristwatch with second hand

STEP NUMBER 1



Check Your Tractor/Sprayer Speed!

Knowing your real sprayer speed is an essential part of accurate spraying. Speedometer readings and some electronic measurement devices can be inaccurate because of wheel slippage. Check the time required to move over a 100- or 200-foot strip on your field. Fence posts can serve as permanent markers. The starting post should be far enough away to permit your tractor/sprayer to reach desired spraying speed. Hold that speed as you travel between the “start” and “end” markers. Most accurate measurement will be obtained with the spray tank half full. Refer to the table on page 140 to calculate your real speed. When the correct throttle and gear settings are identified, mark your tachometer or speedometer to help you control this **vital** part of accurate chemical application.

STEP NUMBER 2

$$A = \frac{B+C}{D}$$

The Inputs

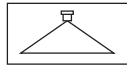
Before spraying, record the following:

Nozzle type on your sprayer.....	TT11004 Flat
(All nozzles must be identical)	Spray Tip
Recommended application volume20 GPA
(From manufacturer’s label)	
Measured sprayer speed6 MPH
Nozzle spacing	20 Inches

EXAMPLE



STEP NUMBER 3



Calculating Required Nozzle Output

Determine GPM nozzle output from formula.

$$\text{FORMULA: GPM} = \frac{\text{GPA} \times \text{MPH} \times \text{W}}{5,940 \text{ (constant)}}$$

$$\text{EXAMPLE: GPM} = \frac{20 \times 6 \times 20}{5,940} = \frac{2,400}{5,940}$$

ANSWER: 0.404 GPM

STEP NUMBER 4



Setting the Correct Pressure

Turn on your sprayer and check for leaks or blockage. Inspect and clean, if necessary, all tips and strainers with TeeJet brush. Replace one tip and strainer **with an identical new tip and strainer** on sprayer boom.

Check appropriate tip selection table and determine the pressure required to deliver the nozzle output calculated from the formula in Step 3 for your new tip. Since all of the tabulations are based on spraying water, conversion factors must be used when spraying solutions that are heavier or lighter than water (see page 141).

Example: (Using above inputs) refer to TeeJet table on page 7 for TT11004 flat spray tip. The table shows that this nozzle delivers 0.40 GPM at 40 PSI.

Turn on your sprayer and adjust pressure. **Collect and measure the volume of the spray from the new tip for one minute in the collection jar.** Fine tune the pressure until you collect .40 GPM.

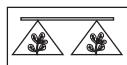
You have now adjusted your sprayer to the proper pressure. It will properly deliver the application rate specified by the chemical manufacturer at your measured sprayer speed.

STEP NUMBER 5



Checking Your System

Problem Diagnosis: Now, check the flow rate of a few tips on each boom section. If the flow rate of any tip is 10 percent greater or less than that of the newly installed spray tip, recheck the output of that tip. If only one tip is faulty, replace with new tip and strainer and your system is ready for spraying. However, if a second tip is defective, **replace all tips on the entire boom**. This may sound unrealistic, but two worn tips on a boom are ample indication of tip wear problems. Replacing only a couple of worn tips invites potentially serious application problems.



Banding and Directed Applications

The only difference between the above procedure and calibrating for banding or directed applications is the input value used for “W” in the formula in Step 3.

For single nozzle banding or boomless applications:

W = Sprayed band width or swath width (in inches).

For multiple nozzle directed applications:

W = Row spacing (in inches) divided by the number of nozzles per row.



BARENBRUG USA INTRODUCES NEW SEED BERMUDAGRASS: MONACO

Exclusively from Barenbrug, Monaco seeded bermudagrass is continuing the legacy founded by Riviera. The newest release from the Johnston Seed breeding program, Monaco, Cynodon dactylon var. dactylon, is a synthetic variety produced by the intercrossing of five clonal parent lines. All seed is Syn-1 generation, which results in superior genetic integrity and seed quality year in and year out. Joey Meibergen from Johnston Seed said, "On behalf of Johnston Seed Company I would like to thank our research and production team. It has taken JSC 12 years to develop this release. I am very proud of what our team has developed and know the blood sweat and tears it takes to be a leader in the development and production of warm season grasses."

