Left: St. Mary's College Hawk's Nest baseball field. **Middle:** Transplanted Crape Myrtle trees. **Right:** Natural area with native plantings and Red Chewing fescue that water drains to from the sports fields.

Continued from page 24

but will be converted to a warm season turf in the near future to reduce the need for fungicide applications. The rest of the college's sports fields, practice fields and the stadium field are planted with Riviera bermudagrass. This is the perfect choice for us because of the tightness of the plant. The playability is right on the mark. The plant responds well to early green-up from cold winters.

For sustainability, Riviera holds up extremely well to drought and excessive play, which our multi-use stadium field gets, having five sports teams on it throughout the year. Other bermudagrasses may offer the same toughness, but Riviera takes very little water usage for establishment. Bermuda sprigs, for example, take a lot of water for growth, which isn't water efficient if water conservation is a consideration in your organization.

The college has two practice fields that grew in completely on native soil in a 6-week period. The athletic department was holding practices three times a day on them by the seventh week. The water used was only to dampen the soil. Watering was done twice a day, early in the morning and early in the evening for 3 minutes a zone. We increased the watering after germination to 5 minutes a zone until grow-in was completed. Sprigging the field was too expensive and not cost-effective. Watering also wasn't as efficient as we would have liked.

Another idea for sustainability occurred to me in the construction phase of two practice fields. We had the drainage for both of the fields run into a natural area filled with native trees and red chewing fescue to collect any nutrient runoff that might occur. This acts not only as a buffer zone, but waters our native plantings and allows water to eventually seep back into the groundwater table.

The renovation of the college's stadium field included resurfacing the field with Riviera. I didn't want to blast the field with herbicides, so I specified that the contractors strip off the old Vamont Bermuda sod. We installed 16 quick couplers to irrigate the field from a storm water pond to recycle nutrients back into the newly laid sod or green space. We then incorporated a buffer zone of wild flowers and red chewing fescue around the perimeter of the storm water pond. This also acts as a natural habitat for wildlife.

As mentioned earlier, these efforts are required for Audubon certification. Each environmental assessment plan can and may be different from another sports turf manager's, but this is how we learn from each other and create a networking plan with our STMA local or national associations. Have fun and share your opinions. We all want to know and learn from each other. Together, and as a team, we can make a difference. Remember, we can only lead tomorrow if we show by example today. ■

Kevin Mercer is superintendent of grounds and turfgrass manager at St. Mary's College of Maryland, St. Mary's City.

Sustainability ideas for sports fields

The following is a checklist of sustainability ideas for sports field complexes. All are required for Audubon ACSP certification:

Wildlife Habitat

Note wildlife habitat around your sports field and keep it protected, free of pesticides and maintenance. Put up signage to identify wildlife or add bird houses, milkweed plants and butterfly bushes to attract wildlife. Make sure you manage all your buffer areas correctly.

Turfgrass Management

Take simple steps to make your sports field more sustainable. Have soil tested yearly. Use organic fertilizers. Get your field on an aerification and verti-cutting program to allow water and nutrients for plant uptake. Check your fields dally for damage, stress, disease pressure and nutrient needs. Rotate goal areas when practice sessions are heavy.

Resource Management

Ensure that your shop uses federal- or state-approved fire lockers with secondary containment for pesticides, paints, oil, aerosols, gasoline and storage for used oil, antifreeze and florescent light bulbs. Use waste oil heaters to burn waste oil to heat your shop. Make sure your crew knows how to respond to any spills safely and correctly. Use energy performance-enhancing light bulbs, sensors, LED exits signs and so on. Use water-saving technology for the interior and exterior of your sports field complex. Use signs to direct people to recycling receptacles placed throughout the sports field complex and have recycling dumpsters in place. Use electric utility vehicles and mowers. Use Hybrid model vehicles for road use. Start a compost pile and get it tested for its carbon and nitrogen ratio. Use pervious surfaces for sidewalks and parking lots to allow water to seep back into the water table. Use mulch around trees and shrubs to help water efficiently.

Outreach and Education

Get your local Boy or Girl Scout Club and community involved with planting native wildflowers, plants or trees in locations where wildlife habitats are desired and where energy performance for buildings can be increased by shading sunlight and blocking wind. Have Scouts pick up trash within your complex as part of their service project.

