



What Irrigation Systems Managers Are Doing To Save Water, Energy and Labor

BY PAUL J. ROCHE

A GOLF COURSE IRRIGATION SYSTEM CAN BE CALLED UPON TO DELIVER 20 MILLION TO OVER 200 MILLION GALLONS OF WATER A YEAR DEPENDING ON THE REGION OF THE COUNTRY.

Pumping stations require electrical power to move large volumes of water

to 800 - 3000 or more sprinklers across the golf course. Operational costs in the form of water, electricity and labor can be significant, which is why strategies are used to maximize efficiency.

Use less water maintaining existing equipment – Add new strategies:

A routine sprinkler maintenance program can help ensure they are operating efficiently. Field studies show that level sprinklers distribute water more evenly and can save up to eight percent or more on the amount of water required.

Other maintenance procedures include inspection to make sure nozzles are not clogged, sprinklers are rotating properly and that part circle arc adjustments are set correctly. Performing a water distribution audit every 3 – 5 years is also recommended to check sprinkler nozzle performance.

An audit is a simple test procedure where a Certified Golf Irrigation Auditor (CGIA) places catch cans between sprinklers to actually measure and record the uniformity of water application. This test helps a superintendent understand the application rate and uniformity of their sprinklers, which helps in determining operating times for sprinklers. (See Figure 1)

Strategies for improvements can also be made if uniformities are low, which may include replacing nozzles, repositioning sprinklers or adding some sprinklers that target specific areas and reduce the labor of hand watering.

When it rains the dilemma for the irrigation system operator is, “Do I shut the water off and if I do what if I don’t get enough rain and the course still needs some water?”

Until recently the answer was to either continue with irrigation and risk overwatering; or shut off the water and

