Case study: artificial turf cooling system at Whittier College

LIKE MOST COLLEGIATE ATHLETIC DIRECTORS, Rob Coleman at Whittier College had a tough time keeping up with the demands for his main sports venue, Chief Newman Field. During football season the turf had to be in top condition for Whittier's Division III home games, putting it off limits to all other events. Everything changed last summer, however, when the historic stadium was converted to artificial turf.

"The synthetic field completely revolutionized our sports program," said Coleman. "Along with football, Newman Field now hosts an incredible range of year-round activities such as intramural sports, lacrosse playoffs, soccer leagues, plus local high school events, like sports camps, cheerleading competitions and much more. The field has become a multi-dimensional facility; activities are scheduled nearly round-the-clock."

When the college decided to revamp the field, they had the financial support of enthusiastic alumni who could foresee the economic benefits of converting to synthetic. "We knew the new field would generate revenue from outside activities, such as soccer leagues and sports camps, which help support our athletic programs," said Coleman. Before making a decision, Coleman surveyed a number of synthetic turf installations at high schools and colleges in California.

He liked what he saw, with one exception: "The only disadvantage was the field tended to get hotter than a standard grass field, but we found a solution: state-of-the-art cooling which operates just like an irrigation system," he said.

Ready to roll, Coleman decided to go with Byrom-Davey of San Diego, CA, for field design and installation. Headed by contractor Steve Davey, Byrom-Davey has completed more than 100 synthetic fields for colleges, high schools and

Right: Through-the-top access allows easier field decoder connection to solenoid.

Groundskeeper Jose Toro with ICC remote activates M-125 sprinklers to cool down synthetic turf at Chief Newman Field, Whittier College.

All M-125 internal components can be reach with fast through-the-top access.

community parks in California and Nevada, and is among the most experienced artificial turf installers in the country. General superintendent Paul Pankow headed up the effort at Whittier.

After graduation ceremonies in May 2008, the old field was demolished and within 3 months the new field was ready for football practice and a big calendar of sports-related events.

The renovation team decided on UltraBlade Dual Fiber from Sprinturf. UltraBlade features a straight, soft polyethylene fiber that has aesthetic appeal while also minimizing field injury, such as cuts and abrasions.

To handle the cooling function, the team selected Hunter's ICC Controller with remote, along with an Underhill 2Wire control system and Underhill M-125 long-throw sprinklers. The cooling system was installed just like a standard irrigation plan.

"Sprinturf was one of the first synthetic turf manufacturers to introduce the concept of a cooling system," says Jim McAllister, regional representative for the Sprinturf company, which has installed more than 400 fields across the U.S.

"Rinsing and dusting off the surface every week or two, especially on a high-demand field like Chief Newman, is a very practical idea. During hot summer months, it keeps the playing surface cool and comfortable and prevents heat stress or dehydration," said McAllister.

Newman Field covers 380 feet x 206 feet, approximately 80,000 square feet. During installation, a perforated drain pipe was laid around the perimeter of the field and a flat drain was then placed in a herringbone pattern on an impermeable membrane. Before the all-rubber infill carpet was laid down, the base was built up with 4 inches of aggregate stone, topped with a fine aggregate and Sprinturf's Stablion backing.

Eight M-125 valve-in-head sprinklers were placed around the perimeter. The M-125s have a 125-foot throwing radius and were spaced 120 feet apart, four along each sideline. Half the heads are adjusted to 180 degrees and four are set at just over 90 degrees. Each operates as a separate zone in the 2Wire system.

The M-125s feature two extra-high-capacity nozzles for an extended throw radius, along with a 4-inch pop-up height and a 22-degree trajectory. Sprinkler covers can also be fitted with green artificial turf so they blend right into the field.

"The M-125s provide enough long-distance coverage so that we only need cooling sprinklers along the edge of the field, which minimizes safety issues in the playing area," said Pankow.

"Cooling systems are strictly an option, but fields that have it are much more comfortable and safer for play from June through September."

Byrom-Davey proposed using two-wire because, they explained, it was more economical to install, easier to maintain and could quickly be expanded in the future, if needed. In 2008 Byrom-Davey installed a series of 2Wire systems on sports fields, using valve-in-head M-125 rotors as cooling sprinklers. They discovered their crews also prefer the new two-wire technology.

"It took just a day of two-wire training and our crews had it figured out.

"2Wire technology made it possible to run just two lines from the ICC to each M-125 sequentially around the field, while following the new 3-inch main water line. There was no extra trenching back and forth to the controller, though we ran a third wire as a spare.

"Having a third wire in the ground is good back-up in case a wire is damaged. It's a lot less expensive than cutting apart the synthetic turf," said Pankow.

The M-125 valve-in-head rotor features a unique design that is ideal for 2Wire turf cooling systems. The weather-resistant plastic housing has a removable cover for through-the-top access. With the cover removed, the installer can easily attach a field decoder to the sprinkler solenoid.

If troubleshooting is required, through-the-top access also means the synthetic turf never needs to be cut apart and repaired.

Before an event, the sprinklers are activated one at a time using the ICC remote. With a 125-foot throwing radius and 100-gallon-per-minute delivery, the entire field can be cooled and cleaned in a matter of minutes.