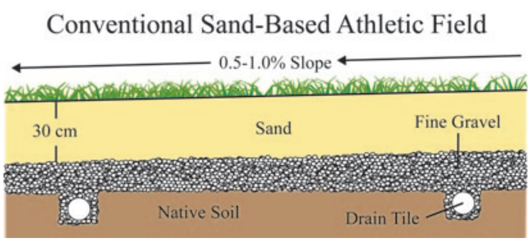
Water Management

Make sure you check soil moisture regularly. Ensure that you aren't wasting water from sprinkler heads that throw water on skin areas of baseball or softball fields or warning tracks. Update your control box with evapotranspiration equipment to reduce over watering. Use wetting agents in localized dry spots to help keep these areas efficient with hand watering. Check your system for leaks, broken heads and uniformity on a regular schedule.

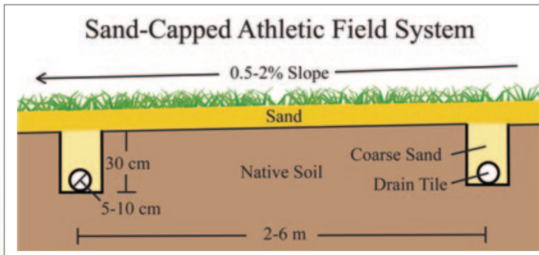
By Alexander R. Kowalewski, James R. Crum and John N. Rogers, III

Improving native soil athletic field drainage

THE TYPICAL MICHIGAN HIGH SCHOOL ATHLETIC FIELD serves as a focal point for social gatherings and community pride. It is often one of the few fields in town with lights, making it host to a variety of after school and work events. Therefore, having an aesthetically pleasing and functional high school athletic field is often important to a variety of members in the average community.



Conventional sand-based athletic field system schematic.



Sand-capped athletic field system schematic

High school athletic fields constructed on native soil relatively high in silt and clay are incapable of providing adequate drainage during periods of heavy rainfall. This in combination with heavy use will result in turfgrass failure, reduced traction and stability, and compaction, which will only worsen infiltration and future turfgrass health and vigor. Current solutions to this dilemma include complete field renovation. However, these processes are very costly and render the athletic surface temporarily unusable. For instance, renovation costs range from $600,000 – 1,000,000 for a synthetic field; $400,000 – 600,000 for a conventional sand-based athletic field with a 12-inch, sand-based rootzone over a 4-inch gravel layer and a subsurface drain tile system; $200,000 – 300,000 for a sand-capped system with a shallow (4 – 6 inch) sand-based rootzone directly over the underlying native soil and a subsurface drain tile system.

These staggering upfront prices are not an option for schools systems with minimal budgets and high annual use requirements.

A possible alternative to complete renovation is the installation of a subsurface drain tile system and subsequent sand topdressing applications, providing a built-up sand-capped system over time. A built-up sand-capped system, which can be done in four simple steps for $58,200 – 103,800 [price includes irrigation system installation ($15,000), 6 – 20 foot drain tile spacing ($60,000 – 14,400, respectively), and 2-inch sand layer depth ($28,800)], would provide high schools and other municipalities with a cost effective solution to imped-ed field playability that does not interrupt field use for an extended period of time.

The concept behind the built-up sand-capped system is to combine the advantages of the sand cap system, rapid drainage and a sand-based rootzone, while providing almost uninterrupted availability. The idea is to cut drain lines in the existing field running lengthwise, put drain tile in the lines, back fill with pea stone and then sand, or coarse sand alone. Installation of an irrigation system, before drain tile installation, is necessary at this time if the existing field does not already have irrigation, because turfgrass grown on a sand-based system will require regular irrigation. At this time it is important to correct any low/wet spots in the existing slope by leveling them with topsoil; soil removed during drain line installation would be appropriate for this task. Repair to any irrigation line damage is necessary at this time.

Subsequently, an aggressive sand-based topdressing program would begin during the summer with a well-graded sand-based material, approximately 90% sand – 10% silt/clay. Sand topdressing would be coupled with an annual field renovation pro-

>> **OKEMOS HIGH SCHOOL SOCCER FIELD,** Okemos MI May 20, 2009. Drain tiles were installed at 8-foot spacing in May 2008 and 1 ½ inches of subsequent sand topdressing has been accumulated since.

gram, including inter-seeding and cultivation. During this period it is also important to regularly clean and maintain irrigation heads to prevent sand from damaging the system. The topdressing stops in early August to allow settling before use in the fall. During the first year the sand may not reach the level necessary to prevent saturated surface conditions from developing, particularly in low lying areas. However, the drain tiles will prevent standing water from developing, providing a system that is better than the original. The next spring the topdressing process would begin again to add the rest of the material, further increasing drainage capacity. The end result is a well drained, stable, sand-based field for a fraction of the cost required for other renovation processes.

