

INNOVATIONS

in golf course construction

→ From bunkers to irrigation, a wave of new technology and products is revolutionizing the way courses are built.

By Katie Thisdell

Before a summer trip to Brazil to visit a client's course, Jason Straka reflected on how much his job has changed in the past decade.

Ten years ago, he and his Fry/Straka Global Golf Course Design team would have walked around a client's property with a paper map in hand, trying to identify roughly where they were standing on the planned course.

Today, while they still carry stacks of course layouts, golf architects also use GPS on iPads. Innovative software allows an architect to locate exact spots on the property and determine proposed routings. While on the site, a designer who finds a unique landform or a dramatic view can easily make a note of it, with plans to put a tee or green there.

"It doesn't make it faster, but it makes it better," Straka said.

During the past decade, innovations in golf

course construction have included everything from better GPS applications for course design to custom-made sand for bunkers. New products and techniques aim to make customers more satisfied with their experience and reduce the amount of maintenance courses need.

Improvements in technology also can improve communication between architects and contractors. Such aid can help complete renovations faster by coordinating the efforts of various work crews.

"We used to have three or six crews working on an 18-hole course," said Jeff Cordes of Landscapes Unlimited. "Now we have three or six crews working on a single green."

This helps meet the demands of clients who want projects completed quickly.

Here are some areas of construction that have seen the biggest changes.



→ Bunkering

Bunker care has traditionally been one of the most labor-intensive aspects of golf course management, but newer products last longer and require less maintenance.

“People are looking at ways to save on labor; they’re looking to drive down maintenance costs,” Straka said. “The lack of labor is the No. 1, or close to the No. 1, most important issue facing construction and maintenance of golf courses. So, when you’re talking about trying to send 15 people out to repair bunkers after a rainstorm, you just don’t have that labor.”

Some owners have reduced, or have considered reducing the number of bunkers on their courses. New methods that reduce bunker maintenance have emerged, and design elements that allow bunkers to fit in with existing course design are also being considered.

What kind of lining are you going to choose? Fifteen years ago, synthetic liners were growing in popularity. Today, longer-lasting liners are coming on the market. There’s porous asphalt and concrete or gravel, which can improve drainage. Courses also are experimenting with a rubberized material. On the lower end, bentonite and clay are popular choices. There are even spray-on products.

Better Billy Bunker is one of the most popular products. It uses polymer-coated gravel, which results in a strong, flexible surface.

The costs and applications for bunker products vary widely, from \$1 per square foot to \$4 or \$5 per square foot for projects with difficult challenges to solve.

Even with all the options available, no single product offers the perfect answer.

“When it comes to the bunker liner, I don’t

JASON STRAKA
of Fry/Straka
Global Golf
Course Design
uses an iPad
to map out the
course. “It doesn’t
make it faster, but
it makes it better,”
he says.

PERMAEDGE is a system of building revetted bunkers with repurposed synthetic turf. This patented method delivers a natural aesthetic and lasts for decades. It has been installed at a variety of high-profile courses and is used by many architects as a new method of bunker construction.

FLEXXCAPE from IVI-GOLF is a new product in the bunker hardscape market. Manufactured from industrial PVC, Flexscape, an ultra-premium bunker liner, is seamless, durable and easy to install.



think anybody has completely solved the problem,” said John Colligan of Colligan Golf Design.

But having a good liner — and good sand — can help eliminate some of the more common and time-consuming issues, including contamination and washouts. “It’s pay me now or pay me later,” Straka said.

Then there’s the sand.

Golfers certainly care about sand and the condition of the bunkers. Straka said it typically is their second-highest area of concern after the

condition of the greens.

Today, there are myriad sands on the market, including some that can be customized to specific particle sizes, shapes and even colors, and some that help prevent balls from plugging in the bunkers. Additionally, there are manufactured sands, such as crushed silica gravel, which are designed for specific types of environments and landscapes.

These products are shipped around the country, creating options beyond local sands. But the prices are higher — as much as two or three times higher.

Durability has also improved.

“Back in the old days, bunkers were good for five years with no liner,” Colligan said. “Nowadays, with these new materials, you can depend on a bunker for 10 to 15 years.”

