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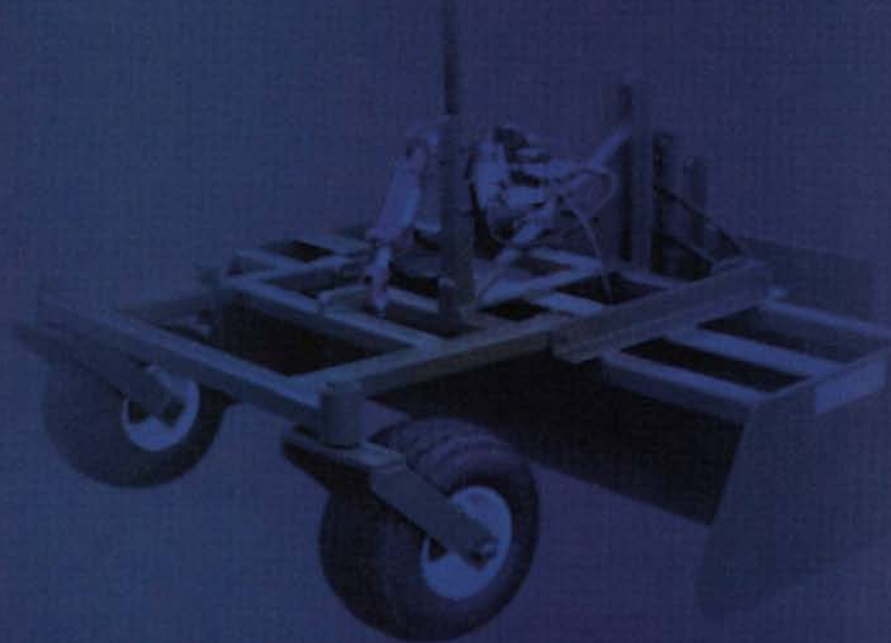


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communicate an average demand back to a series of control valves, which modulate the flow of warm water in response.

The objective is to keep the root system at a consistently comfortable 65 degrees F, says Bennett. "The field is warm and moist enough that it can actually grow grass in December or even January," he says. "The freezing point for the glycol mixture is minus-25 degrees, so the system can be filled with fluid year-round, without the hassle and expense of draining and re-filling it prior to each season."

But what happens if any of the underground sensors ever need to be repaired? All eight are on a GPS (Global Positioning System), according to Bennett, enabling service personnel to pinpoint the positions of the underground boxes to within 18 inches. "We also provide a complete photo log of the boxes' installation, which should also help in locating them," he says.

Sports Construction Group, the Cleveland-based contractor responsible for building the playing surface at Toyota Park, began the installation process in early November 2005 by laying a four-inch foundation made of pea gravel. The earth-moving machinery used here was equipped with a laser to guide the grading process, so that the finished surface was flat. In the aftermath of this careful grading, Althoff's 10-man installation crew was not permitted to step onto the gravel while installing the PEX loops.

Bennett and company faced a similar dilemma at Soldier Field in 2003. Their solution then and, again, at Toyota Park was a motorized carrier built from a child's snow sled that could run unattended the length of the field. The Althoff crew fit the sled with a sheet-metal spool and tethered the sled to motorized pulleys behind each end zone. The Wirsbo hePEX plus tubing was looped around the spool: one end was held at the copper manifold, the other to a reel holding the rest of the 850-foot hePEX plus coil. The sled ran atop numerous 4 x 6-foot Masonite sheets that were laid end to end across the field. As it moved from end zone to end zone, the sled pulled the tubing over a series of plastic tracking rails positioned at intervals. Installers followed the sled down the field, walking on the same plywood planks to avoid dimpling the pea gravel, and snapping the hePEX plus into place on the rails with their shoes.

New rail system

The rail system is a major upgrade over an older method of securing the tubing to the field. The latter involves hand-tying the PEX to a wire grid covering the pea-gravel surface. That process is not only more time-consuming, but also requires more bending and crouching by the installer.



To prevent dimpling of surface with shoe prints, Althoff mechanics stood on sheets of Masonite while working on the field surface.

