

Proper drainage is one of the fundamentals for good greens.



Don't lose out to POOR DRAINAGE

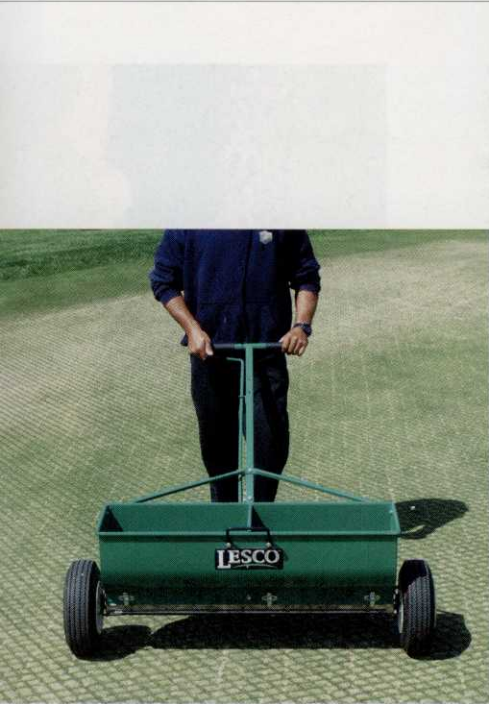
Green drainage is a critical part of any long-range plan.

By David McPherson

Putting greens with poor drainage are prone to problems when heavy rain and hot weather combine. Poorly drained greens tend to have poor soil oxygen, which is crucial for root health. As Al Schwemler, property manager, Toronto Golf Club, likes to say: "Drainage is one of the fundamentals for good greens."

Toronto Golf Club, designed by Harry S. Colt, is North America's third oldest club (1876). It recently underwent a complete renovation. As part of the long-range plan, the club added new subsurface green drainage to all 18 holes, plus the practice green. Like many of the tracks built in the late 1800s and early 20th century, it features old pushup greens, which were built with little consideration for drainage.

"We had good surface drainage on these old Colt greens, but there was no subsurface drainage," Schwemler says. "When doing our long-range plan, green drainage wasn't initially part



The greens drainage installation project underway at North Shore Country Club.

NORTH SHORE CC

of the project, but I threw this in from an agronomic standpoint. It was going to be a \$200,000-plus job though, so the club put it on hold. Then, when the whole project came in under budget, they put it back in.”

In 2009, Toronto Golf Club literally rebuilt its course – from new tee decks and bunkers to new grass in the rough, green expansions and a brand new irrigation system to name a few of the many changes the historic property made. It was the perfect time to install new green drainage as the course was closed from July 2009 to May 2010. The club hired TDI Golf and its XGD (Existing Greens Drainage) division, to install a subsurface drainage system to remove surface water more

Each green is unique. Therefore, design a drainage pattern using the green's natural contour to catch as much surface and ground water as possible.



rapidly and lower the water table, thereby improving turf growth. The procedure has gained a lot of recognition and popularity in the turf industry as an excellent method of improving the subsurface drainage of existing greens without rebuilding them.

"Conventional golf drainage theories rely on surface water as the primary focus, but this is absolutely false," explains Mark Luckhardt, vice-president, XGD, who helped develop and perfect TDI's XGD process more than 18 years ago. "We need to look at groundwater table issues first and foremost. XGD drainage is based on similar farm drainage practices which relies 99 per cent of the time on groundwater table lowering, and very few open surface inlets or catch basins. Every single mile of this simple, yet effective, drainage installation relies on controlling the subsurface groundwater table down to a manageable level out of the crop root zone."

This was the first time XGD had done an entire course. Schwemler says what was most interesting for them, because Toronto Golf Club has a sandy soil profile on the property, is that XGD backfilled the club's green drainage with their native soil. "If you put a blend of sand/peat back in the trenches, when you get hot, dry conditions, you can start to see those trenches," Schwemler says.