To determine what material is best, course owners are advised to experiment. Some courses, especially those at private clubs, will line several bunkers, each with a different material, to find out which is best for their property and their players. When they identify the one

that works best, they’ll use it in the rest of the bunkers.

Irrigation and the environment ←

Gone are the days of watering the fairways for a predetermined amount of time, using a few hundred sprinkler heads that threw water everywhere. That could leave the greens saturated, with water running down slopes and wasting money.

New irrigation systems give superintendents better control over which areas get watered, how much, when, and with what quality of water.

“Anything and everything is being done to influence and improve those situations,” Straka said.

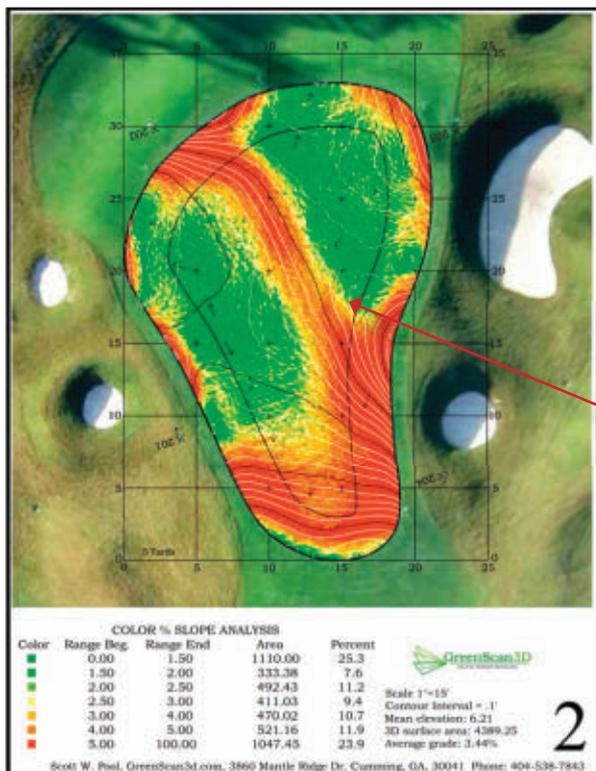
That includes treating water to improve its quality through processes such as reverse osmosis, bioremediation ponds and filtering.

Minimizing the amount of water being used saves water and money. That’s something everyone can get behind.