Monaco has excellent density and wear tolerance that are staples in Barenbrug's product line. Bred for a genetically darker green color, it also has quicker spring green-up, high fall color retention, and winter hardiness to help further extend the growing season for transition-zone areas. In the 2016 NTEP trials, Monaco was a proven performer. Rating high in several categories, Monaco specifically stood out in trials encompassing overall turfgrass quality, early spring green-up, and fall color. Included in over 10 trial sites from coast to coast and from the transition zone to the Deep South, Monaco exhibits superior adaptability. This range of implementation makes it the perfect choice for traditional bermudagrass regions and transition climates alike. Dr. Charles Taliaferro said, "Monaco bermudagrass has performed well in turf evaluation trials conducted over a range of environments. It's demonstrated performance makes it a good choice for a wide range of applications in the turfgrass industry."

Employing Barenbrug's exclusive Yellow Jacket coating process, Monaco seed holds moisture for a more uniform, successful

germ. Yellow Jacket is like having a sponge around each and every seed. Once water is applied, the coating holds that moisture and other nutrients around the seed, making them available as needed for germination and establishment. Without coating, the water simply passes the seed allowing it to dry out, resulting in more frequent watering and increased expense.



OUTCROSS MACHINE REALLY IS NEW

Toro introduces the all-new Outcross 9060 machine that delivers on the benefits of both a tractor and a super-duty utility vehicle. In contrast to many traditional compact tractors, the Outcross 9060 is turf-friendly, thanks to a weight-balanced chassis and four-wheel steering, coupled with full-time four-wheel drive. All four wheels turn individually at a rate determined by the machine's ground speed and turning angle, ultimately minimizing the possibility of turf damage. Managers can pre-program attachment parameters, reducing the possibility of operator error. The Outcross incorporates a standard three-point hitch with PTO, drawbar and universal loader mounting plate, enabling the machine to accommodate a variety of standard turf maintenance attachments. This includes, but is not limited to, loader buckets, forks, pull-behind rotary mowers, fertilizer spreaders and aerators, as well as seasonal attachments for snow and ice maintenance. Additionally, the controls of the new Outcross 9060 are simple and intuitive, allowing operators of all skill levels and experience to expertly accomplish a variety of tasks.

The Outcross also features a passenger seat and roomy operator station for easily transporting people, as well as an optional

cargo bed with a 4,500-lb., 1.3 cubic yard capacity for hauling tools and materials. The machine is capable of towing up to 16,000 lbs. and is powered by a 59.8-hp Yanmar liquid-cooled diesel engine.



NEW INFIELD TOPDRESSING FROM SURFACE

Turf SlideMaster is a premier infield topdressing that plays a crucial role in improving sliding surfaces on skinned infields, and water management especially in dry conditions. Researched, developed and tested in the lab and on the field, SlideMaster meets the demands of today's groundskeepers and coaches, making maintenance easier for field managers. SlideMaster is durable, long lasting, and offers the cleanest, most uniform particle screening of any vitrified clay or shale product. The all-natural reddish color blends well with Turface Pro League Heritage Red and Pro League Champion Brown calcined clays, and will not stain uniforms. SlideMaster particles are designed to allow water to quickly penetrate into the infield skin for deeper saturation, and can be combined with Turface calcined clay for optimum moisture management at the surface and in an infield mix.

NEW TARGET SPECIALTY PRODUCTS FERTILIZERS WITH SCOTTS TECHNOLOGY

Target Specialty Products has launched a complete line of professional turf fertilizers



under the brand names Turf Fuel G and TS Pro, both of which will leverage Scotts PRO technologies and exclusive co-branding. Turf Fuel G™ has been designed to address the most technically demanding needs of turf professionals, and the TS Pro line of products has been designed to deliver premium performance and consistent quality for a broad spectrum of turf demands. Each offer a steady, consistent release of nutrients designed and tested for turf to produce a quick color response that lasts over the specified longevity of the product. There are four families of technologies, each with different release longevities and release characteristics to meet the varied needs of the professional turf industry.



MULTI PRO 1750 WITH GEOLINK

Toro recently announced the introduction of the Multi Pro 1750 with GeoLink. The innovative GPS spraying solution is designed to maximize efficiency, deliver exceptional coverage, and minimize chemical costs by eliminating overspray. The Multi Pro 1750 is a 175-gallon dedicated turf vehicle sprayer designed to maneuver in smaller turf areas to improve productivity and spray accuracy. The Multi Pro 1750 features a completely redesigned polyethylene

elliptical tank with side agitation nozzles, which eliminates the shelves and corners on which chemicals tend to stick, and ensures proper mixing and agitation. It features an exclusive six-diaphragm pump, which provides the highest spray rates while simultaneously supplying a generous agitation flow. Together, these spray components create the Multi Pro spray system that sets the standard for chemical mixing and unmatched spray performance and accuracy.

