

Topdressing Smooths The Way for Sports

Hidden below the green canopy of sports turf are land mines just waiting to explode. They can wrench an athlete's ankle, redirect a carefully aimed putt, or cause serious problems with drainage.

There may be hundreds of these mines on any one sports surface. By managing only the turf — and not the soil surface below — sports turf managers are playing with explosives.

Managers of putting greens, bowling greens, croquet courts and tennis courts know their jobs may be at stake if the soil is not as smooth and level as the turf above. They verticut, topdress, drag and roll these surfaces regularly, to make sure that balls rolling over them don't veer off course unexpectedly. To achieve an absolutely smooth surface they will even compromise the health of the turf for the sake of a "true roll."

With so much attention paid to the soil surface by these sports turf managers, people are beginning to wonder why athletic fields receive so little attention when it comes to smoothness.

You have to crawl before you walk, as the expression goes. Just maintaining turf cover is hard enough at many facilities. It's

a constant battle to establish and maintain dense turf when fields are used day in and day out and budgets are tight. Furthermore, the amount of soil disturbing activity is greater on athletic fields than on greens and tennis courts. Repairing large divots after games is a step in the right direction. However, by mid-season a heavily used field can still become a patchwork of repaired spots.

When you get right down to it, turf cover may be secondary to field smoothness in many instances. Of course, the ultimate goal is to provide both. But with liability insurance rates and injury lawsuits at an all-time high, a sports complex can't afford to neglect either. Facilities that provide fields for sports can reduce their risk only by having a complete maintenance program and controlling use.

You might expect that preventing injuries should be reason enough to invest in surface maintenance equipment. Instead, action is usually taken when disruptions in play caused by bad bounces or poor footing become intolerable for the teams using fields.

Whatever the reason, topdressing to restore field integrity and smoothness is an

important part of sports turf management today. Advances in topdressing equipment allow large quantities of topdressing to be applied to acres of turf in a matter of hours without interrupting field use.

Topdressing can also correct heavy layers of thatch, which cause fields to be spongy and less drought tolerant, without the more severe practice of heavy verticutting. Furthermore, when combined with heavy aeration, topdressing can slowly amend heavy soils that drain poorly and compact easily.

Topdressing has long been a chapter in the book of tricks for managers of greens and tennis courts. Cloaked in secrecy for decades, these tricks were the job security of the greenskeeper. Without nationally recognized standards for greens construction, such as those developed in the 1960s by the United States Golf Association Green Section, greenskeepers developed their own mixes of soil, sand and organic matter for spreading on these surfaces.

Prior to the '60s, golf course architects would specify their own particular combination of materials for greens construction. It was not unusual for them to modify native soils with sand, composted sawdust, shredded corn cobs, leaf mulch, peat moss or whatever material was available locally. The wise greenskeeper sought to match this mixture for topdressing, usually spreading the mix with shovels, since the area was relatively small.

With the development of the USGA specifications, greens built or reconstructed

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Turfco Mete-R-Matic topdresses football field (right). Small loader simplifies handling topdressing mix.



Large topdresser from Bannerman can topdress large areas heavily.

Topdressing

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during the past three decades contained a top layer consisting largely of fine-to-medium sand regardless of their location. Golf course superintendents, discarding secrecy for open discussion of improved turf management techniques, learned that periodic topdressing with pure sand or sandy mixes made their greens "truer" and "faster." Cutting heights started dropping at the same time, as improved cultivars of bentgrasses and bermudagrasses for greens were developed.

By the end of the '70s, it was not unusual for superintendents to topdress greens every week to ten days. Obviously, this required equipment that could apply a thin, even layer of material quickly. However, they didn't want to use heavy equipment on greens if they could help it.

Drop spreaders put down streams of material. Agricultural spreaders, such as manure spreaders, were too large to operate on greens. They also allowed clumps of material to pass through the machine onto the turf. A smaller, more precise device was needed for topdressing greens.

Frank Ditter, a designer of aircraft components, consorted with Art Cobbs and Bennett Larson at the Minneapolis Golf Club to develop a lighter topdresser for golf courses. The original Mete-R-Matic was introduced in 1961 by the Sodmaster Division of Federal Aircraft.