The built-up sand-capped system will not only reduce the annual repair costs required for a native soil field, but also reduce the initial cost of field renovation. To install the drainage and backfill a field with 6-foot centers (would approximately have 30 400-foot x 4-inch drain lines @ $4-5/linear foot) would cost $48,000-60,000 installed, while a field with 13-foot centers would cost $22,400-28,000, and 20-foot centers would cost $14,400-18,000. Then topdressing would begin on the field during the summer with each inch of material costing about $14,400 (300 tons of sand for $8,400 and $6,000 for labor).

However, a number of concerns arise when considering the built-up sand-capped renovation procedure, such as what is the optimum topdressing regime capable of accumulating an adequate sand layer without being detrimental to turfgrass health, vigor or wear tolerance? Can athletic field use continue throughout the topdressing regime? What is the optimum drain tile spacing in combination with sand topdressing depth, accumulated over time, necessary to prevent prolonged saturated field conditions, which would otherwise compromise field playability?

A series of research projects were initiated in the spring of 2007 at the Hancock Turfgrass Research Center, Michigan State University, East Lansing, to explore the feasibility of a built-up sand-capped system. Objectives of this research were to evaluate the effects of cumulative sand topdressing rates on the fall wear tolerance of a cool-season turfgrass stand, determine the effects of traffic applied during the topdressing regime on the fall wear tolerance and establish drain tile spacing, in combination with sand topdressing, necessary to improve drainage characteristics, wear tolerance and surface stability.

All research was conducted on a 90% Kentucky bluegrass (*Poa pratensis*) – 10% perennial ryegrass (*Lolium perenne*) mixture established from seed on a compacted sandy loam soil with a 1% surface slope in relation to drain tiles. The turfgrass established for these

WATER MANAGEMENT INC. cutting drain lines and installing drain tiles, Intramural Field, Michigan State University, July 2008.

WATER MANAGEMENT INC. backfilling lines with a sand-based rootzone material, Intramural Field, Michigan State University, July 2008.

SAND TOPDRESSING being applied at the Haslett high school football field, Haslett, MI May 2007.

SAND TOPDRESSING being applied to research plots at the Hancock Turfgrass Research Center, Michigan State University, July 27, 2008.

SIMULATED TRAFFIC being applied with the Cady traffic simulator, Hancock Turfgrass Research Center, Michigan State, October 22, 2007.

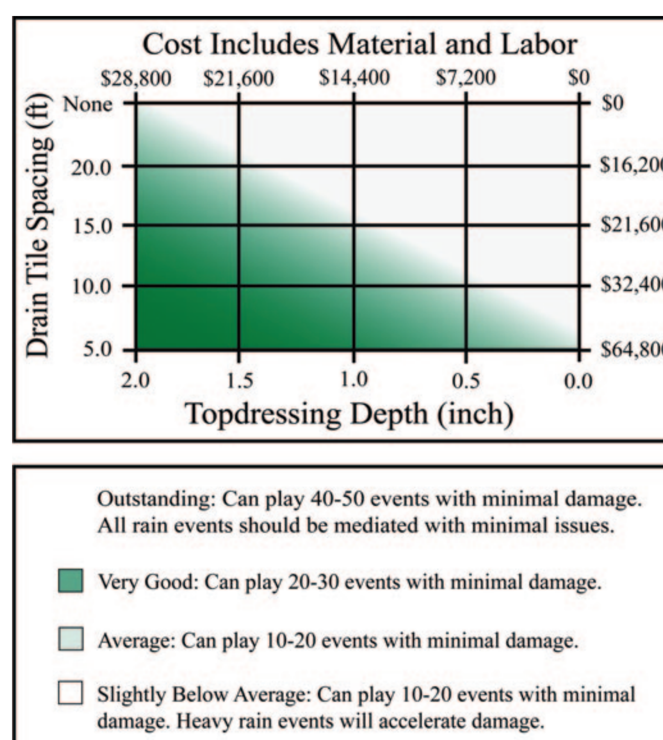
ONE INCH OF SAND topdressing, ½ inch applied over a 5-week period in 2007 and ½ inch applied over a 5-week period in 2008, Hancock Turfgrass Research Center, Michigan State, September 18, 2008.