SHOCKDRAIN 580

Since our launch in 2015, En-Plast Technology has strived to produce groundbreaking products. In the latter half of 2017, we rolled out ShockDrain 580, a drastically new and improved solution for impact attenuation and drainage in athletic fields. In tandem with ShockDrain 580's official launch, we felt it would be appropriate to refresh our brand. Each of the three dots in our new logo represent an integral part of our new company slogan: Robust. Reputable. Responsible. En-Plast Technology's products are all made with the highest quality materials available and prioritize functionality, performance, and longevity above all else. En-Plast Technology strives to offer our customers the finest experience when doing business with our veteran team. En-Plast Technology cares deeply about the planet and is committed to creating products that are both recyclable and environmentally friendly.

NEW KUBOTA RTV, THE SIDEKICK

Available at Kubota dealerships beginning spring of 2018, the new Sidekick features a quick and powerful 48-HP gasoline engine, with the speed to get there fast, up to 40 mph fast. Equipped with a Continuously Variable Transmission with Centrifugal Clutch (CVT Plus), the Sidekick's water-cooled engine provides plenty of torque for a quick and smooth takeoff. The Idle Speed Control (ISC) and highland correction ensure stable power for any situation. The Sidekick can carry up to 15.2 cubic feet or half a ton in a steel cargo box with optional electric hydraulic lift for fast dumping. Towing a



boat or trailer is possible with the Sidekick and standard trailer hitch as it provides 2,000 lbs. towing capacity on level terrain and 1,550 lbs. on inclines. From the new smart ergonomic digital panel, steering wheel and shift knob, to the bright LED headlights and a ton of convenience utility features, the Kubota Sidekick has everything. Available in Kubota dealerships in spring 2018, the Sidekick will be offered in four distinct colors – Kubota Orange, RealTree AP Camo, and additional new colors green and black.



TURFEX SKID-MOUNTED SPOT SPRAYERS

TurfEx offers a line of skid-mounted spot sprayers. Designed to mount into the bed of any utility vehicle or pickup, the spot sprayers are ideal for weed spraying, turf maintenance, and pest control applications. Two TurfEx spot sprayers are available with a 50-gallon tank and a 100-gallon tank. Both units feature fully corrosion-resistant polyethylene tank construction, 50-foot hoses on 100-foot capacity manual-rewind hose reels, and long spray wands with trigger actuation. Featuring 12-volt diaphragm pumps, the sprayers conveniently connect to the carrying vehicle's electrical system for operation. The pumps move liquid at a rate of 5 gallons per minute at 40 psi.



► FIELD

5/3 BANK STADIUM

KENNESAW STATE UNIVERSITY/PRECISION TURF LLC

► LOCATION

Kennesaw, GA

► **Category of Submission:** College Sporting Grounds
 ► **Sports Turf Manager:** Shane Hohlbein, CSFM
 ► **Title:** Sports Turf Manager
 ► **Education:** BS from The Ohio State University in Turfgrass Science
 ► **Experience:** I have had a wide array of experience in the sports turf industry. During my time at The Ohio State University I worked for Camargo Country Club and Golden Bear Golf Club participating in internships to further enhance my education. Following graduation I joined SMG/Jacksonville Jaguars for two seasons maintaining the stadium and 3 practice fields. I then moved back home with my wife to Cincinnati where I worked for Hamilton County/Cincinnati Bengals for a season maintaining the stadium, practice fields, and landscape areas. Wanting to gain more experience, and be well rounded, I found a job with The Motz Group in Cincinnati. Working for The Motz Group helped me learn the fields from the ground up. I got to work on several aspects of turf construction, as well as natural/synthetic field maintenance. After leaving The Motz Group I found myself back in the southeastern US working for Precision Turf LLC with whom I am still currently employed. I currently oversee our maintenance division in metro Atlanta maintaining over 70 acres of 419 Bermudagrass fields (overseeded with Perennial Ryegrass)

with 6 other employees and 1 summer intern. My crew and I also get the pleasure of installing and maintaining temporary soccer fields all over the country, which comes with a whole new set of challenges. These temporary surfaces are installed for international competition and friendly soccer matches at venues in the US that do not have natural grass surfaces.

► **Full-time staff:** Parker McGlone, Jared Kent and Austin Smith
 ► **Has your field been renovated* in the last 2 years?** In 2017 we stripped off the top 4 inches of the field to remove the 3" layer organic buildup from the previous 7 years. We then added 4 inches of fresh USGA sand at a grade of 1/4 percent. New irrigation heads were installed and leveled to grade. The field was then sodded with 3/4" Tifway 419 bermudagrass 16 days before the first event. We also added Acco drain around the entire perimeter of the field to catch all of the runoff from the stands.