"I don't care how good a shape the installers are in," says Bennett. "With the hand-tying approach, they could have back problems before too long. We have quality people on our team, and if we lose one of them to injury, it may take us awhile to find an equally qualified replacement. With the railing system, we move more quickly with no bending, so no one gets hurt."

Bennett reports that the Toyota Park installation ultimately went as smoothly as Althoff's previous work at Soldier Field, due in part to having the same field team led by John Lavin and Jay Althoff. The entire tubing system was firmly in place after only 5 days. "Speed, getting the tubing down quickly and properly, is a premium value on a job like this," says Bennett. "Because of rains in October, our startup was delayed by a week and a half. Once we finally had an opening in the weather, we had to get the job done before it turned bad again and we found ourselves working in a mud hole."

Only two days after the Althoff crew finished, the PEX tubing was buried in 10 inches of rootzone medium [a mixture of USGA sand and peat moss] and 1-5/8 inches of premium Kentucky bluegrass sod.

The spectacle of 10 grown men chasing a kid's sled up and down a soccer field, as it spins a web of plastic tubing from end to end, is bound to attract attention. "All the other trades have a tendency to stop and watch us," says Bennett, "and that's really kinda cool. At Althoff, we get involved in sorts of construction projects, but a job like this one or the one at Soldier Field gives our guys a little break from the norm, and they get excited about that."

This article was supplied by LNC Communications LLC, Frankfort, IL, www.LNCCommunications.com. ■

Here in Pasadena California, the turf in the Rose Bowl needs to look its best 365 days a year. Not only is this arena used for football, soccer and concerts, it is occupied almost every week filming TV commercials and motion pictures. Because of this intense schedule and amount of compaction, I chose the Verti-Drain 7521. Within eight hours, I can have the Rose Bowl's 3-acre field aerified using 12-inch hollow tines. I use the Verti-Drain 7521 every six weeks and the only maintenance has been greasing and changing the tines. After five years of service, I have spent \$0 on parts. The Verti-Drain 7521 is one well built machine.

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Injury Surveillance System to include field conditions

By J.T. Brosnan, R. Dick, & A.S. McNitt

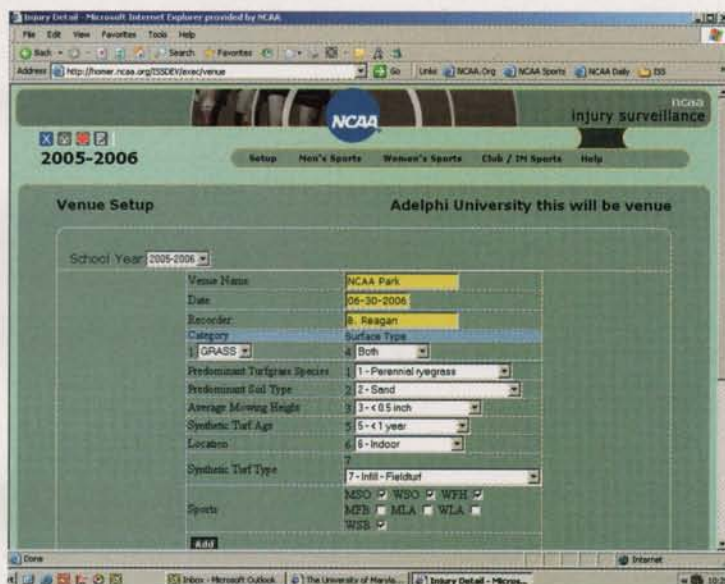
Beginning this fall, collegiate sports turf managers and athletic trainers will collaborate to track and ultimately reduce player injuries using the new web-based NCAA Injury Surveillance System (ISS). Athletic trainers will now be collecting additional information about playing surfaces that will be coupled with athletic injury data to create a national database listing the types of injuries occurring on various surfaces.

Athletic trainers and the NCAA have collaborated for 25 years through the NCAA ISS to create the largest ongoing collegiate sports injury database in the world. The primary goal of the ISS is to collect injury and exposure data from a representative sample of NCAA institutions in a variety of sports.