As the name implies, the topdressing is metered onto a conveyor belt. A spinning brush at the end of the belt shoots the material down evenly into the turf. With this system, a layer of material as thick as 1/2-inch or as thin as a dusting could be applied in one pass. The original self-propelled unit and another model designed to be pulled by a turf vehicle are marketed today by Turfco Manufacturing, Inc.

In 1971, Cushman developed a topdresser for greens that was mounted on the rear of its turf truckster. The unit did not tie up the vehicle, since it was easily removed and replaced with a variety of other attachments. One of these was a large hopper spreader that could distribute sand in a pattern nearly 20 feet wide. If the turf manager was looking only for a light topdressing with sand, these units were faster. Hahn also offers an interchangeable hopper spreader attachment for its Multi-Pro 44 utility vehicle.

But greens weren't the only areas superintendents wanted to topdress. "Superintendents have started to manage their fairways like greens," says Bruce Calhoun with Bannerman in Rexdale, Ontario. "Today, many superintendents cut their fairways with triplex greens mowers and pick up the clippings.



Brush on Cushman topdresser distributes mix evenly and breaks up clumps.

They also topdress fairways heavily once or twice a year. Greens topdressers are great for greens, but when you have acres of fairway to cover, they can be too slow."

Topdressing acres of turf is a large operation. To apply a 1/4-inch-thick layer over one acre requires more than 30 cubic yards of material. To apply the same layer on a 5,000-square-foot green takes almost four cubic yards. Compare this to a baseball infield with 2 3/4 yards or an outfield with more than 30 yards. A regulation football field or soccer field would require between 35 and 40 cubic yards — for 1/4-quarter inch of coverage!

Volume is one thing, but weight is more dramatic. Topdressing mixes can weigh from 1,000 lbs. per cubic yard to more than a ton. Handling and shipping 80 tons of sand is a big task for anyone.

Working with a number of Ontario superintendents, Bannerman redesigned and reconstructed a large-capacity manure spreader that could hold up to three cubic yards per load. The Turf Topper reduces the handling of material, in some cases by more than two-thirds and applies up to one inch of material at a time. However, due to the spreader's size and weight when loaded, the company does not recommend it for greens. The firm recently developed a model that will carry nine cubic yards.

Fairway topdressing opened the door for sports turf managers to topdress athletic fields. It also gave them the ability to amend the topsoil in large areas. Fields constructed with heavy soil can be core aerified prior to topdressing. Then better-draining, more compaction-resistant amendments can be topdressed over the area and dragged into the holes. While a single topdressing may improve the soil only slightly (less than 15 percent), repeating the process over time can make a difference where total reconstruction is out of the question.

The most recent entry into the topdresser market is the Spread-Master by Green Care International. This machine replaces the belt feed mechanism with a matted drum roller. The roller prevents an initial surge of material as the unit starts up. The topdresser utilizes hydraulic power for the roller and the brushes, to provide a wide range of adjustments.

Regardless of the type of topdresser used, plans should be made to handle materials as efficiently as possible, states Ron Urban, operations manager for Green Care. "Unless exotic mixes are used, it is best to stockpile topdressing material in a water-proof bin or cover it with PVC sheeting."

"A popular technique is to load a trailer with material and use a Bobcat (small loader) to transfer the material on location to the topdresser," says Urban. In this way, the loader does not have to return to the bin for reloading each time. Another technique is to calculate the rate of application and dump the material on the turf at prescribed intervals.

The frequency of topdressing decreases with the size of the turf area. Golf courses prefer frequent, light topdressing, while athletic field managers will apply a thick layer when overseeding early in the fall or while preparing the fields in the spring, says Jim Kelsey, president of Partac Peat Corp., a New Jersey supplier of topdressing. "Ideally, the sports turf manager should topdress once in the spring and once in the fall.

"Topdressing is especially helpful in maintaining the crown of a football field. The center of the field takes the most beating and requires the best drainage. Topdressing helps maintain the proper grade and smooths out depressions made during previous games. It can also improve the germination of seed sown in worn areas. Do not apply heavy topdressing to restore crowns during hot weather."