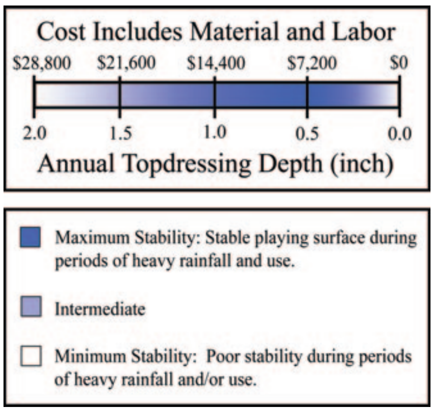
projects received sand topdressing applications in the summer, applied over a 5-week period at a ¼ inch per application, and simulated athletic field traffic, applied using the Cady traffic simulator.

Results obtained from this research regarding topdressing rates suggest that when topdressing is used to develop a sand layer over an existing native soil athletic field, a conservative topdressing regime, ½ inch applied over a 5-week period in the summer, will provide field managers the greatest results, wear tolerance and surface stability, in the subsequent fall. Results also suggest that if a spring re-establishment before the initiation of sand topdressing is required, restricting summer traffic will provide the best results in the subsequent fall. Findings from this research also indicate that if spring re-establishment is not required, effects of summer traffic will be inconsequential to turfgrass wear tolerance and surface stability characteristics in the ensuing fall. As little as ½ inch of sand topdressing ($7,200) was shown to substantially reduce the surface moisture content of a native soil athletic field, implying that this cultural practice alone could substantially improve the drainage characteristics of a native soil athletic field.

Regarding drain tile spacing, in combination with sand topdressing, results suggest that as topdressing is being accumulated from a 0 to 1 inch depth in the first year, the 6-foot drain tile spacing will provide the greatest overall drainage, wear tolerance (ground cover) and surface stability (shear strength and surface hardness) characteristics.

Cost-benefit analysis of annual topdressing depth applied over a 5-week period at ¼ inch per application.





Cost-benefit analysis of drain tile spacing and cumulative topdressing depth accumulated over a 2-year period.

However, the 13-foot drain spacing will provide drainage and surface stability characteristics equivalent to the 6-foot drain spacing. These findings indicate that a drain tile spacing of 13 feet, which will substantially reduce installation costs ($22,400-28,000), is adequate to provide sufficient drainage and stability when 1 inch of sand topdressing ($14,400) has been applied.

As topdressing depths were accumulated from 1 to 2 inches in the second year, minimal wear tolerance and surface stability differences were observed, suggesting that the effects of drain tile spacing on wear tolerance and stability are minimal once 2 inches of topdressing has accumulated. These findings suggest that if 2 inches of sand topdressing ($28,800) has been accumulated and an adequate surface slope is available (≥1%), drain tile spacing can be increased to distances of 20 feet or even greater. Drain tile installation at 20 foot spacing would cost approximately $14,400-18,000. It is important to note that substantial surface runoff was still collected from the control treatment after 2 inches of sand topdressing was accumulated, suggesting that drain tiles are still required for the removal of surface runoff from low lying areas. ■

Alexander R. Kowalewski, James R. Crum and John N. Rogers, III are members of the Crop and Soil Science Department, Michigan State University.

Tools & Equipment

Let your senses lead you through troubleshooting engine problems

By Dale Gabrielse

Editor's note: This article was supplied by Subaru Robin, a manufacturer of small, industrial engines.

Imagine a lush stretch of turf being mowed on a beautiful summer morning. The sun accents the perfectly straight lines left by the mower, and the clippings yield the distinct, sweet fragrance of freshly cut grass. But gradually, its scent is interrupted by the smell of gasoline coming from the engine. As this intensifies, the mower slows, sounding as if it could stall. Perhaps this will not be such a beautiful day after all.

The first step in this scenario is turning the machine off, but then what? Even if you're not an expert mechanic, just follow your senses and listen to what the engine is saying. It might not be your language, but by deciphering simple clues you can efficiently troubleshoot many problems.