With the use and abuse this field gets we have to be on a very, heavy quick release nitrogen program to be able to recover before each event. With that said we had built up a 3" organic layer since the field was built 7 years prior. We had a couple of instances with monsoon rains that we had some major drainage issues. With the field being so heavily used for major events the stadium and Precision Turf came to a decision that we had to pull the trigger

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

before it was too late. We couldn't afford to have the field flood again for a nationally televised event.

► **Original construction:** 2010

► **Turfgrass variety:** Tifway 419 bermudagrass overseeded with perennial ryegrass

► **Overseed:** We overseed with Pennington's Pro Select @ a rate of 10 lbs./1000 square feet. We use Landpride seeders to apply the seed at exact rates, taking wind out of the equation and giving us good seed to soil contact. We then drag the seed into the canopy using a carpet drag. We have found this to be a good recipe for success. We will probably put out a few more pounds right before Owl-O-Ween, so that it pops following the event. This will in return help us get the field back into shape for the remaining football games.

► **Rootzone:** 100% sand

► **Drainage:** USGA Profile

► **What challenges did you face this year that you did not in previous years?** Last December we hosted the Offense Defense Bowl week from December 29-31. This consisted of 3 days from dawn until dusk of football games on 5/3 Bank Stadium field. Needless to say the center of the field got beat up pretty good. With the stadium personnel not wanting to resod it was up to us to pull off a miracle. We aerified, overseeded, fertilized, installed growth covers and prayed for a miracle. We removed the covers every 7-10 days to mow and fertilize until we had to remove them for good on February 8, 2017 before the first lacrosse match. Luckily we escaped a disaster.

Once again with having the Atlanta Blaze MLL season run from Spring through Summer we were not given an opportunity to transition our rye. We decided to keep the rye through the summer months knowing that we were renovating the field after the last Atlanta Blaze game before soccer and football ramped up. We also made a last minute decision to overseed with a heat tolerant Kentucky bluegrass cultivar, which in the end ended up being a great decision. I truly think this helped us withstand the brutal Atlanta summer heat.

Now it is July 31, 2017 and the renovation process is just beginning. The goal is to take 3" of organics out of the field with an additional inch being taken out to get down to clean USGA sand. We then installed new irrigation heads and graded the field with a 1/4 slope. Following this we sodded the field with Tifway 419 bermudagrass cut at 3/4" thick. Now begins the real challenge. We have 16 days to get "The Bank" game ready. We knew we had our backs against the wall to begin with, but after the first week of having temps in the 90's during the day and 70's at night the temperatures plummeted into the 70's during the day and 50's at night. The first week we were pushing a 1/4" of roots per night. That halted quickly when the temperatures dropped. We had been topdressing (150 tons total), foliar applications and granular applications on a weekly basis, but we needed something more. With being a multi-use facility we decided our only choice was to overseed to have a chance of having a safe, playable field, and worry about the consequences later. This was our last resort, but one I think we had to take.





For the circumstances we were dealt with I look back and know that there was not one more thing we could have done to make the field play any better than it did for the first soccer match. I owe a lot to my crew for working endless hours to give our client the best product imaginable.

With lacrosse, we have found wear to be a much greater issue in the goal mouth area's than we find in any other sport we manage. Wear is so excessive that we have to resod the goal creases several times a year to keep the surface safe for our athletes. We aerify these high traffic, high wear areas as much as time allows. With the majority of the game happening in the crease areas this is where you get the most foot traffic and compaction. Seeding these areas a few days prior to each match, as well as applying a Potassium Silicate product to increase rigidity helps withstand the constant abuse.

Why STMA should consider your field a winner?

5/3 Bank Stadium continues to push the envelope with year-round, high profile events. From Kennesaw State University Men and Women's sporting events, to hosting Atlanta United, The United States' Men's National Rugby team, and Atlanta Blaze on nationally televised broadcasts. Day after day 5/3 Bank Stadium field is challenged to perform to a world class standard, regardless of the last event or weather conditions. This ruthless regiment pushes the living, natural grass surface and field management crew to its very limits.

Due to the recent flooding during the 2015 season, staff at KSU's Sports and Entertainment Park and Precision Turf LLC were forced to look into options to keep incidents that happened in the past from happening again, while continuing to play host and draw major sporting events that the people of north Georgia have been accustomed to throughout the years.