After only one season, Schwemler says he doesn't have any scientific proof as to the effectiveness of the new drainage, but he does have a superintendent's feel. "They are working great," he says. "Our soils drain significantly quicker and our greens are firming up faster after a series of rain events. It's also bringing more oxygen down to the soils, which should help reduce diseases and make the turf healthier in the long run."

The greens drainage project cost about \$230,000 for all 19 greens. The work was spread out among the entire renovation project with each green taking approximately five days to complete.

"The XGD system is a permanent solution to poorly drained and compacted greens, leading to increased aeration and the removal of excess moisture," Schwemler says. "The result is a revived green without the need for expensive and disruptive reconstruction. No other system minimizes the disruption to the green as XGD does, which ensures the surface is back in play as soon as possible. It was a great investment for our club."

intendents, Garrett Luck's budget is tight these days. The greenkeeper at North Shore Country Club in Mequon, Wis., recently developed a master plan to renovate the entire course. Part of his long-range plan included a complete rebuild of North Shore's greens.

But during the course of interviewing architects, the club decided they weren't willing

to spend the money needed to rebuild the greens. "Our members were happy with the conditions and subtleties of these old push-up greens," he explains. "But, we had about four inches of top dressing on top of a mucky soil, so our greens drained poorly ... we still needed to address this issue."

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specs was out of the question due to the cost, Luck looked for alternatives. That's when he discovered Golf Preservations, who the club hired to install green drainage on all 27 of its holes.

"At the onset, I thought it would be an improvement, but not nearly to the level that a complete rebuild would be," Luck says. "It has been a dramatic improvement, surpassing

our expectations in the ability of the greens to drain. For example, after a hard rain, we used to have standing water on 30 per cent of the greens. Since Golf Preservations installed the new drainage, now, within 20 minutes, the green surfaces are completely clear."

Luck used the opportunity of the greens being out of play to reseed them with a high-quality bentgrass; their consulting architect

also added some subtle contours to give the greens a little more interest on a select number of holes. "The members are very pleased," says Luck. "The balls don't plug now and they roll more smoothly. And, we can now mow and roll more quickly following rain events."

Samson Bailey, Golf Preservations' president, says the key to any green drainage project is choosing the right sand mix. "I recommend guys keep a sand mix that matches as closely as possible to their top three to four inches of aerifying mix. Most of the time, I tell clients to stay between two to four inches an hour on their sand mix. A lot of guys in the earlier days went sandy and now they have problems with their drainage lines showing up."

The first thing Bailey's crews perform is a survey to understand each green's topography. "Each green is unique," he explains. "We design a drainage pattern by using the natural contour of the green; then, we try to catch as much surface and ground water as we can. After we've used lasers to get the topography, we design a specific drainage layout for each green."

After the topography is determined, Bailey says the next step is to install six-foot centers to provide consistent drainage throughout the green.

This is followed by hand removing the sod in seven inch by 15 inch strips and placing plywood before trenching, Bailey says. The grade is then checked before installing two-inch perforated pipe with micro-slits to a depth of between 15 and 16 inches. The pipe is covered with a 6-2-2 greens mix to help direct the water into the system, he adds.

"After the mix is hand tamped in place, the sod is returned to its exact location to prevent shrinkage," says Bailey. "The sod is tamped level, the green is cleaned with blowers, and the green is immediately ready to roll, mow and play."

So, don't let Mother Nature wreak more havoc on your course than is necessary following a heavy storm. Take preventative measures now to tackle any subsurface greens issues your facility may have and make sure surface water drains away, rather than remains on the green.

Your members will thank you. **GCI**

David McPherson is a freelance writer based in Toronto.

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Help for your HAZARDS

Bunker liners can hold sand in place and improve drainage.

By Frank H. Andorka Jr.

An old golfing adage holds that if you don't like the condition of the bunkers, don't hit your ball into them. The real problem with bunkers is that they are, like the rest of the golf course, ever-changing entities. Even with the best drainage systems, bunkers can succumb to soil contamination and washed out sand during hard rains.

