Intelligent Central Controls Can Save Water and Electricity - Part II

BY **BILL STINSON**

IRRIGATION CONTROL SYSTEMS AND THAT PUMPING STATION HAVE OPERATED INDEPENDENTLY FOR YEARS.

The irrigation system operator could, at best, monitor pump station activity and historical pump operation at his irrigation system computer.

Today the most advanced irrigation systems provide complete automatic integration between the irrigation system controls and the pump station. This interaction can lead to real savings in electrical costs and minimize costs that are incurred from unforeseen problems such as database flow errors, stuck valves, and pipe breaks.

A HISTORICAL PERSPECTIVE

Golf course pump stations operate by sensing pressure changes in the system. If there is a pressure drop, the pump station controls assume that flow is occurring and turn on a pump, or pumps, to meet that flow demand, while maintaining system pressure.

Typically, this flow demand is in the form of sprinklers running or hose watering. This method of control is very effective in providing the variable flows that a golf course requires on a daily basis and has been used in the industry for over 30 years.

However, there was always a major weakness in this method. What if the flow demand doesn't match the flow that the irrigation control system is calling for? A sprinkler head that sticks on would be an example of such a discrepancy and is certainly a nuisance.

But what if there's a pipe break gouging a crater into the side of a green? If the pump station is large enough to meet the flow demand while maintaining system pressure, it will happily pump hundreds of gallons of water a minute through the break for hours until the maintenance crew sees the problem and responds. This kind of problem is far more than a nuisance.

The best solution is to have an irrigation system that allows the irrigation controls to monitor and control the pump station operation, maximizing pumping efficiency and preventing worst-case scenarios from happening.

MAXIMIZING PUMP EFFICIENCY

A pump station's peak efficiency is at its full capacity design point in both flow and pressure. For decades, an irrigation manager would typically handicap the pump station to help absorb any irrigation anomalies that might happen, like stuck on sprinklers. This is important, because a pump station is designed to shut down if the design points are exceeded.

For example, an irrigation manager might have a 1,500 gallon per minute (GPM) pump station, but program his irrigation system to run at 1,200 GPM. This 20 percent would allow for 300 GPM of unaccounted flow, resulting from database discrepancies or small leaks, without causing an over-flow or under-pressure condition, potentially resulting in a shutdown of the entire system. This artificial buffer is an almost universal occurrence on older irrigation systems.

The problem with this approach is that an irrigation system always ran at less than peak efficiency. Nonetheless, it was a necessary trade off that helped ensure a full night's watering.

THE MODERN SOLUTION

Now, the irrigation system manager has a tool allowing for precise control of the system while eliminating self-inflicted inefficiencies. It's no longer necessary to create an artificial buffer in the irrigation software. The pump station will operate at its design point, saving electrical costs and reducing watering times.

This is accomplished with the use of sophisticated programming at the irrigation system computer. The central software will compare the hypothetical flow output, derived from the system database against the pump station flow being communicated back to the irrigation computer via

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Soil, Chemistry and Biological Testing

Are they necessary during these inflationary times?

BY **DAVE DOHERTY**

THE SKYROCKETING COST OF MATERIALS WE USE ON OUR GOLF COURSES IS HIGHER THAN AT ANY TIME IN OUR INDUSTRY'S HISTORY.

At the time that budgets were put together during the second half of last year (2007) no one could have foreseen the rise in cost of petroleum products by almost 100 percent or more, resulting in the cost of the chemicals we use on our golf courses being raised accordingly.

Some of the more affluent courses have been able to raise their budgets accordingly but they are the more fortunate ones with a sympathetic board or owner and the funds to do so.

The normal reaction to these skyrocketing costs has been to cut expenses somewhere. Most courses have reduced their staffs and are taking a closer look at the products they are using. Some courses have even gone so far as to eliminate the monies they have budgeted for soil and chemistry analysis as well as reducing the amount of fertilizer and other chemical products, which would normally be applied over the course of a year.

Most courses have also reduced irrigation to save on water cost. Although these actions result in the savings of monies short term the consequences of some of these cutbacks can be devastating long term.

Over the last 10 years we have learned that by knowing the conditions that exist in our courses from a physical, chemical and biological standpoint we can use that knowledge to apply the correct amount and type of chemicals that will best meet the needs of our plants.

The physical properties knowledge allows us to aerify to the proper depth and with the most efficient size tine, and to fill the holes with the proper material or leave them open.

The most effective and ineffective irrigation is dictated by the physical properties of the soil we are trying to water into – not onto or through.

When we irrigate onto an area that is out of balance with the physical properties we are wasting water.

If the area to be watered is sealed off (less than two inches of infiltration rate per hour) from compaction, excessive thatch, high organic matter, high percent of fines in the sand or soil, etc. then the water cannot penetrate into the root zone system and will run off to the surrounding areas.