On top of hosting KSU football (6 games/6 walk-throughs), KSU football spring game, KSU women's soccer (11 games/22 walk-throughs), USA Rugby vs Country of Georgia (1 game/2

walk-throughs), Atlanta United vs Charleston Battery (1 game/2 walk-throughs), Owl-O-Ween (2 day event/7 days setup/teardown), cheerleading practice, band practice, KSU rap video, breast cancer walk, Alzheimer's ATL walk, AAA PAC Fundraiser, Offense-Defense Bowl Week, Atlanta Blaze (7 games), Kennesaw Women's Lacrosse (11 games/22 walk-throughs) we were searching for a window to complete the renovation of the playing surface. This consisted of stripping of the top 4 inches of grass and organics, hauling in new USGA sand, and grading to a .25% crown from the existing 0% grade, and resodding the surface, as well as installing goal posts sleeves for future rugby events. A good bit of work to force in between July 31 and September 1. Work was completed and we had a 16-day window from sodding until our first home soccer match. During the grow-in we were met with less than ideal growing temperatures for the bermudagrass. We decided to overseed with Ryegrass 10 days before the first football game on September 9 to increase stability within the playing surface, along with applying 150 tons of sand to weigh down the surface.

Completing this project with not missing so much as a single "walk-through," is the reason why Kennesaw's 5/3 Bank Stadium deserves to win the title of "STMA Sporting Grounds (Collegiate) Field of the Year!" A true testament dedicated to all the hands involved!

SportsTurf: *What channels of communication do you use to reach coaches, administrators and users of your facility? Any tips on communicating well?*

HOLBEIN: I believe face-to-face communication is a key component to developing a trusting relationship with the coaches, administrators and users of our facilities. This helps you develop a bond, and gives you an avenue to educate those individuals through your knowledge and experience. In return, this will illustrate the repercussions it could have on the integrity of the playing surface. I believe that if you start at the top by selling



yourself and your point of view this will lead to a “trickle down” effect where you can ingrain your knowledge from the top level administrators to the coaches to the players to the outside user groups. This will create a new culture and mindset of how these individuals approach drills, set-up, scheduling, etc. I think it is also a great idea to always email the individual to leave a digital footprint following an important conversation. This will give you evidence and backup your story should something go awry. The more individuals that you can educate on how to keep your surface in tiptop shape the easier it will be on you and your staff.

ST: What are your specific job responsibilities?

HOLBEIN: At Precision Turf, I oversee our maintenance division consisting of collegiate and high school athletic fields around the metro Atlanta area covering more than 70+ acres of 419 bermudagrass. Besides the typical everyday tasks of a sports turf manager, I am also writing contracts/proposals for all-inclusive turf packages down to single application jobs, scheduling various tasks for “TBDCITL” (The Best Damn Crew In The Land), budgeting, shopping out and ordering materials, equipment, parts, etc., communicating with our clients, scheduling preventative equipment maintenance, site visits, etc. Along with this I also oversee our synthetic turf maintenance division where we offer aerification, deep cleaning, disinfectant application, Gmax testing, and repairs. In addition I have become involved in our “Instant Play” sod installations around the country for international soccer matches. During these events we will lay a temporary field down for the match, put some TLC into the surface to get it as safe and aesthetically pleasing as we can, host the match, and then remove the surface immediately following the match. Overall, my plate is quite full, but I would not have it any other way. It constantly keeps me on my toes.

ST: What changes if any are you considering or implementing for the winning field in 2018?

HOLBEIN: In 2018, I would like to be a lot more aggressive on our

PGR program, as well as our thatch management. We are going to begin doing our PGR applications at lower label rates at a higher frequency. On the same note, we are going to try this approach with verticutting as well. We are going to do more frequent verticuttings, but be a little less aggressive. I believe this will tighten up the turf, reduce thatch, and push roots leading to an overall healthier and safer playing surface.

ST: How do you balance your family life with work demands?

HOLBEIN: Here at Precision Turf LLC we try to put our time in during the work week to get the job accomplished. In return, we can then spend the majority of our weekends off enjoying our families and friends. Obviously this isn't true all of the time, but for the most part this works out good for us. I think it's important to have a very understanding wife, and when you are at home to make the most out of every moment. Your kids only grow up once, so it is very important to be involved in their schooling and extra-curricular activities. If that means leaving early one day to catch a ballgame, and working late the next day then those are the sacrifices that you need to make. I also think it is important to bring your kids to work, so that they can see what you do on a daily basis, as well as learn a good work ethic.

ST: What advice would you give someone looking to start the journey into sports turf management or that was given you when starting out?