Hearing

Hearing is the first sense that can be used in detecting engine problems. Just as a doctor listens for a steady heartbeat, an operator can use his sense of hearing to detect engine hiccups. When an engine isn't running properly, it may create a popping sound or backfire. These noises shouldn't be ignored and generally indicate that the fuel-air mixture is too lean for the engine, meaning the fuel portion is low.

The fuel-air mixture is managed by either a carburetor or fuel injection system. While modern automobiles use fuel injection, many small engines found in outdoor power equipment still use carburetors. To help a carburetor run efficiently, its inside components can be cleaned with carburetor cleaner, but if this doesn't fix the problem, it may need to be replaced.

On the other hand, fuel injection systems are more reliable and efficient. They use several sensors to determine and deliver the proper fuel-air mixture into the combustion chamber. A clogged fuel pump may cause some problems with fuel injected engines, but in the case of a more complex issue, an authorized engine dealer is probably your best option for providing service.

Next, if the engine produces a knocking noise, it likely contains a worn connecting rod, which connects one of the pistons to the crankshaft. This may be caused by dirty oil in the system, which is one of the many reasons for changing oil regularly, and failure to fix this problem could result in significant damage. Tinny or metallic sounds often indicate a less serious symptom and usually result from loose components, which can be easily fixed by tightening.

On engines with electric starters, a "click" sound when turning the key could indicate a number of problems. The first step in troubleshooting this issue is to trace the battery cables, ensuring that all connections are secure and the terminals are clean. If there is a problem, the terminals can be cleaned with a wire brush, and the cables can be tightened. If all connections are fine, the problem may be in the battery. A voltage tester can be used to check the battery, and if it tests low, it should be hooked up to a charger.

Seeing

If the problem can't be heard, a closer look may be all that's needed to detect a problem. For example, smoke is an obvious sign that something is wrong; however, many don't know that the color of smoke may reveal the issue. Blue smoke, for one, indicates that the engine is burning oil, an occurrence that tends to be more common on cold days. This should dissipate as the piston rings become warmer and expand, but if not, the breather hose or piston rings may need to be repaired or replaced.

Black smoke typically indicates that the air-fuel mixture is too rich, meaning the engine is not receiving enough air to burn the fuel efficiently. Oil residue collecting on the exhaust outlet of the muffler provides another visual hint of a rich mixture. To correct this, the carburetor may need to be cleaned or replaced. A change in elevation also may cause black smoke in carbureted engines, in which case modification is needed. Manufacturers offer elevation kits, which are best installed by an authorized engine dealer.

A loosely hanging recoil rope signals another potential problem. If the rope does not completely return after pulling, the lubricant on the internal drive parts may have washed off. This can be fixed by removing the recoil drive assembly and applying additional lubrication. If the dangling rope goes ignored, it can result in a broken rope or eventual damage to the recoil starter.

Next, the fuel strainer at the top of the tank should be inspected for dirt. Soap and water will easily clean the strainer, but if any dirt enters the fuel tank, it will need to be removed. To do so, one must shut off the fuel line valve, drain the fuel, and use a suction device to remove the sediment. If the contamination is severe, the gas tank can be removed and shaken upside down. The sediment bowl next to the carburetor will be the end-of-the-line for most dirt, and it can be taken off and wiped with a clean rag to remove sediment. Higher-end engines will have additional filters to prevent dirt from traveling farther through the engine, but they may clog and require changing.

By simply standing back and observing, fluid leaks can also be detected. These are much easier to find if the engine is kept clean and dry. If one is found, the leaking components must be tightened or replaced immediately. Failing to fix the issue is not only wasteful and inefficient, but also potentially dangerous.

Feeling

Unless a person hopes to seriously burn himself, the next sense of touch requires the engine to be cool, and for added safety the spark plugs should be disconnected. Then, the engine can be felt for fluid leaks. This process can pinpoint hidden spots that were missed in the visual inspection. By feeling the engine, loose components can also be detected and subsequently tightened or replaced.

Other problems, such as power loss, can be pinpointed by the feel of a machine during operation. For example, an engine may seem to lug for no apparent reason. This power loss may be the result of a saturated air filter, which should be checked often, or dirty spark plugs, which can be cleaned by a wire brush or spark plug cleaner. In more serious instances, the engine may be experiencing compression loss, which may be caused by poor seals from the piston rings, valves or gaskets.