Bunker liners are growing in popularity as a potential remedy for some of the worst problems bunkers suffer. Here are some pointers and tips on how to use them most effectively.

DO YOUR HOMEWORK. Mike Hurdzan, principal at Hurdzan/Fry Design in Columbus, Ohio, says it's critical for superintendents to do their homework before deciding which bunker liner is best for their conditions. He recommends digging test bunkers and applying the different products and sands to ensure the proper product is used.

"You have to do a proper cost-benefit analysis of bunker liners because if you don't, you'll be sorry," Hurdzan says. "So many factors come into play when evaluating these products. It pays

in the long run to do a thorough investigation."

There are a number of factors to consider, including weather conditions – freezing and thawing can affect the way bunker liners perform – irrigation water quality, number of bunkers, maintenance labor, installation cost and sand quality and shape.

Bunker liners are most effective when they are added as a drainage aid. Hurdzan says, "What you're hoping to do is channel the water during hard rains into the drainage system

“If you’re not having to send crews out to put the sand back into bunkers, they can be doing other things like squeegeeing greens or picking debris off fairways. **The amount you save on labor can be huge.**”

— Chuck Hutton, SandTrapper

to keep puddles from forming in the bottom of your bunkers,” he says.

Chuck Hutton, sales representative for SandTrapper, says sand inconsistency is one of the most common complaints about bunkers. Bunker liners, because of their drainage capabilities, offer superintendents a chance to take that off golfers’ lists, he says.

“When the bunker drains more quickly, the sand is more consistent,” Hutton says. “You can offer golfers the same shot values from a bunker because the sand will have the same moisture content throughout.”

GEOTEXTILES. There are primarily two different types of liners on the market today – geotextile fabrics (such as those produced by SandMat and SandTrapper) and polyurethane sprays that bind the soil substrate together (manufactured by companies like Klingstone).

Geotextile liners, fabric liners that are stapled into the bunker face and rest underneath the sand, are designed to hold sand in place, channel water into the drainage systems and prevent sand erosion, says Ted Fist, product manager for SandMat, a geotextile liner. Superintendents installing geotextile liners will have more labor costs during installation, he says, but will have

less labor in putting bunkers back together after it rains.

“Our goal is to keep the water from crashing through the sand during an intense rainstorm and dislodging the substrate and contaminating the sand,” Fist says. “It keeps the drainage system cleaner and prevents catastrophic breakdowns that are hugely expensive to fix. The extra money they spend on installation on the front end will save them money down the road.”

Chuck Barber, superintendent at Indian Lakes Resort in Bloomington, Ill., sees the advantage to using geotextile fabrics as liners. He uses the SandMat 400. The bunker liners he uses keep the sand in place and improve drainage, a critical consideration in the Midwest where rains can sometimes wreak havoc with the sand in bunkers, he says.

“If you put the bunker liner into the face of your bunkers, you can create a direct channel into the drain tiles,” Barber says. “We have high-flashed bunkers, and we couldn’t keep sand on those slopes if we didn’t have bunker liners in place.”

Liners also help golf courses return the golf course to playability more quickly after a heavy rain, giving owners the opportunity to earn more money, Hutton says. “If you’re not having to send crews out to put the sand back

into bunkers, they can be doing other things like squeegeeing greens or picking debris off fairways,” he says. “The amount you save on labor can be huge.”

Barber recommends choosing the proper staples to install the fabrics. Otherwise, freezing and thawing conditions can pull the staples out of the ground.

“If you’re going to use the geotextiles, you absolutely need to install the number of staples recommended by the manufacturer,” Hurdzan says. “I’ve seen superintendents scrimp on the number of staples and the amount of fabric they use. They always end up paying for it later.”

Superintendents will have to change the way they care for bunkers. “When you install a geotextile, it does require superintendents to groom the bunkers,” Fist adds.

Geotextile liners all but eliminate mechanical raking, Barber says. “You have to take into account the additional labor you will need so that you don’t tear or damage the liner,” he says. “But if you take care of the sand and the liner, you will save yourself money in the long run.”

