



Sensing an irrigation change

A course on Alabama's Gulf Coast implements innovative use of flow sensors to minimize irrigation system mechanical problems.

Brad Orndorff, CGCS

In superintendents' quest to put forth the best possible playing conditions for golfers, most come to accept that some things affecting those conditions, such as weather, are simply beyond their control.

There are other things, though, that superintendents believe they should be able to control, and that includes a facility's irrigation system. Yet, with something as large and complex as today's systems, occasional problems are inevitable, and pipe breaks, rotors damaged by aerators and other mechanical problems are the realities of maintaining a golf course. Still, these problems leave many superintendents extremely frustrated and can drive down a course's bottom line through play disruption and high repair costs.

As superintendent of Gulf Shores (Ala.) Golf Club (which changed its name to the Golf Club at the Wharf in 2007), I have faced these same problems on my course. So when the opportunity arose to install a state-of-the-art flow management and flow detection system that would help prevent flow malfunctions, it was an opportunity I couldn't refuse.



Above: A 2006 renovation at Gulf Shores GC presented an opportunity to upgrade to a sophisticated irrigation system.

Left: The system included 58 flow sensors on the course and two reserved for the recharge wells. Photos courtesy of Brad Orndorff, CGCS

A green light to innovation

Beginning in January 2006, our course underwent a complete renovation, a project that included a new irrigation system. The club's board of directors had given me the green light to explore all possibilities that would result in a high-efficiency system. To accomplish this, I turned to some long-time acquaintances for help.

I was fortunate to have known and worked with local irrigation designer Eric Merkt, who is vice president for Pro Rain Irrigation Services Inc. in Athens, Ala. We had both worked with Bill Seigle, a former superintendent who is now an irrigation management specialist with the Stoval Co., an irrigation distributor based in Buford, Ga.

For years the three of us had discussed how superintendents could solve many common irrigation system management worries using what we called an "automatic isolation" system. This concept involved isolating several areas of a golf course's irrigation system so each could be monitored individually and reacted to as needed.

Ten years ago, Merkt and Seigle worked on a large golf course and residential irrigation project at Regatta Bay in Destin, Fla., where they were able to experiment with the automatic isolation concept on the residential side. With the help of software and irrigation specialists from Rain Bird, they designed a new irrigation system using multiple flow sensors, allowing them to monitor and control specific sections of the subdivision. By monitoring the water flow, the system could sense when the gallons-per-minute exceeded requirements and automatically isolate that specific section of the system.

Seigle was the superintendent at Regatta Bay at the time and faced a situation where a cable worker knocked off a master valve, allowing water to pour freely from a 3-inch main line. The system picked up the problem from the flow sensor and shut off that part of the system. I can only imagine the damage that would have occurred had the problem gone unnoticed or how much time it would have taken to locate the problem and take care of it manually.

Technology catches up

Merkt and Seigle thought about that project a lot and always believed there should be a way to use technology to set up a similar system on a golf course. However, one element remained elusive: software that could monitor a significant



The advantages of Gulf Shores' system made it an easy sell to the club's board of directors. In addition to cost savings, it could also decrease damage to the greens and potentially reduce the likelihood of disease.

isolation system on the project. Because Seigle worked extensively with Rain Bird through his distributorship, he contacted the company to gauge its interest in taking part in the irrigation renovation, and they were eager to take part in such an innovative project.

In late 2005, we began developing a plan to integrate the concept of automatic isolation into our new irrigation system. Depending on the length of each hole, we looked at placing flow sensors in two or three locations in the fairways and one near the green. Our plan included 58 flow sensors on the course and two for the recharge wells. We decided to use normally open and normally closed electric valves to maintain a pressurized loop in our fairways and greens.

In addition to the flow sensors and electric valves, the system included a variety of irrigation components, including a Rain Bird pump station, weather station, Cirrus central control and Par+ES satellite controllers. It was a given that the added flow sensors and other needed hardware would increase the overall cost of the irrigation system. However, with the increased safety and efficiency gained through the plan, I thought the 5 to 6 percent increase in hard costs would be more than offset.

It's pretty easy to sell a plan like this when calculating the turf investment seen in just one green. We planted MiniVerde (ultradwarf) bermudagrass on sand-based greens, which could suffer severe damage from a greens-loop blow out. It

could also be costly; our estimates indicated such a malfunction could result in a loss of \$25,000 to \$30,000. Also, the added, unwanted water of a stuck sprinkler head running undetected for hours could greatly increase disease pressure on our greens complexes.

With the plan approved, construction began in January 2006 with the major work complete by August. We allowed for grow-in and did a little system troubleshooting, but basically were running full speed by fall. The system has performed as designed and has responded well in cases where we have had breaks (because of construction) or malfunctions.

Extra advantages

While our primary intent for this system was for automatic isolation, we've discovered a secondary benefit as well. I can audit my entire system regularly to see if I have flow problems caused by worn out or damaged parts.

For instance, once a month I set up a program to run every sprinkler head on the course for four minutes. This allows me to gauge how many gallons per minute each sprinkler head on every fairway should apply. I then do a monthly comparison to see if those per-gallon figures are matching up. If not, I check that specific section of the system to see what might be causing the problem. In addition to safety, the flow sensor system helps maintain a more consistent and playable golf course.

We've also received other benefits from this system. We're

using a decoder interface to read the sensors, and that decoder interface helps us read other information. For instance, with the two ultrasonic level devices, the decoder interface is able to read the level of the lake. If the lake drops below a certain level, one recharge well automatically turns on. If the lake gets even lower, the next well is turned on and the lake is refilled. The system allows us to get the lake level back where it needs to be without wasting water or electricity by unnecessarily running our wells.

We're also able to close valves electronically with a push of a button. This eliminates having to find, dig up and then use a key to manually shut off the valve. In seconds, we can close a valve and isolate a fairway with a radio from the opposite side of the course.

Keys to success

To my knowledge, the Golf Club at the Wharf is the first golf course in the country to use such a large number of flow sensors integrated into the entire irrigation system. As with any innovative idea, there is some trial-and-error and troubleshooting involved. However, the keys to achieving our goals with our system include having experts like Merkt and Seigle on hand to help manage the project and a company like Rain Bird (which is already working on similar projects) that was willing to go the extra mile to make everything work as designed.

Needless to say, we've been pleased with our system at the GC at the Wharf. With these types of efficiency advances in irrigation products, we can expect to see other golf courses begin integrating these ideas and technologies into their systems.

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