If another area to be watered is too droughty (more than 20 inches of infiltration an hour) the water will pass through the area we are trying to water and in most cases out through our drains.

Not knowing what chemicals need to be applied and in what amounts and wasting water when irrigating will normally result in more wasted dollars than the combined testing costs.

I recently visited with a superintendent in Florida who explained to me that his total budget was $1.2 million per year and that he budgeted $6,000 per year for testing. This amounts to one-half of 1 percent of his total budget.

Another superintendent in the Midwest with a total budget of $700,000 allocates $3,500 a year for testing amounting to one-half of 1 percent a year of his total budget. They each felt that it was one of the best investments they make. **BR**

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radio or cable. This is done 24/7, unless the operator chooses to disable the monitoring system.

This information is used to make intelligent decisions. If there's a small difference, let's say less than 10 percent caused by incorrect nozzle information in the irrigation database, the irrigation computer might turn on or cancel sprinklers, as necessary, to ensure that the pump station is operating at its design point.

Or it might pause irrigation for a brief time to see if the discrepancy disappears, and then resume the irrigation cycle where it left off. If the discrepancy between irrigation computer and pump station is large, say more than 25 percent, then the system will cancel all irrigation and actually send a stop command to the pumps, preventing any catastrophes, like the green crater.

These actions would all be documented and sent to the system operator via text message or email, giving the opera-

That may be fine when dealing with day-in-day-out operations, but there is little shared citizenship on big picture items. Case in point: witness the lack of real progress on player development despite years of trying through Golf 20/20.

True to form, golf has yet to come together to develop industry-wide positions or action plans regarding water. The battles that have been won have been local or at the state level. (Again, see Georgia). That must change. To win the "water war" we in golf must act collectively and speak with One Voice regarding the industry's rightful position on access to water.

And when we do speak, what should we say and what should our goal be?

To me we must: **Achieve Water Independence Within Five Years.**

I define water independence as securing control over the stable, adequate supply of suitable water needed to responsibly irrigate the nation's golf courses. Granted, that means many different things depending on where you are in the country but, accepting those differences, it's still a goal we all can hold in common.

Gaining water independence will require several things of and from golf. For example:

1. Much greater use of recycled water for golf course irrigation. This is not to be taken lightly. Access to recycled water is becoming more costly and competitive. Developing appropriate recycled use agreements has become more challenging. To many water and sewer districts, recycled water has become a valuable asset. As a result, many experts say that the next great water wars in this country will be fought over recycled water. I agree.
2. State-by-state economic impact studies.
3. State-by-state, course-by-course BMPs for efficient golf course irrigation.
4. Key alliances with non-golf people, groups and organizations including: environmental engineers and attorneys, educators, university research groups, legislators, water agency personnel, etc.
5. Development of a water credit program for golf courses that irrigate responsibly, use recycled water and mitigate nutrient runoff. This would be analogous to the nationwide credit program spurring mitigation of carbon dioxide emissions.
6. Creation of a cap and trade marketplace for buying and selling water credits, which could become a significant financing vehicle for golf to build water infrastructure.
7. Development of an industry-wide task force of governing and representative organizations to represent golf's position on water.
8. Development of a comprehensive industry position on water access and use of a supporting public relations, lobbying, industry action plan to influence national and state water regulation.

In my view, golf has no option but to take action on water!

As quoted in the seminal paper, "Troubled Waters: Golf's Future In A Thirsty World," soon to be published by the National Golf Course Owners Association, Dr. Clark Throssell, Ph.D., director of research for the GCSAA says, "I wouldn't say we're at a crisis point but water, the quantity and quality of it, is the number one challenge for golf."

In the same paper, Dr. Bob Carrow, Ph.D., University of Georgia turfgrass and water quality specialist says, "If golf course owners are not willing to come to the table and state their case, how can they complain when someone else does it for them? And others will do it, no doubt." The May 2008 issue of Golf Digest said, "Golf in America will face a crisis over water."

At a fundamental level, much of human history has been a drama over the control of resources, many of them like water, provided by Mother Nature. Control of those resources has determined human fortunes for better or worse and that is where golf finds itself now.

If we lose control over water we have lost control over the fortunes of the industry itself. That simply cannot be allowed to happen and it is avoidable.

Let's get organized. Let's take action. Let's gain control.

Let's become independent. **BR**

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tor instant feedback on what's happening at the golf course.

All these actions and thresholds are user definable – each irrigation manager decides what level of automation is allowed to happen at their site and is notified of all actions that occur. The operator can resume manual control of the system at any point.

The latest technologies allow for improved irrigation system operation and efficiency, leading to significant savings in power and water and better playability. **BR**

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