Commentary

Progress in irrigation technology means choice

By SCOTT MORGAN

Irrigation is defined as the practice of supplying arable land with water. A simple concept, yet the practice of irrigation has become increasingly complex. As most people familiar with the golf course industry know, the superintendent is facing a more complex set of requirements. Effluent water usage, government-driven regulations and multiple customer requirements and expectations complicate and conflict.

Every time a new regulation or expectation emerges, it increases the complexity of the superintendent's job. Hence, the equipment related to irrigation has also become increasingly complex.

My wife, a software engineer for a major aerospace company, related a story to me. Whenever the work environment at her office gets a little testy, the engineers start musing about careers in less technically demanding industries. Of course, irrigation is thought of as one of those less demanding industries. The logic seems to run like this: "How hard can it be to build an irrigation controller? 4:00 a.m. Water on. 4:05 a.m. Water off."

Of course, the logic offered up by my wife's associates does not hold true. Some radical changes have occurred in the irrigation industry over the last 10 or 15 years. Each one of those changes has added to the complexity of irrigation. An analysis of those changes will lead us to some idea of what direction the technology in the industry may be heading.

One of the long-running debates has centered upon the method of driving a sprinkler's rotation. Does one use the impact method or does one use the gear-driven method? At one time, the major industry competitors were oriented against one another in this debate. The usual sales pitches touted the impact drives as having a simpler design. This meant that water passed through the sprinkler in a straighter course, allowing for more energy efficiency and higher resistance to debris.

Now that gear-drives have taken over, one can assume that the straight-through design of the impact drive was not an advantage. Instead, it succumbed to a technology that was more complex and more flexible. Gear-drives were improved to be more pressure-efficient than impacts and equaled or exceeded impacts in durability and debris resistance.

Today, an important on gear-drive technology is not clearly evident. Some of the major manufacturers are just developing gear-drive sprinklers and will not be ready to innovate beyond that technology soon. In fact, it is more likely that the next major change involving a sprinkler will be associated with its actuation rather than its ability to distribute water.

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Returning to the concept of "4:00 a.m., water on," it is important to note the basic factors that a sophisticated, computer-controlled irrigation system must recognize and manage. These factors include evapotranspiration rate, rainfall, plant materials, soil types, soil compaction, terrain slope, geographic location, pH factor and system design. Combine these requirements with flow management, environmental sensing and field satellite input and it is easy to see the complexity.

Fortunately, software is very flexible. One can create and modify according to changing requirements without investing in tooling or production facilities. The trade-off is the increasing reliance on the micro computer. As we are already seeing in the personal computing industry, the new micro computers will have standard eight to 16 megabytes or RAM and hard-drives in the 400 megabyte range. The computer itself adds to the complexity.

No matter how good the software and hardware is, computer systems require a tremendous amount of support. In the future, computer-controlled central software will be even easier to use. However, system support will be even more crucial. Manufacturers will have to invest more time and resources in supporting systems. They will need to develop dedicated organizations specially focused on computer-controlled system support. These organizations will have the tools to look into the superintendent's computer to diagnose and solve problems.

In fact, these dedicated organizations may even source the computers for the golf course, be capable of fast component replacement service and offer cradle-to-grave warranties and upgrades. All of this is an effort to make the job of managing golf course irrigation less complex.

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