The data is used to assist NCAA sports rules committees to make decisions on rules and policy. The information also has been used for policy decisions outside of collegiate athletics that benefits the larger sports medicine community.

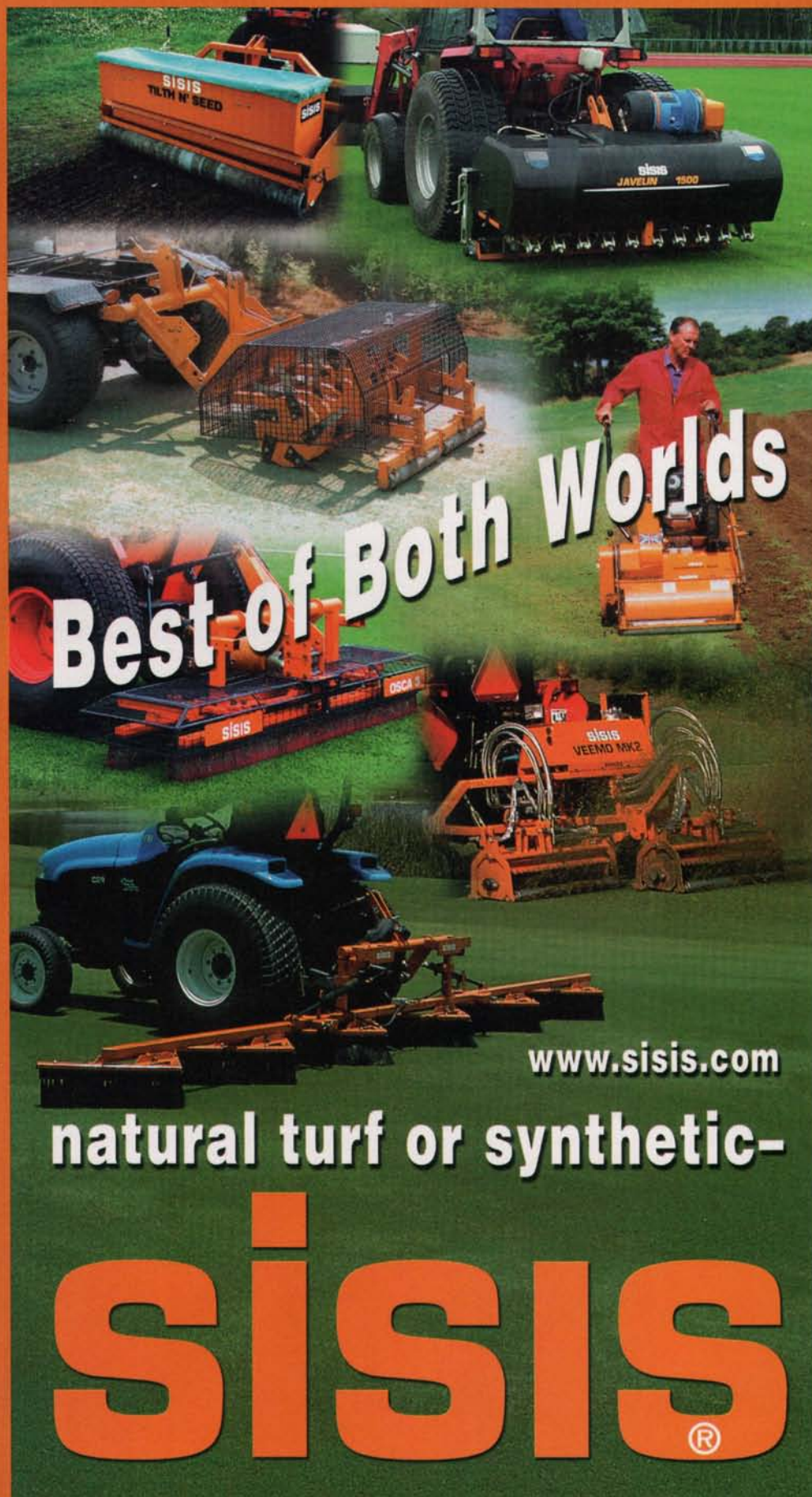
The conversion of the ISS from a paper-based to a web-based format in 2004 allowed the system to collect data on all NCAA championship and emerging sports (e.g. women's rugby) as well as approximately 50 club/intramural activities. Athletic trainers provide details on time-loss injuries that occurred in an organized practice or game. They also collect exposure data to describe the situation in which the injury occurred. Traditionally, minimal detail about the playing surface has been collected beyond designating the field as either synthetic or natural turf.