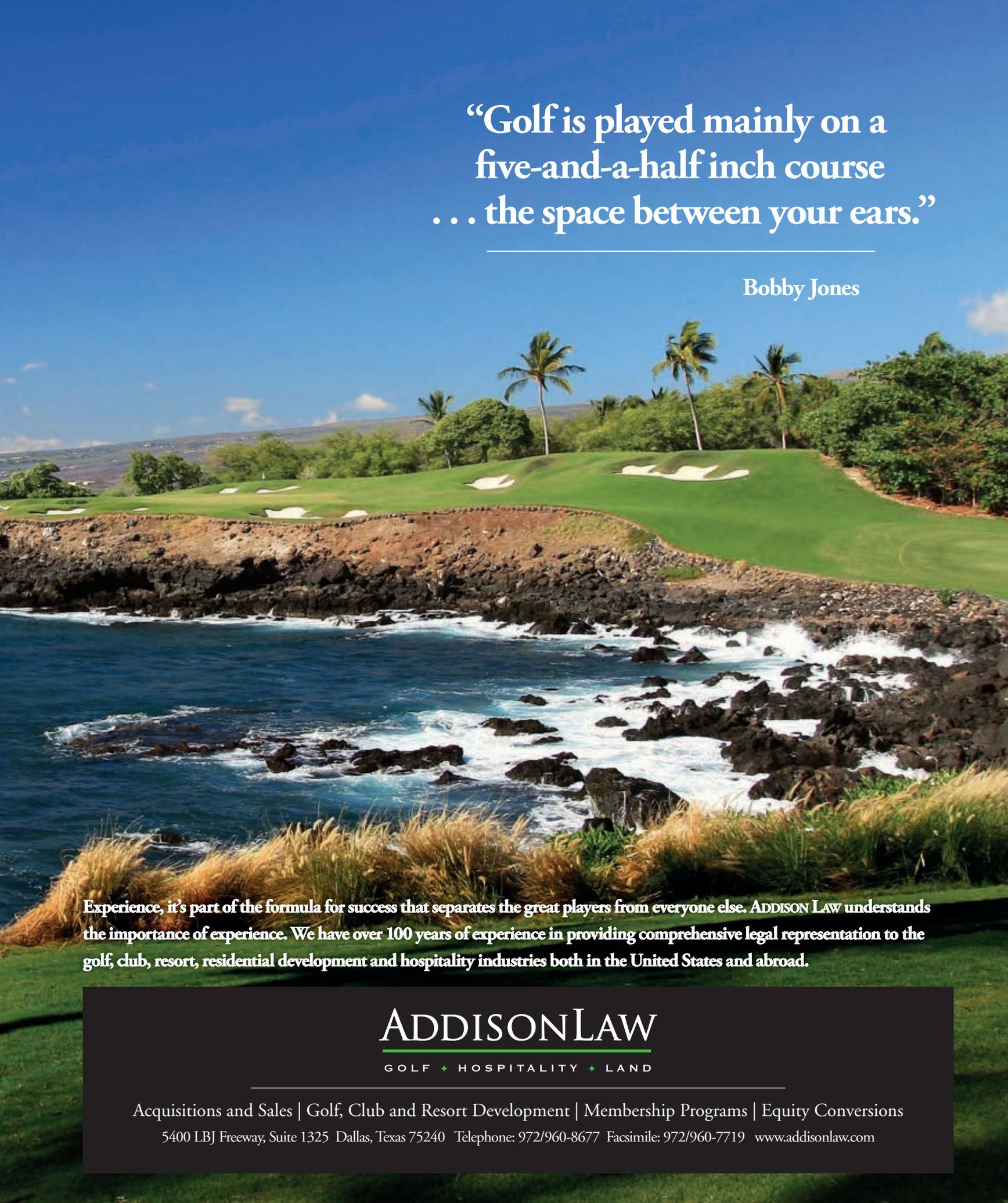
Irrigation innovations also include the number and types of nozzles, dispersion patterns, moisture sensors and adjustments for various types of grasses.

Low-pressure delivery systems allow water to reach specific areas without overwatering. That likely means courses will have more irrigation heads than they did previously. “Nowadays we have courses with 1,400, 1,800, 2,000 heads,” Colligan said.

Irrigation systems also use improved pipes these days. HDPE pipes are replacing PVC pipes. They are more flexible, have a longer life expectancy and are more environmentally friendly.



GREENSCAN3D uses 3D imaging to create a virtual surface that is used to analyze slopes and control grades. It helps superintendents control wet and dry spots, with steeper areas in red and flatter areas in green. The Digital Terrain Model produced can also be used for grade control when rebuilding greens to their original specifications or making minor adjustments to greens.



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Bobby Jones

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In the past several years, there's been a big jump in the number of courses that are using moisture sensors linked to individual irrigation heads. They're wireless, so they can communicate with master irrigation systems and send alerts when areas need water.

"With a lot of older systems . . . it could be raining and the system would still be running," Cordes said. "With newer technology, a weather

detection device will shut it off if it's raining, so you won't get unneeded watering."

Cordes said many systems that are 20 to 25 years old are being replaced these days. Most systems older than that already have been replaced or upgraded, he said. But there are also systems that are only five to 10 years old that may need some component replacements. Much of this depends on the type of water that

flows through the pipes and how the system is being used.

GPS allows courses to track players' traffic patterns and access points. By improving the efficiency of traffic flow, Straka said, course owners can save money. If they can take an area out of play, they can limit or cease irrigation and fertilizer application.

"If you have 10 to 20 acres that you have data for that people aren't playing in . . . you can take them out of production," Straka said. "That's a big environmental impact."

Water storage is another area where projects may vary.