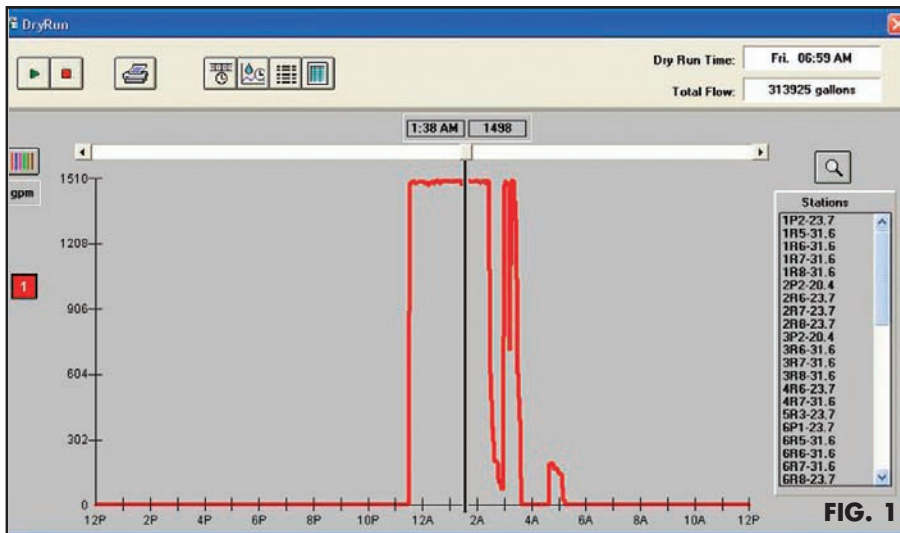


FIG. 1

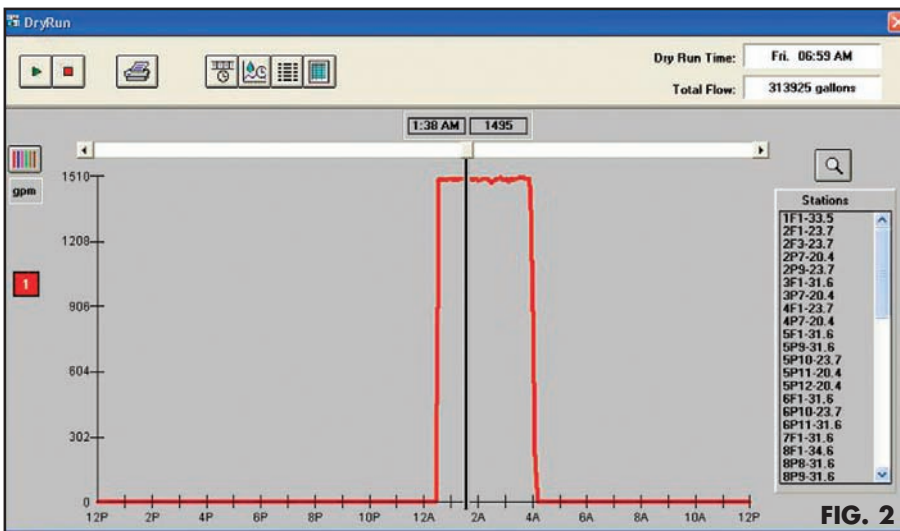


FIG. 2

risk not providing enough water to the turfgrass. Today rain monitoring devices can be added to some systems to automatically “pause” the irrigation cycle during a rain event.

These inexpensive devices work with the central control system to make important decisions completely independently. If the rain event is more than what was required by the irrigation system the irrigation system is simply turned off. Conversely, if the rain event is less than what the system was scheduled to distribute the central control system automatically adjusts the operating time of the remaining sprinklers so they don't over water.

Increase pump efficiency to save electrical costs: Pump station preventative maintenance (PM) programs and pump efficiency assessments (PEA) services are two services that can help improve performance and identify problems at the pump station.

A PM service is a mechanical inspection and routine maintenance procedure that keeps pumping equipment in proper operational condition – this is similar to taking your car for an oil change and a tire rotation. A PEA is a more detailed analysis of individual pump efficiency and can indicate pump or motor issues that should be addressed.

An effective way of increasing operational efficiency is to improve Water

Window Efficiency (WWE - see Water Window Special Report at www.rain-bird.com/performance).

Water window efficiency is a measurement of how effectively a control system is able to maximize the potential flow capacity of the pumping station. The benefits of a high WWE include:

- Reducing the time it takes to operate the system
- Operating pumps at their best efficiency points (all pumps prefer to operate at peak capacity, operating a pump below its intended design point is inefficient and increases operational costs), and
- Reducing the number of times pumps cycle on and off which has electrical and mechanical consequences (unnecessary additional wear and tear).

Depending on the type of central controls, increasing the WWE can be a simple process taking only a few minutes and can provide significant benefits over time.

In **Figure 2** a WWE of 77 percent shows that the system flow rate was inconsistent, causing pumps to cycle on and off while extending the operating time of the irrigation system. After some adjustments this course improved their WWE dramatically to 97 percent (Figure 3) and is now applying the same amount of water in less time, maximizing system efficiency and reducing unnecessary pump cycling.

Sometimes the addition of new technology can increase operational efficiency to the point of significant economic return. Special software allows the pump station and central control equipment to communicate directly with each other throughout the day and throughout an irrigation cycle.

The ability to conduct this two-way conversation provides a way for the pump station to “ask” the central control system to turn sprinklers on or off so that the pumping station is operating at its maximum capacity, which reduces operational costs.

Increasing efficiency reduces labor costs: Golf course superintendents are working hard to find ways to reduce water, electricity and labor costs. Ensuring sprinklers are in the right location and are operating at peak efficiency can reduce labor required for hand watering.

Managing rainfall effectively reduces the time and effort to manually readjust sprinkler programs and the resulting scramble effect of mobilizing a crew to water the golf course during play. The proper maintenance and management of the pumping station and maximizing its operational efficiency helps promote reliable operation without user intervention. Some of these strategies are fairly inexpensive to incorporate and have significant potential saving benefits. **BR**

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