Topdressing offers many benefits. However, they must be balanced by an understanding of soil/topdressing compatibility. If the existing soil drains poorly and compacts easily, you won't want to topdress with the same soil—even though it would provide the greatest compatibility.

Part of the goal is to improve soil texture where possible. Using a topdressing with a texture different from the existing soil carries with it the risk of layering. A surface layer can impede the movement of air, water and nutrients in the root zone, warns Dr. A.J. Turgeon, professor of turf management at Pennsylvania State University.

Layering has been cited for disrupting decomposition processes in moist soil, a condition frequently called "black layer." Surface water percolates down through a layer of well-textured surface soil to heavier soil below. The subsoil becomes waterlogged, robbing bacteria and microorganisms of the air they need to properly decompose organic material. The subsurface layer must be broken up by cultivation periodically to restore proper drainage.

Instead of withholding topdressing, sports turf managers should incorporate better-textured soils into existing ones with surface cultivation techniques such as shallow and deep aeration. "As long as the topdressing consists of a better-draining medium than the existing soil, the benefits will outweigh the drawbacks with proper management," says Kelsey. However, he cautions sports turf managers about using straight sand for topdressing. "Sand has to be babysat, especially with cool-season grasses. It can change water and nutrient requirements—in other words your maintenance schedule." Sand rootzones require careful management and a particularly close watch on water. A good irrigation system is a critical component of sand-based sports turf.

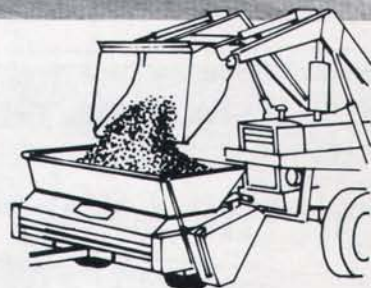
After selecting a particular topdressing, stick with it from then on. Even sands can vary considerably in size and shape. Managing compatibility is simpler with two different known textures than a multitude of varying ones.

Uniformity of topdressing mixes is also important. Commercial suppliers have the equipment to mix, screen and fumigate topdressing to meet almost any specified analysis. They will usually stock quantities of greens mixes. The two most common ones are the USGA and the Rutgers mixes.

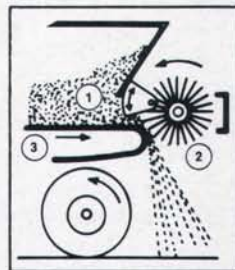
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Large hopper pendulum spreader from Hahn is a fast way to topdress lightly.

Topdressing

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The USGA mix is more than 90 percent sand by analysis (weight) and should contain no more than five percent silt and three percent clay. By volume the USGA mix is between 70 and 80 percent sand. It was designed for high infiltration on greens constructed to USGA specifications (high sand).

The Rutgers mix contains 70 to 80 percent sand by weight, or roughly 50 percent by volume. It contains between 5-15 percent silt and 5 to 8 percent clay by weight. This mix is heat treated for a number of rea-

sons. The first is to kill weed seeds, fungi and nematodes in the components. The heat also binds the silt and clay to sand particles to form water-stable aggregates. Finally, it dries the mix so it can be screened to a size of 2 mm.

Kelsey believes mixes for Kentucky bluegrass or perennial ryegrass athletic fields should not contain more than 50 percent sand by analysis, unless they were constructed with a high-sand soil mix. The silt and clay portions retain more moisture and nutrients than sand, and they provide sites for chemical reactions important to nutrient

exchange. Microbial activity is also lower in sand. As the sand content increases the likelihood of leaching nutrients through the soil increases. Kelsey also states that the higher the sand content, the less topdressing should be applied at any one time.

Sports turf managers should consult with their state extension service before selecting and beginning a topdressing program. As John Hall, extension turf specialist at Virginia Polytechnic Institute, states, topdressing mixes should be tested in a laboratory for many different factors. These include infiltration rate, moisture retention, bulk density, pH (acidity or alkalinity) and pore spaces. Commercial suppliers will have test results for their mixes.

In the final analysis, topdressed sports turf requires closer and more skilled management than turf that is not topdressed. This is a small price to pay for the benefits it provides.