Over the past year, The Penn State Center for Turfgrass Science has worked with the NCAA to further expand the amount of information collected about the playing surfaces used in soccer, lacrosse, field hockey, and football. Recognizing the limitations of some athletic trainers in collecting more detailed playing surface information, the Center assisted in designing a user friendly "Venue Descriptor page" that could be easily completed by the athletic trainer with assistance from the sports turf manager (see figure).



Athletic trainers will be asked to fill out a Venue Descriptor page for each field used for home games and practices with data provided by the sports turf manager. To complete the page, a unique identification for the field is created; this identification will be kept confidential. Fields might be identified as "Football 1" for example. A set of descriptive information about the field will then be saved under this identifying label within the Venue Descriptor page. Thus, when an injury occurs on "Football 1" or "Field Hockey 3," information about that field will automatically be linked to the athletic injury information submitted to the database.

For natural turfgrass fields the predominant species of turfgrass, the height of cut, and the predominant soil type will be documented. Turfgrass species choices include: Kentucky bluegrass, perennial ryegrass, tall fescue, bermudagrass, zoysiagrass, or other. The height of cut



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will be described as less than 0.5 in., 0.5-1.0 in., 1.0-1.5 in., 1.5 - 2.0 in., or greater than 2.0 in. Finally, the predominant soil type categories include: sand based, native soil (non-sand), sand cap, or other.

Specific information captured about the synthetic turf fields will include the age of the field, its location, and the type of synthetic turf used. Fields will be categorized as less than 1 year, 1-2 years, 2-3 years, 3-4 years, or greater than 4 years old as well as indoors or outdoors. The type of synthetic turf will be described as, for example, "Infill-Fieldturf," "Infill-Sportexe," "Non-Infill-Astroturf," etc.

As data begins to accumulate, this additional information will expand the knowledge base of playing surfaces and their relationship to injury. Eventually one could use the system to compare such things as the number of injuries throughout all NCAA sports on various

IN TIME, THE ENHANCED ISS SYSTEM WILL STRENGTHEN RELATIONSHIPS BETWEEN THE VARIOUS PROFESSIONALS WORKING IN THE ATHLETIC DEPARTMENT, ENCOURAGING THEM TO TAKE A TEAM APPROACH TO IMPROVING THE OVERALL QUALITY OF THE ATHLETIC PROGRAM.