POLYURETHANE. The first objection Bob McCormick, general manager of Klingstone, will hear about his product – a polyure-



SANDMAT

part of the course to maintain
is the bunker," Johnson says.
"Anything we can do to help
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In the end, superintendents
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selves if bunker liners are worth
the cost for their specific course.

can't bring on the rate," Johnson
says. "You will have problems if
you do."
Sometimes it's difficult to sell
a bunker liner to a superintendent.

Johnson says that bunker liners
will reduce the amount of sand
that is lost during the course
of the year.
"We understand your role as a
superintendent."

A bunker liner keeps the drainage system cleaner and prevents catastrophic breakdowns that are expensive to fix.



thane bunker liner that binds the soil substrate together to prevent it from moving – is the cost.

“We understand going into a discussion with a superintendent that the first thing we’ll hear is that our system costs a lot more than other bunker liner systems,” McCormick says. “And it’s true. You will not get an instantaneous savings. But in the long run, you will save money.”

A spray-on polyurethane bunker liner costs superintendents about \$1.20 per square foot to install, whereas a geotextile liner will cost anywhere from 20 cents to 50 cents per square foot (not including labor). But McCormick argues the extra costs are worth it because of the polyurethane’s durability and ease of installation.

Tim Johnson, superintendent of Spring Hill Golf Club in Wayzata, Minn., first installed Klingstone’s product in his bunkers 13 years ago during a renovation. He is currently the company’s longest-standing customer, and he says the extra cost up front is worth it.

“The only failures we’ve had are places where we didn’t install it properly in the first place,” Johnson says. “We decided to go with permanent liners because weather conditions here in Minnesota can get pretty nasty in the winter.”

Johnson doesn’t have to replace sand after a heavy rains because the polyurethane bunker liners do a solid job of channeling the water into the drainage systems. He adds it’s also a labor savings during the installation.

“It’s easy to install,” Johnson says. “You can send a two-man crew out to install it, and it’s no harder than spraying for weeds. Once you put it on, you’re good for the next 10 years.”

Johnson can’t stress strongly enough how important it is to calculate the proper rate of the product before installation. “You

can’t skimp on the rate,” Johnson says. “You will have problems if you do.”

Sometimes it’s difficult to sell a greens committee or board of directors on the initial cost, so superintendents have to convince them to look down the road 10 or 15 years, Johnson says. The bottom-line for the product looks

much better the further out you go, he says.

In the end, superintendents will have to decide for themselves if bunker liners are appropriate for their specific courses conditions, Hurdzan says.

“When superintendents do an in-depth cost analysis, they’ll discover that the most expensive

part of the course to maintain is the bunkers,” Hurdzan says. “Anything superintendents can do to help bring down those costs is worth it.” **GCI**

Frank Andoraka Jr. is a freelance writer based in South Euclid, Ohio.



Liner Notes

Bunker work, like with any type of construction or renovation project at your facility, is a strategic financial investment meant to improve the playing experience for the golfer, as well as assist the superintendent and his team in their maintenance routine.

However, to fully realize the return on that investment it pays to do the project the right way, says Craig Porovne, vice president at Professional Turf Products.

Provone offers these liner notes to consider when embarking a bunker project.

- To accommodate cuts and waste, be sure to always add about 10 percent to your total square footage of liner.
- When determining sand, it’s a sound practice to add an extra inch for depth because sand will invariably infiltrate the liner.
- Cover the entire bunker, drains, etc. Failure to do this will result in drainage gravel being mixed in with your sand.
- If you’re covering the face of bunker and plan on laying sod on top of the liner, it makes sense to add 2-3 inches of soil and rub it into the liner for the turf’s roots to take hold of.
- An important, an often overlooked, practice is to use Liquid Nails or another construction adhesive on all seams.
- Most importantly, if you’re hiring a contractor to do the work, then make sure he is a certified builder from the GCBA list.