The most obvious is a smooth surface that ensures the greatest safety and playability. Athletes can safely place their feet on the turf knowing that it will be level and give them the support a body needs to avoid injury. This increased confidence helps them perform to the best of their ability. They can also rely on a ball striking or rolling on the turf to react consistently without surprises. Competition then becomes a true test of skill, rather than a matter of luck or circumstance.

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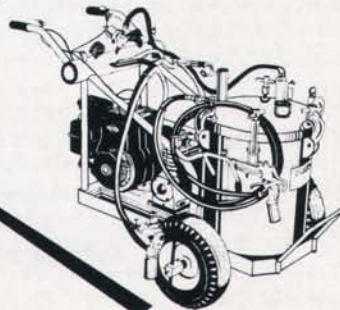
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Topdressing

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The benefits to players and the sport are matched by benefits provided to the turf-grass plant. Topdressing protects important parts of the plant, particularly the crown and lateral roots and shoots of creeping turf-grasses such as bermudagrass, Kentucky bluegrass, creeping bentgrass and red fescue. Under low mowing conditions these plant parts are more exposed to traffic, heat and wind. Topdressing protects them from wear and the elements, thus improving the growing conditions for the turf. The same is true for seed applied to fields. Topdressing helps maintain moisture levels and insulates the germinating seed and seedlings from excess heat or traffic injury.

By restoring a smooth grade and improving the texture of the topsoil, both vertical and horizontal drainage are improved. Better-textured soil resists compaction and the complications it causes with drainage and surface hardness. Air, water and nutrients can also reach a healthy balance in the soil.

One of the recent pluses for topdressing is its role in speeding up decomposition of thatch. It creates an environment at the soil surface favorable to organisms which break down dead plant material. By keeping thatch levels in check, turf is less prone to surface rooting and less disposed to drought and surface damage.

Recent tests by Dr. Robert Carrow and Dr. B.J. Johnson at the University of Georgia revealed that topdressing was more effective in reducing thatch in Tifway bermudagrass than aeration or vertical mowing. Carrow and Johnson report that topdressing mixed with thatch becomes mat. "Even if the thatch does not decompose rapidly, the mat situation that is encouraged provides a better turfgrass growing medium."

A Washington golf course superintendent reports that sand topdressing has reduced the population of *Poa annua* on his bentgrass greens. The greens were constructed of organic soil 70 years ago without drain tile. Topdressing saved him from rebuilding 20 greens. A Georgia superintendent has reduced the number of times he aerates his greens by topdressing and dragging sand into the core holes.

A superintendent can't help but notice the soil and roots on his greens each time he changes the cup. When he notices that the roots stop where the old soil ends and the topdressing starts, he has a decision to make. He can continue topdressing to make the topdressing material deep enough for healthy root growth. He can attempt to mix the subsoil with the topdressing by deep cultivation. He can cut trenches to connect the old drain lines with the new topsoil. Or he can rebuild. These are tough choices.

Sports turf managers should take core samples of topdressed areas regularly to

check root growth, soil moisture and compatibility. Aerate periodically to break through any subsurface layers. Explore occasional deep cultivation or channel drains to preserve drainage. Avoid using pure sand as a topdressing unless you are willing to make the adjustments in maintenance.

Rebuilding is the final option. Technically the field should have been constructed with properly textured soil in the first place. If it had been, and you topdressed with the same soil, there wouldn't be a compatibility problem. Even when a field is rebuilt, topdressing is the best way to preserve a smooth, consistent and safe surface.

Just in case topdressing can't be worked out right away and your sports turf is not as smooth as it should be, remember that soil cores removed by aerifiers are essentially a form of topdressing. Let the cores dry for a day or two on the surface. Then use a drag to break them up and brush the soil into low spots. The combination of aerifying and topdressing with the cores will provide some of the same benefits as a prepared topdressing. Some sports turf managers collect cores for this purpose.

If directors of schools, parks, colleges and stadiums want safe sports turf, eventually they will have to make a commitment to proper field construction. Until they do, and after they do, topdressing is one technique that will go a long way toward providing safe, consistently playable sports turf. □

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