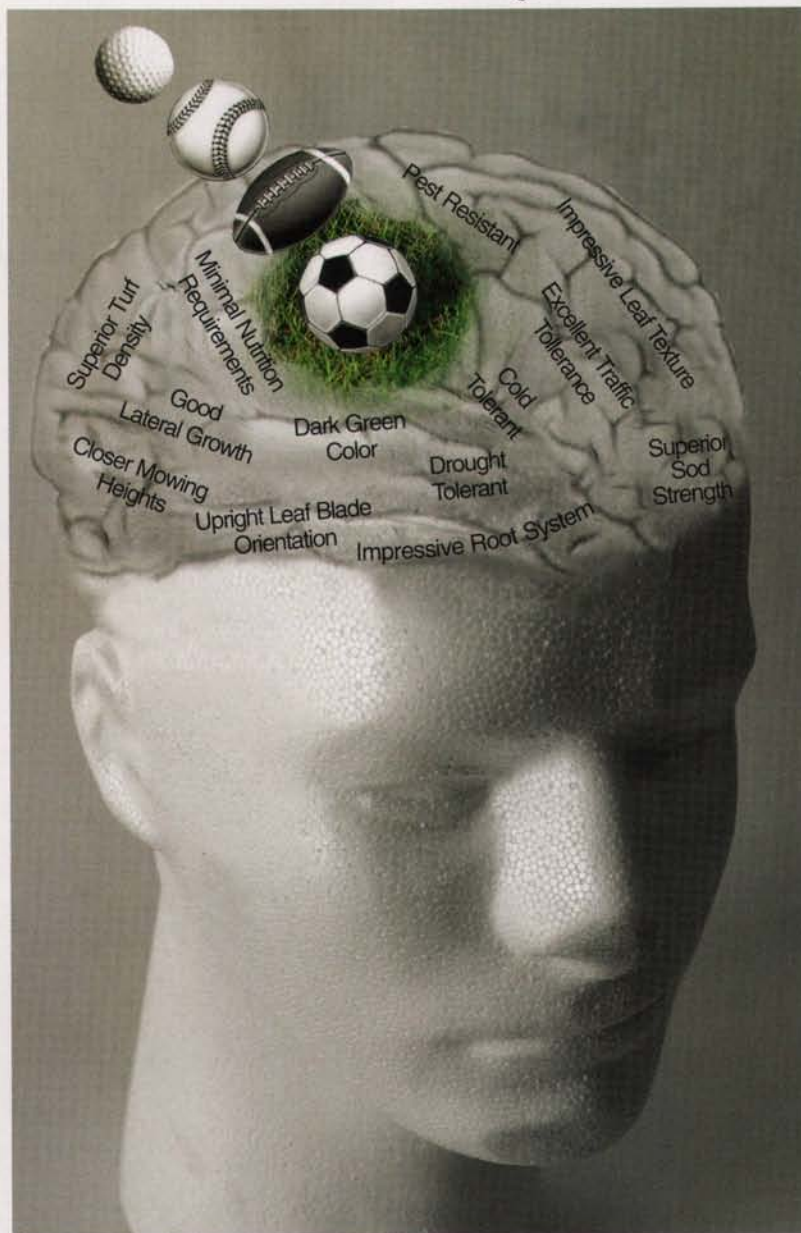
species of turfgrass, different rootzones, different types of infill systems, etc. In time, the enhanced ISS system will allow our industry to improve the safety and playability of all surfaces. In addition, it will strengthen relationships between the various professionals working in the athletic department, encouraging them to take a team approach to improving the overall quality of the athletic program.

The NCAA Injury Surveillance System is available at no cost to any NCAA member institution and currently almost 200 schools are using it. For basic injury and exposure data collection, including a one-time entry of venue information, the time commitment for data collection is 10-15 minutes per week per sport. If you are not already participating in the ISS, please contact your athletic trainer if interested. You can receive more information and your school's unique log-in information by contacting the ISS staff at (317) 917-6367. More general information on the system can be obtained at www.ncaa.org/iss. Application of this data collection platform for organizations outside the NCAA also is being considered.

The NCAA Injury Surveillance System has a strong track record. The program's expansion to include more detailed surface conditions encourages better communication between the sports turf manager and the athletic training staff. If the athletic trainers knock on your door for assistance with this project, please take five minutes of your time to provide them with information that will benefit everyone; athletic trainers, sports field managers, and especially the student-athletes.

J.T. Brosnan is a doctoral candidate in the Department of Crop and Soil Science at Penn State; Randall Dick is associate director of research/Injury Surveillance System for the NCAA; and Dr. Andy McNitt is a professor of soil science and turfgrass at Penn State. ■