HOLBEIN: I would tell him/her to get in there and get their hands dirty. Go above and beyond every moment you're at work. If that means working extra hours or being a weekend warrior, always be the first one to volunteer. Ask lots of questions and be eager to learn. The more you can learn in the beginning the more it is going to pay off in the end. Even if you think, “Is anyone noticing the extra effort I'm putting in?” Believe me there is always someone paying attention. There are no free hand outs in our industry. If you want to climb the ladder you need to be willing to make the sacrifice day in and day out. **/ST/**

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THE IMPORTANCE OF PUBLIC RELATIONS

Did you know STMA works with a public relations firm? At its 2013 fall meeting, the STMA Board of Directors approved the hiring of Buffalo Agency. The goal was to highlight 2,600 members who manage sports fields worldwide, and the sports turf profession. While the individual storylines may have changed over the past 5 years, the mission remains the same: elevate the perception of sports turf professionals in the eyes of their employers.

WHY IS PR IMPORTANT?

Plain and simple, public relations is the professional maintenance of a favorable public image. Its cornerstone is the ability to compellingly communicate your story. Each theme needs to be unified in its messaging to different audiences and optimized for distribution across multiple communications channels.

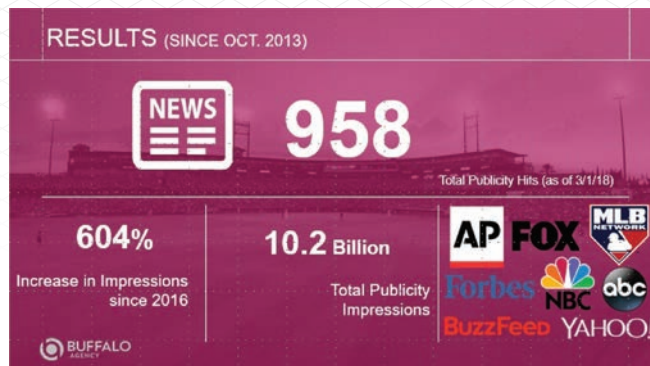
As “Directors of First Impressions,” you are the unsung heroes of any organization, ensuring a consistent, safe playing surface remains visually appealing. Cultural practices of your employers and aggressive scheduling to maximize facility use often prevent your voices from being heard. Effective communication tactics coupled with sound policy measures serve as the prescription to increase your recognition within your organization and turn your employers into your biggest advocates. Enter Buffalo.

GROWING THE BRAND

Over the past 5 years, Buffalo has collaborated closely with the STMA team in Lawrence, KS as well as individual members across the world to secure stories in both consumer and trade publications. From 2013 to February 2018, Buffalo has obtained more than 10.2 billion total media impressions with STMA appearing in 950-plus outlets. Non-endemic titles include: Associated Press, Forbes, NBC, SB Nation, Sports Illustrated, The Washington Post, USA Today and Yahoo! Sports. Each year, impressions have increased exponentially.

Through this collaboration, our aim is to gain awareness for sports turf managers in consumer outlets and educate their employers through trade publications on the complexity, technical knowledge and expertise needed to manage sports surfaces. By acquiring media attention for sports turf managers at all levels, Buffalo has increased recognition for STMA in business, sports and lifestyle outlets.

Seen in any successful team, each player has a specific role during a game. We’ve highlighted countless number of turf managers on specific storylines around events, anniversaries and so on. After an introductory discovery call, Buffalo takes grassroots initiatives and elevates the conversation nationally. Most recently, they helped promote several STMA members regarding our Environmental Certification, Bowman Field’s



renovation, and preparations for the Super Bowl, to name a few. Placements include Tony Leonard (Philadelphia Eagles), John Cogdill (Pleasant View Sports Complex), and Murray Cook (BrightView Sports Turf).

MEDIA CONSUMPTION AND MEMBER ENGAGEMENT

What used to be TV, newspapers and magazines is now a full band of digital communications vehicles with which all businesses (and individuals) need to concern themselves. Video is also increasing in influence; engagement in dynamic video content is, by many studies, 63% more likely to be consumed than content only in print.

As a profession, we’d encourage everyone to remain active throughout your social media platforms. This is an opportunity to expand your personal brand, foster connections with followers and provide personalized dialogue, stay current and relevant within the industry, and influence the younger generation that is less apt to consume traditional media.

In addition to placing STMA members “in the news,” Buffalo also manages STMA’s social media channels. Since January 2014, they’ve organically grown all STMA’s online communities across Twitter, Facebook, Instagram and LinkedIn.

@FieldExperts has reached members, influencers and strategic media networks. From pro sports leagues, teams, NCAA conferences

and schools, the messages used to move the needle with editorial outreach shifts nicely to the digital social platforms.