"We pull a sweeper behind a golf cart once a week to pick up leaves and debris, and we pull a greens groomer every three or four weeks. The stiff groomer brushes spruce up the fibers so the blades stand up straight for a fresh appearance. That's pretty much it," said Coleman.

The price tag for Newman Field was $700,000 to $800,000. The synthetic turf was approximately $450,000 of that amount and the cooling system approximately $30,000.

"At Byrom-Davey we've been installing state-of-the-art synthetic track and fields for nearly 10 years and have seen significant improvements in quality, aesthetics and safety. Turf manufacturers typically offer 8-year warranties, but we've installed fields that have been down for 10 years and are still performing well," said Pankow.

"Our experience tells us that synthetic turf is the future in sports fields and tracks, especially in the Southwest where water use is a major concern," said Pankow.

Installation

"The first step is to snap the Underhill Decoder Module into the ICC Controller in the first module slot," said Pankow.

Each 2Wire field decoder was then programmed with a unique station address, using an Underhill portable programmer/tester. (There is also a built-in decoder programmer on the ICC Decoder Module, which allows the installer to program a field decoder by inserting red and black decoder wires into the ICC Decoder Module.)

The crew routed the main two-wire cable from the ICC to each valve-in-head M-125 and connected the 2Wire field decoders to the sprinkler solenoids. Back at the ICC Controller, they ran the main two-wire cable through the conduit and attached the conduit to the controller at the large portal at the right side bottom of the cabinet. They finished by connecting the wires to the Decoder Module's L1 and L2.

As the controller "calls up" each decoder station, power runs down the main two-wire cable along with the digital signal (the address) specific to each field decoder. When the decoder/receiver hears its address, it applies voltage to the solenoid, completing communication and activating the sprinkler.

Both the 2Wire Decoder Module and field decoders have a two-year warranty that includes lightning protection, even with direct hits. Two-wire systems generally offer greater resistance to lightning damage because there is less copper wire in the ground. No field grounding is required for decoders along the two-wire path, but the Decoder Module should be properly grounded at the controller.

Hardwick Creative Services, Encinitas, CA supplied this article, www.hardwickcreative.com. ■

Irrigation&Drainage **By Paul Gannett**

Reducing water use with remote weather stations

REMOTE WEATHER STATIONS provide an ideal platform for turf managers looking to reduce irrigation costs and water use. Equipped with soil moisture sensors, they can be used to automate irrigation based on soil moisture, or allow you to monitor soil moisture and optimize irrigation schedules. Typically web-enabled software provides the remote access to data from any web browser as well as the ability to remotely change system settings.

There are two ways to use this technology: one, use soil moisture readings to automatically turn on irrigation when soil moisture levels get low and two, monitor a timer-based irrigation system. In the latter case, you use the soil moisture data to verify that the desired range is being obtained and then adjust the irrigation schedule as needed.

In the first case, system alarms are configured to activate the irrigation system when the soil moisture goes below the desired minimum, and to turn the system off when the soil moisture nears saturation. The set points depend on the soil type. Multiple soil moisture sensors can be deployed to get a better profile of soil moisture, and trigger irrigation if any area is too dry. A text-message notification can also be sent when irrigation is turned on. This way you can go out to the site and do a visual inspection to verify that all the sprinkler heads are in fact working.

The other approach is use the remote weather station to verify that the soil moisture is staying within the optimal range for the turf. If not, the irrigation frequency or duration can be increased or decreased as needed. Also, if a pressure sensor is included in the system, alarms can be set up to send a text message any time the pumps turn on.

A rain sensor can be added since it's often important to know how much rain fell at each site, since rainfall can vary widely over an area. This sensor can also be used to verify irrigation amounts if it is deployed in the irrigated area (if using a sprinkler-based system.) You also can add a second pressure sensor to your station to monitor filter clogging. This is done by connecting a pressure sensor to the lines on either side of a filter. When there is a large pressure drop across the filter, it means the filter needs to be cleaned.

Remote weather stations can save you time and money by boosting monitoring efficiency in three ways:

Reducing the cost of maintaining a weather station. After initial system deployment in the field, many things can happen. No matter how well-built and durable the hardware and sensors, rodents chew through cables; birds nest in rain gauges; and lightning and vandals strike. What's more, different seasons may require you to change logging intervals or set an alarm weeks or months after you deploy your station.

The truth is, many users check on their weather stations, if possible. Data is just too valuable to risk losing it. These units allow you to log on to the Internet to ensure that things are running smoothly and make adjustments. If a problem is detected, you can make a field visit to fix the problem.

Reduce the cost of retrieving data. Visiting the field to retrieve data requires money and time. There may also be instances where you will need to do more than just download your data; field sampling or qualitative observations may be best done under certain environmental conditions, and it is good to know that you are not wasting time visiting a field site under suboptimal conditions. Downloading your data remotely also means that there's no need to worry about taking a laptop computer out into the field. And since your data is available over the Internet, you can share it with colleagues from your office.

Reduce the costs associated with losing data. Remote communications lets you know if something is wrong as soon as you check your data on the Internet, or you can even set up sensor and system alarms that immediately notify you by email or text message when something goes wrong. It may even be possible to fix the problem from your desk. This reduces the chances of losing your data due to some type of system error. ■

Paul Gannett is with Onset Computer Corporation, www.onsetcomp.com, which offers the HOBO U30 remote monitoring system that incorporates either built-in GSM cellular or Wi-Fi communication.