Intelligent Central Controls can Save Water and Electricity - Part I

BY **PAUL J. ROCHE**

SAVING WATER AND ELECTRICITY HAS NEVER BEEN MORE IMPORTANT THAN IT IS TODAY.

It's not generally recognized in the community at large that golf irrigation system managers are some of the world's best water managers. As a result, they remain under a disproportionate amount of scrutiny.

It's imperative that the golf turf manager takes advantage of the proper tools to help them manage their irrigation systems to the highest degree.

Good irrigation system managers are always looking at ways to better manage their water supplies and to reduce any unnecessary wear and tear on their pumping station. One of the most obvious ways to save water and electricity is to apply water with a high degree of uniformity, which prevents overwatering all the turf to address dry spots.

But even if a golf course is using sprinklers that apply water with exceptional uniformity, there are still some great ways to reduce water consumption, potentially millions of gallons, and the pump related costs that go with it.

WHEN TO WATER

Golf course irrigation managers water at night for a number of different reasons. From a management perspective, there is no interference with play or course maintenance. Additionally, water losses because of evaporation are eliminated and winds are typically at their lowest, reducing sprinkler drift.

From an agronomic standpoint watering overnight, especially during the earlier hours of the morning, can reduce the chance of turfgrass diseases, as most disease pathogens require water to develop and propagate.

But there are also some economic advantages to watering at night too. Typically utility companies offer a reduced price for power consumption during the overnight hours, typically between 10 p.m. and 6 a.m. when there is a considerable reduction in the electrical demands on the power grid.

However, watering at night has historically posed a major problem for the golf irrigation manager because no one is there to monitor the system operation and take corrective action for any events that may occur like a short rainstorm.

Even with the most advanced irrigation systems today, many managers will still travel to the irrigation site at night to monitor and alter the system based on changing conditions.

As you will see, rapidly changing technology is allowing the irrigation system to respond intelligently and, more importantly, independently.

MANAGING RAINFALL HISTORICALLY AND TODAY

A common challenge for an irrigation system manager is the incorporation of natural rainfall into a scheduled irrigation event. It is understood that rainfall is almost always more or less than the desired irrigation system application. The choice, when rainfall occurs, has been to either cancel the irrigation event or let it continue to run.

More rainfall is somewhat easier to manage – a simple rain switch can cancel the irrigation at an acceptable threshold, typically more than the golf course would ideally receive.

It's the rain events where less than the desire irrigation application occurs that cause the most management headaches. For example, what happens if the golf course receives .20 inches of rainfall, but the irrigation system is programmed to apply .40 inches of irrigation?

If the irrigation system were to shut down then the course wouldn't get enough water and the water manager would be faced with either hand watering or running groups of sprinklers during the day to satisfy the plant water requirement. If the irrigation system continued to run, the course would receive .20 inches more water than necessary, resulting in poor playability and additional disease pressure.

Today, the irrigation manager has access to a system that will react to rainfall without any user intervention. Rainfall will be recognized, measured, and compensated for with user-defined settings. The end result is turf that is drier and healthier with greater playability.

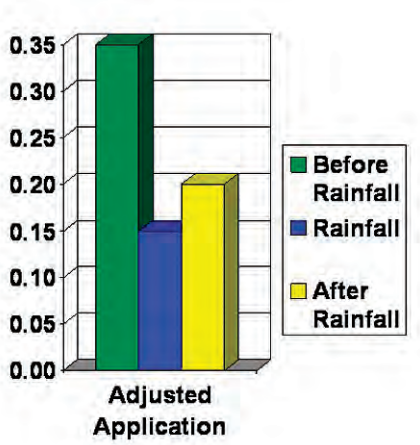
HOW DOES IT WORK?

Since golf courses can cover a large area, anywhere from 150 – 250 acres or more, it's not uncommon to receive different amounts of rainfall across the course. For that reason irrigation system managers typically locate two to four rain cans (see figure 1) across the property and assign the sprinklers that are in the region to that rain can.

These rain cans are capable of measuring and responding to as little as .01 inches (one hundredth of an inch) of rain - almost the first drop of water! As rainfall is detected and measured at the central control system the irrigation system manager can have several automatic preprogrammed, independent responses. These responses automatically go into action at a defined amount.

Let's look at a scenario where the irrigation system is programmed to apply .35 inches and it begins to rain. At a determined amount of rainfall the system leaps into action and the following occurs:

• The central computer recognizes the rainfall and gradually starts to **PAUSE** all active sprinklers throughout the course so the irrigation system is not operating in the rain. It will only pause those sprinklers that are assigned to a rain can that



is receiving rainfall. All other sprinklers will continue to operate.

• As it rains the central control systems continues to **MEASURE** the rainfall at each independent rain can.

• If the rain cans measure more than the programmed amount of water (in this example .35 inches) the system will automatically **CANCEL** all the operating time for all of the remaining sprinklers that have yet to operate.

• If rainfall stops and is less than the programmed sprinkler application rates, the system will automatically **ADJUST** the remaining sprinkler application rates downward. For example, if it only rained .15 inches during the rain event, all sprinkler runtimes will be adjusted to .20 inches (.35 inches - .15 inches).

• The irrigation system will then automatically **RESUME** the irrigation event using the new, adjusted runtimes. The system gradually turns sprinklers on until the system is operating at its designed flow rate.

All of these actions take place independent of the system operator so that the precise amount of water is applied to the golf course and valuable water and electricity is saved.

In Part 2 of this article we will discuss ways to further increase water and electrical savings by integrating central controls with the pumping station. **BR**

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