With a wide variety of activation tactics in social media, members are encouraged to join the conversation. From contests to #DayInTheLife Twitter takeovers to the always popular #TurfTips, the community will continue to grow only if STMA's constituents continue to engage.

Speaking with media and developing a presentation does not come easily to everyone. Some prefer to steer away from this completely. STMA is committed to helping each individual succeed.

A critical mass has generated substantial traditional media attention and social media engagement. To continue elevating the perception

of the sports turf manager industry, there's been a focus on internal professional development. Through education, awareness programs and industry development, STMA and Buffalo work collectively to provide relevant resources and networking opportunities to members, educating non-industry professionals on the importance of natural grass playing surfaces and increasing overall STMA membership numbers.

Buffalo is always interested in hearing from STMA members and encourages you to reach out if you have an interesting story, event or research project you would like to share. Be sure to connect with all @FieldExperts social media accounts and contact Tomás Silvani, TSilvani@Buffalo.Agency to share any exciting news.

Playing Conditions Index updated

Use it to prove fields are safe

STMA developed the Playing Conditions Index (PCI) to help members assess the playability of their fields. The original tool was developed in 2008 to help sports turf managers gain more respect for their efforts in managing fields. Dr. Brad Fresenburg has updated the tool to further address the complexities involved in conditioning sports fields for safety, playability, and fan enjoyment (see page 16 for more).

STMA is using the updated PCI to conduct a Field Performance Study to investigate if it is possible to determine when a field becomes unsafe for athletes. The greatest need for this information is for field managers at high schools and at municipalities in parks and rec departments. Each year, approximately 715,000 sports and recreation injuries occur in school settings alone. The updated PCI tool seeks to provide information about where the sports turf managers' field(s) are in the spectrum from safe to unsafe. Once that information is known, maintenance and cultural practices can be employed to provide a safer playing surface. The results of this study may assist in reducing injuries by identifying unsafe surfaces, lowering risk and liability to employers and field owners, determining budget needs, improving the visibility and authority of the sports field manager, and driving innovation in the industry.

The PCI is now available in a digital format for both natural grass fields and synthetic turf fields. It is a protected Excel spreadsheet and users can only enter information in the cells that allow entry. The spreadsheet can be saved under different file names by the field manager to maintain records for each field. Not only does the spreadsheet automatically generate a PCI for the field being tested, but it also provides immediate feedback to sports turf managers about areas of the field that need attention if unsafe conditions are present. The digital format allows the spreadsheet to be used as many times as needed to maintain records for all fields.

The Natural Grass PCI collects information pertaining to the entire facility, staff and the field itself. Cultural practices, turfgrass type and uniformity, rootzone composition, and pest issues are all considered. Additionally, a section is dedicated to baseball and softball fields to record infield information. Collection of data on turfgrass cover, field hardness, compaction and volumetric soil moisture requires additional tools.

To enter data on percent turfgrass cover, the free Canopeo app can be downloaded. To enter data on field hardness, compaction, and volumetric soil moisture, a Clegg Impact Hammer, soil moisture sensor, and dial penetrometer are necessary. Data entered for hardness, compaction, and soil moisture immediately produces a reading that indicates if the field is safe and ready for play, or if it needs attention before athletes are allowed access. After entering field and facility data, the tool automatically generates a PCI to indicate if the field is excellent, above average, average, below average, or unplayable.

The Synthetic Turf PCI collects similar information as the Natural Grass PCI regarding facility information. Field information focuses on field use, base composition, drainage and cultural practices. Infill depth and field hardness are also collected and automatically generate a reading to determine if the field is safe, or if adjustments need to be made before athletes may use it. Values for field hardness are calculated based on the testing method. The Synthetic PCI also takes temperature into account and makes a recommendation if temperatures are safe or dangerously high. Baseball and softball fields are also included in the synthetic version. As with the Natural Grass PCI, the synthetic tool automatically generates a PCI to rate the field as excellent, above average, average, below average, or unplayable.

Over the course of time, STMA hopes to develop a database that will help bring us closer to making informed decisions about when fields become unsafe by identifying trends with field usage. Once you collect field data using the spreadsheet, please send the results to kalthouse@stma.org. The spreadsheet can be used as many times as necessary and may act as a recordkeeping tool for your fields. Please send your results any time you enter data to help us further the mission of keeping fields safe and playable for our athletes.

Each member may find the PCI useful in different ways. We encourage you to use it to your benefit in the way that makes the most sense for your situation. We believe that the PCI will help your employer, athletes, coaches, and fans understand the skills and knowledge needed to provide high quality playing surfaces.