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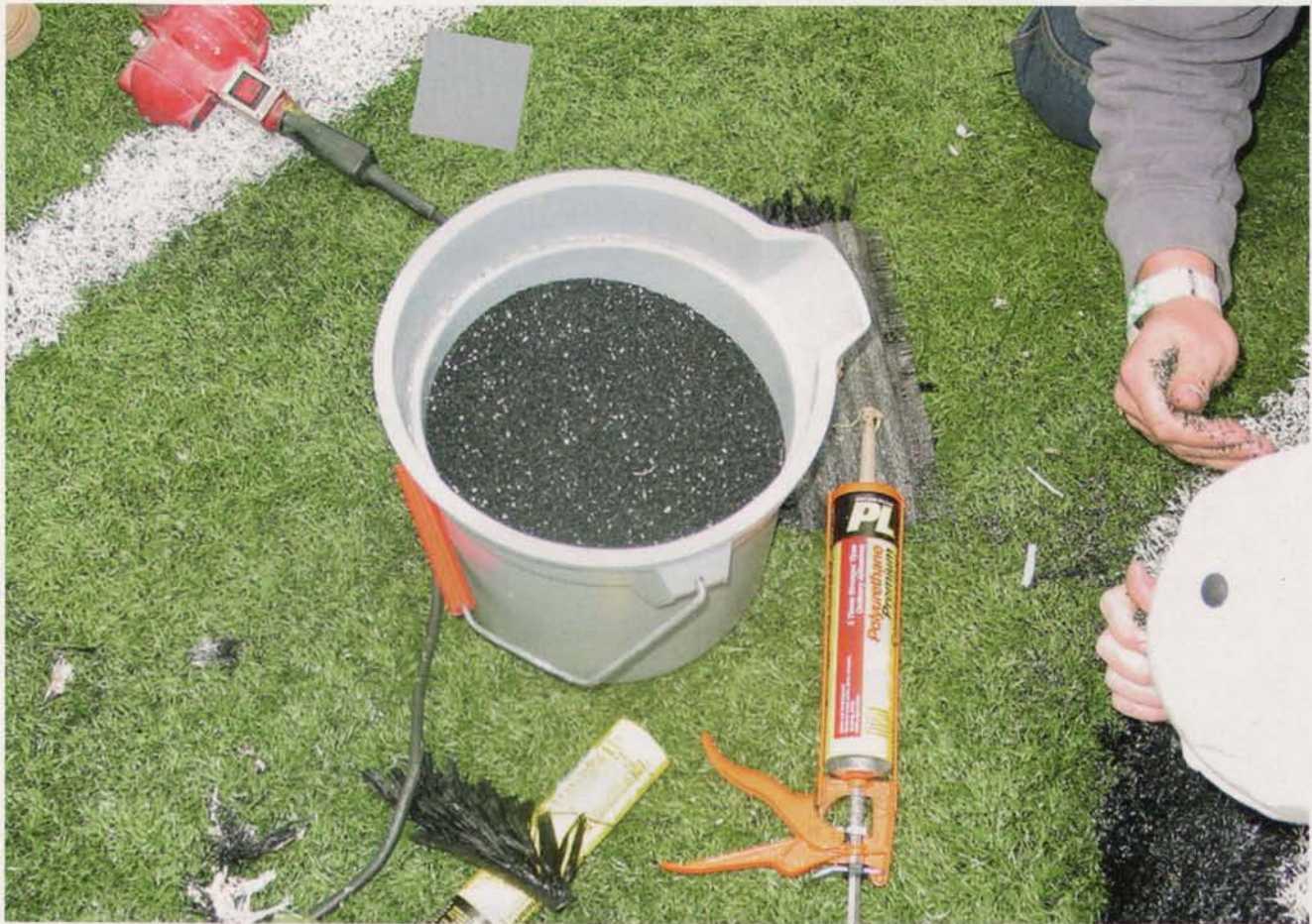
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as well as improved pest resistance. And while it might green up a little later than some bermudas come spring, once it takes off it's very aggressive. A lot of turf managers feel this is a big plus when they're dealing with fluctuating spring temperatures. TifSport. Be sure to keep it in mind for your new field or renovation project.

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Questions for potential infill contractors

By James Hlavaty and Darian Daily



Presently there are three types of sports field managers: ones who currently maintain an infill system, ones who are having an infill system installed, and ones who are investigating having one installed.

There are numerous issues that must be taken into account when choosing a company to install and construct an infill surface. This article will discuss some of the basic questions that need to be answered by the manufacturers, and by you, the owner.