Smelling

If a person doesn't find any clues with the previous senses, the answer might be right under his nose. For example, if a burning smell is present, the engine oil may be leaking and burning. The scent can be traced to the source of the leak to determine if a part needs to be tightened or replaced. Then, the oil level must be checked and replenished to adequate levels if a significant amount was lost.

While oil has a distinct odor, it shouldn't be noticeable when operating an engine. If it is, the engine is likely burning oil. As mentioned earlier, the culprit for this may be a clogged breather hose or worn piston rings.

Another bad sign is the smell of gasoline coming from the oil reservoir. This often happens when an engine floods, and gasoline dilutes the oil, producing the gassy smell. Before operating again, the gas and oil should be replaced, and the spark plugs should be cleaned. Gasoline should also be drained and refilled if the fuel tank possesses a varnish scent, suggesting that the fuel has turned stale.

Finally, getting a whiff of gasoline while operating a machine may be the smell of trouble, as a strong gas odor coming from the exhaust sometimes indicates an engine problem. If this happens, the operator should ensure the choke is not stuck in the closed position and check the engine exhaust for leaks or loose parts.

Tasting

Fortunately, it's not recommended to use the final sense of taste to diagnose problems. In fact, it's strongly discouraged! Instead, follow your other four senses to determine when the engine on any of your equipment is out of tune. By understanding the issue, you can save quite a bit of time and quickly get back to doing what you know best—maintaining a picturesque sports field. ■

Dale Gabrielse is a Subaru training manager.

Tools & Equipment

Line Painter 1200 and Xtreme Paint

For straight lines or perfect circles and arcs, no machine makes it easier than the Toro Line Painter 1200. An ergonomic gearshift and handle offers more control than any competitor designs, while the front pivoting caster wheel moves effortlessly in any direction then self locks in place. Clean up is easier. The Express Clean System has an on board water tank to clean lines and nozzles with the flip of a switch. Toro Xtreme Paint is the ultimate field marking paint for all natural turf sports fields, lines and logo.

www.Toro.com

Conco acrylic field marking paint

Conco's quick-drying formula is available in bright white, with optical brighteners that maximize line visibility, as well as your team's colors. This cost-effective, concentrated formula can be reduced up to 200% with water. So whether your fields are natural grass or artificial turf, you can count on Conco Paints to score points with athletes, officials and fans alike. Conco paints are available exclusively at Menards, your one-stop shop for all your turf maintenance needs and more.

www.concopaints.com

Streamliner dryline marker

The Streamliner is simply the best dryline marker in the business. With its variable flow control, Field Testing has proven the Streamliner is the best for the quality of the chalk line, all the while using less chalk than its competition. A heavy-duty steel frame, pneumatic tires, rugged molded plastic hopper, flexible brush agitator, accurate string-line guides, and a one-button retractable handle for easy storage set the Streamliner apart. Available in 2-, 3-, and 4-wheel models with optional Double-Play aerosol paint attachment. Streamliner models now available at a reduced "rollback price"!

www.beaconathletics.com

World Class stencils, paints

World Class Field Stencils are designed to provide high quality field graphics at an economical price. With just one phone call you will find your custom graphics package with custom matched paints to your exact specifications. Our stencils are perfect for lettering, team logos and corporate sponsor logos to take your event to the next level. Call now for your free Virtual Field Look.

Do wish that you could paint your fields less often? Is your current field paint causing harm to your grass? Are you looking for a way to save your field painting budget while maintaining high quality and value? World Class Premium Paint is the answer. Call now and let us help you find the solutions to your field painting challenges. (800) 748 9649

www.worldclasspaints.com

Ingredients matter

The finest fields, turf or grass, are the product of great ingredients. Choosing the right products and equipment that make the work smooth and effective makes all the difference. At Pioneer we know how much ingredients matter. We see to it that each and every stencil, striper, paint, groomer, tool and accessory we offer delivers the performance you need to be on top of your game. Every drop of paint, every striping tip, every engineering and formulation choice are all focused on providing you with key ingredients for a field of excellence.

www.pioneerathletics.com

Newstripe's athletic field marking machine

Newstripe has introduced the NewRider 3000 with upgrades to all the great features of the NewRider series to line your fields even easier and faster. The NewRider 3000 features a 55-gallon tank, foot pedal and hand lever for forward/reverse, continuous paint re-circulation, a 13 hp Honda engine, hydrostatic transmission, seat-based operator controls, front dual spray head, hand wand and water bottle holder. Options include side spray head and removable sun shade.