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:
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JOHN DEERE

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it adds nutrients. However, it's important to keep an eye on infiltration rates, since composts retain water.

The most common approach to improving compacted soils is to use soil cultivation equipment that punches a hole in the soil or removes a soil core. To reduce bulk density, the soil must either occupy the same volume with less material (eg hollow core), or occupy a great volume caused by soil heave (eg verti-drain). The goal is to punch holes in the soil, which will in turn add oxygen to the rootzone, release toxic gases, help rapid drying, increase water penetration and help root and shoot growth. The holes can also be used to increase seed to soil contact during spring seedings.

Choose equipment that is efficient (aim for at least 12-15 holes/sq. ft., ideally more like 40-50), does not cause too much surface disruption if fields are in use, and helps to reduce bulk density (i.e., pulls a core or creates soil cracks & fissures). Equipment with pencil tines or spikes is good at removing surface water quickly and could be a game-saver. A hand fork works just as well in small areas!

One thing I always see in common with STMA's Field of the Year winners is they all have a strong soil cultivation program. Some may be carrying out 6-8 cultivations a season and some are doing it every couple of weeks, maybe even every week in the spring and fall. Timing ultimately depends on the playing season and field use, but the general rule of thumb is to aerate as often as you see fit, keeping in mind that a field typically takes 2-3 weeks to recover, particularly in cold weather when the grass isn't growing very well. Also, avoid soil cultivation during the hottest part of the year, especially on non-irrigated fields. Since cool-season grasses lose ~ 50% of their root mass in summer, the last thing we should do is dry the roots out further.

Soil cultivation is one of the most important practices to aid water and air movement into and through the rootzone. If the goal is to reduce compaction, use equipment that removes or displaces soil and consider starting a soil modification program by renovation or topdressing. One last thing: don't ever roll the field too much. It might make a field flat, but it causes surface soil compaction and bigger headaches down the road. **/ST/**



Q&A with PAMELA SHERRATT

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Soil compaction and aeration

Q: How do I know if my soil field is compacted, and can you recommend a spring soil cultivation/aeration program?

A: In spring, precipitation amounts are generally greater than evapotranspiration rates, which can ultimately result in saturated soils. If a field is saturated, there's a good chance it will get seriously damaged during a game. This is because native soil fields contain silt and clay that are considered "cohesive" soils that stick together when wet but are very hard when dry. This cohesive behavior means they are prone to compaction. Soils with considerable amount of silt and clay are more prone to soil compaction than soils with a more granular (sandy) texture.

Diagnosing and monitoring levels of soil compaction can be done in a number of ways, but I will focus on two: indicators and field testing. If you suspect that soil compaction levels are high, look for indicator weeds or other problems. If certain weeds, like *Poa annua*, prostrate knotweed, prostrate spurge, goosegrass and broadleaf plantain are present in large numbers, the soil is compacted.

A common problem associated with soil compaction is that the surface has poor drainage qualities, so a saturated soil surface may also become infested with algae, which forms a black slimy mass when wet and a hard, impenetrable crust when dry.

Another way to measure compaction is to measure surface hardness in high traffic areas, either by hand (soil probe or penetrometer)

or by Clegg Impact Hammer (Gmax) or by sending a soil sample away for a bulk density analysis. Keep in mind that any kind of hardness testing must be done in conjunction with soil moisture testing, since percent volumetric moisture affects how hard or soft the surface is (wet soils are much softer than dry soils). This data can help to monitor improvements in soil compaction over time.

Most recently, there has been research and testing protocols developed to use devices that test field quality properties, like hardness, and to incorporate GPS and Bluetooth technology so that the data can be collected and send to a computer or phone/tablet. That data is then used to create a "Map" of the field, highlighting areas of greatest compaction. While most sports facilities probably don't have the budget or trained staff to create these maps using Geographic Information Systems (GIS), there are sports turf consultants that can do it.

There are two approaches to relieving soil compaction: soil modification and soil cultivation. The first is to modify the soil with sand or compost to reduce bulk density and improve soil macroporosity. If sand is used as a topdressing or in a renovation, the sand component of the rootzone must be at least 75% by weight, to ensure that at least 15% of the air pores are large enough for root growth, and rapid air and water movement. This will also make sure that infiltration rates are at least 2 inches per hour. If a compost is used to decrease bulk density, it is also beneficial in that

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Signs of soil compaction; each of these problems is a clear indicator that soil compaction is an issue and that turf-grasses cannot compete.



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