At his Stevens Park Golf Course in Dallas, Colligan couldn't find a good place to build an irrigation lake. To do so would have required moving a sewer line and installing a liner for the lake. Instead, he designed a water tank that holds 400,000 gallons.

One of the benefits will be a minimal loss of water from evaporation, and that equates to savings.

"It's a long-term deal to recoup the costs," Colligan said.

New research and developments in grass types also affects the amount of water needed. Many grasses are being engineered to be more drought resistant.

"That's a really important aspect, because as water becomes limited, what's going to be driving new turf grass production is how drought resistant can we get those grasses," Straka said.

Required environmental standards and improved management practices, including erosion control and abatement, have affected projects during the past decade as well.

"They're more costly and require more time," Cordes said.

Increased regulation of chemicals has changed how turf removal and sterilization is done. Instead of fumigation, time-consuming mechanical methods are being used.

Some newer processes, such as heat or steam treatments or chemicals that are less harmful to the environment, are being developed.

Technology and time in design and construction

Today, most architects and contractors are

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working on renovations rather than new course construction. These projects have budgets that can range from several thousand dollars to several million.

Knowing what offers the best value — both in upfront costs and in expenses in years to come — is important.

“From an architect’s standpoint, when we have to get creative and work within a really tight budget, that’s where we shine,” Colligan said. “To do a good job for your client, you have to have a good grasp on what these different options cost.”

Having more options available improves projects overall, he added. That means there are also more ways to stand out from the competition through technologically advanced systems and designs.

Improved technology also allows for more efficient operations.



THE LYNX DASH (above left), Toro’s latest mobile accessibility product, is a dashboard that allows superintendents to monitor course conditions from a smart phone or tablet. Its functions include site-specific frost monitoring and it can help the maintenance staff make decisions on watering or play. Toro also has introduced the Infinity sprinkler (below left). Its shape allows it to be upgraded from the top of the sprinkler so courses can keep up with sprinkler technology advances and maintain the sprinkler without requiring digging.



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PRECISION TURF TECHNOLOGIES' drone supplies data for that can aid superintendents in water conservation, determining labor efficiencies, chemical applications and strategic planning.

“What gets measured gets managed,” Straka said. “If you can measure it, you can better manage it.”

For example, GPS devices not only can help determine the best flow for players on a course but also can help maintenance crews determine the most efficient routes for their work.

Fry/Straka is in the permitting process for a \$4 million course renovation at West Bay Club in Estero, Fla. GPS data loggers have already tracked the traffic patterns of players and staff, and that information will help ensure the best possible outcome for the project. Eight acres of turf removal has been planned, thanks to this initial data collection.

“We’re very concerned about the speed of play and not making the golf course more difficult,” Straka said. “We feel like we’ve got really good data to take this turf out and also not complicate play.”

Construction is planned to start in April 2018.

Then there are drones

Just five years ago, drones weren’t used in golf course construction or maintenance. As they grew in popularity in other industries, especially in other construction industries, they entered the golf world.

“Almost every superintendent buys a drone now,” Straka said. “There are things you can’t see by walking on the ground.”

That includes reviewing the progress of a project and examining turf color and health. An aerial vantage point also can give course owners and operators a perspective that previously was not available, and the effect goes far beyond capturing beautiful course photos for marketing purposes.

Some companies are selling infrared sensors that can produce images to help identify diseases, water issues and pressures that the turf may be experiencing that aren’t apparent to the naked eye.

Making the right decision ←

With such an influx of new technology making its way into the industry, how does a course owner know which are good products and services? As with anything, there are always going to be bright, shiny prospects that end up being duds. Some contractors and architects try to search out the best options for their clients.

“Just because it’s new doesn’t mean it’s good,” Straka said.

And just because something works today doesn’t mean it will work tomorrow.

Cordes expects to see more changes in terms of labor as equipment is developed and used for maintenance and construction that replaces human labor.

“For us, one of the biggest challenges is the supply and demand of labor as a resource to be able to execute our project,” he said.

The way architects and contractors do their work and communicate with each other has also sped up. With aerial and topographic maps readily available online, information can be gathered in much less time.

“It’s really made the industry a much better world,” Colligan said.

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