Pre-construction

The first question to answer is whether you want to hire a consultant, who will assist with writing the bid documents, help you evaluate the companies, and most importantly, have lots of experience with infill field construction. A consultant will also insure that you will receive the proper materials that are called for in the specs as well as making certain that no corners are cut in the installation. In short, consultants provide quality control.

Next, are there any upgrades needed on your field, such as improved drainage, additional electrical outlets, added communications lines, etc? The cost of adding these services will be much higher once the carpet has been laid. If the funds are available, and if you think you may need it, put it in.

The next decision is the amount of area to be covered. As we collected information about infill systems during the renovation at Paul Brown Stadium (PBS), we talked with several high schools and asked what they would do differently. The number one response was that they would add the synthetic turf in the "D" area on their football fields. (The "D's" are the areas behind the goal posts and in front of the athletics track. This is usually the area for the long jump and pole vault pits.) The people we spoke with said that leaving grass in the "D" area creates a maintenance nightmare. By not having the "D" area covered, you must have staff to maintain the grass. A major side effect is that grass clippings get into the infill and contaminates the mix. Also, it is more likely that weeds will start to grow in the infill.

There are also other issues to decide. Do you want logos? Do you want the lines to be inlaid? What other sports will be using the new surface? Do you want specific markings from those sports inlaid?

Do your homework

The first step in selecting an infill company is to narrow the companies down to a manageable number. When we started the search for PBS, there were 52 different surfaces. We called numerous other facilities in the country to see how their surfaces are performing so we could narrow the number of companies. Another way is to contact different companies and ask for a reference list. This activity begins to give you a feel for the companies.

Once you have narrowed to a manageable number, (we suggest no more than four to five), send out a questionnaire. During our investigation, we found that these questions should be mainly numbers answers, yes or no answers, or two to three word answers. This will allow a data sheet to be put together.

The questionnaire should ask each company its specifications for the carpet. Ask questions such as face weight and denier. Have the companies describe their backing and how the water will drain through the carpet backing, and also how the seams are joined together. Ask if they suggest an E-pad, what their infill material is made of (percentage of rubber, sand, or other), and any other questions you feel are important.



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After the questionnaires are returned, take the information and put it on one sheet of paper. We found this was helpful to compare all the companies.

Once all the information is collected, set up a face-to-face meeting with each company. At this time ask the questions that could not be answered in three to four words in the questionnaire. Ask questions about warranties, span, how the field will be constructed, who will install it, other installations in the area, and legal questions (insurance, lawsuits, etc.).

**THE WARRANTY WILL ONLY BE AS
GOOD AS THE COMPANY. IF
THE COMPANY GOES OUT OF
BUSINESS, THEN YOU MAY LOSE
YOUR WARRANTY.**

Ask the company if it does design-builds and will they do the project "turnkey." Turnkey is when one company handles all the work, the sub-base, base, and carpet installation. You should insist that one company handle the entire project. Research from other turf managers shows that if there are issues with the field, such as poor drainage, grade unevenness, etc., and if there were multiple contractors, finger-pointing occurs and nothing is done to fix the field. Also, at this time any upgrades should be discussed with the contractor so they can give you a complete bid price.

You also should research and ask questions about the financial condition of the company. This is important because if your warranty is with this company, the warranty will only be as good as the company. If the company goes out of business, then you may lose your warranty.

Now that you have all the information, it is time to make the decision. In most cases, the decision will not be in your hands solely. A committee makes most of these types of decisions. The best thing is to let this group have all the information and then make the best choice.

Once the installation is completed, make sure the company gives you the contact information of the company or person that will do your warranty work or repair. You do not want to find out on the day of an event that the warranty repair person is two states away.

These suggestions are just guidelines to consider. You can always get information by contacting other Sport Field Managers and by referring to "A Guide to Synthetic and Natural Turfgrass for Sports Fields" released this January by the STMA. Just remember to plan for everything that you can, so that the installation goes smoothly, and you will have a great and safe playing surface.

James Hlavaty is assistant groundskeeper at Paul Brown Stadium in Cincinnati; Darian Daily is head groundskeeper there, and a member of the STMA Board of Directors. ■