www.newstripe.com

Turf paint, accessories

GameTime Athletics is your premier resource for turf paint! From aerosol to bulk paint, we have your turf covered. Our Aerosol Paint comes in white or 10 other colors, and our Bulk Field Marketing Paint is great for creating a professional look on all types of fields. We offer all the equipment and accessories you need to create a perfect field for football, baseball, soccer, lacrosse, and field hockey. Save money by ordering online.

www.GTathletics.net

John Mascaro's Photo Quiz

>> Answer: from page 17

This large brown circular area appeared in the winter ryegrass at the end of December at the Scottsdale Civic Center Mall lawn. The area had been previously overseeded with Bulls-eye perennial ryegrass 3 months before this photograph was taken. So what caused the perfect circle in the turf? Is it a turf disease? An irrigation problem? Some kind of pest problem or something mechanical? Or could it have even been a UFO landing site (this is in Arizona)? Well, the answer is "Christmas Tree Blight." The story is that after the area was overseeded in October a few weeks later the city placed a large artificial Christmas tree on the turf. The Sports Turf Manager objected to placing the tree directly on the turf and asked if it could be assembled on the cement area instead. Having the tree placed in this turf area blocked all the sunlight, causing this perfectly dead circle of winter rye to appear.

Photo submitted by Wayne Charles Cady, Sports Turf Manager, City of Scottsdale, Scottsdale, AZ.

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 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.

Painting fields made easy

The Line-Up Hash-Mark Painting System: helps ground crews paint football field hash marks accurately and efficiently. Line-Up's individual hash mark and inbound line pans minimize paint overspray. Its built-in centering and offsets ensure the system produces consistent hash marks. Inbound lines and hash marks for an entire field are often painted in less than 90 minutes. Line-Up folds in half easily and weighs 48 pounds. Alumanumber: provides 4' by 6' Pro or Stadium style font, 1/8-inch thick aluminum number templates. Alumanumber's useful handholds and built-in offsets ensure quick alignments.

www.dssworks.com

Bulk liquid paint and aerosol chalk

Temporary field marking solutions without special cleaning agents for removal are available. A time and labor saving solution for short duration events. Tru Mark Athletic Field Marker introduced Bulk Liquid Chalk in 5-gallon pails for application on both synthetic turf and natural grass applications. Also offered is aerosol chalk in 20-ounce cans with 18 ounces of material. Using foot or brush abrasion along with water removes all effects of field marking chalk.

www.AthleticFieldMarker.com

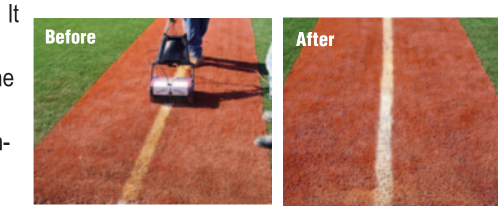
Krylon striping paints

Krylon Products Group offers a complete "line-up" of striping paints. Line-Up Striping Paints are water-based, fast drying formulas specifically designed for striping athletic fields. With excellent coverage for bright, vivid lines and a safe alternative to lime, this VOC nationally compliant program is available in many popular team colors. Our aerosol products are greenhouse gas free; which does not contribute to global warming and our bulk products are available as concentrates or ready-to-use and can be custom tinted.

www.KPG-Industrial.com

Temporary paint remover machine

This machine is excellent for removal of Whitlam's Temp-Stripe Athletic Field paint from new synthetic turf surfaces. Operator friendly, saves time, money and labor costs. Used at both indoor and outdoor venues. It cleans virtually any surface. It is a quick, efficient, multipurpose machine with two 12-inch counter rotating cylindrical brushes that allows the portable scrubber to clean both sides of the synthetic grass fiber and glide back and forth in forward or reverse with little effort. Also works great for cleaning those old dingy, dirty white lines or letters on your field.



www.whitlampaint.com

Trac-Cut rolling spray shield

Athletic Field Design offers Trac-Cut rolling spray shield that features razor-sharp cut lines. The disc shield makes contact with work surfaces and cuts as it rolls and the reusable discs last long. Attaches to most airless spray tips without tools. See informational pdf file at **www.athleticfield.com.**