

Intelligent

Irrigation

the runtime automatically gets adjusted to 10 minutes, due to the lower water requirement. On slopes and hills, the same 12 minute runtime may be broken into three cycles of 4 minutes each, with an hour between each cycle, to allow for better water penetration into the soil and to prevent runoff. "Cycle and soak" features, multiple start times and microclimate and soil adjustment factors are common on higher end software packages.

Many older golf courses have fairly good irrigation hardware irrigating their golf course, but the central control system, installed say, fifteen years ago, does not have the capabilities we have discussed above. And the golf course has "gotten by" just fine with the system for years. It still irrigates the golf course automatically, it's just not very efficient in terms of its ability to control where water is placed and for how long. As a result, more water is used per night than needs to be.

But if water savings are now a priority, then newer control systems (like more recent versions of central control software) need to be put into place. Sometimes greater efficiencies can be achieved by replacing just the irrigation control software; the sprinklers and hardware are pretty good and don't necessarily require immediate replacement.

SPRINKLER TECHNOLOGY

Sprinkler manufacturers have been consistently trying to improve sprinkler performance through research and development. Newer nozzles, newer gear drive assemblies, newer heads - all have been responsible for raising Distribution Uniformity levels for golf course irrigation.

Distribution Uniformity, or DU, is a measure of how uniformly an irrigation system delivers water to a specific area. Typical DU values for golf courses should be above 80 per cent; meaning that over 80 per cent of the water being distributed by a sprinkler or by the system is being applied uniformly. Higher DU values are now achievable due to technological advances in the manufacture of sprinkler heads. Using sprinkler / nozzle

Golf course superintendents are facing a daunting task in the face of new awareness about water issues, and find themselves trying to solve a pretty tough question – "How can I create perfect playing conditions while I use less and less water every year?"

A great number of golf courses in Canada are having their water usage numbers scrutinized in the face of oncoming water restrictions and tighter controls over how water is used. First, golf course pesticide use was (and still is) criticized and examined in great detail by a variety of legislative entities; now, water and irrigation practices are being placed under the microscope of inquiry.

THE TECHNOLOGY 'WAVE'

The golf industry has embraced the challenge of water conservation with open arms. For many years now, golf irrigation has had access to some of the most sophisticated irrigation technologies available.

Central control systems controlled by desktop computers are already the standard at most operations in the golf industry and capable of minute adjustments of water delivered anywhere on the golf course. The single greatest savings in labour in golf irrigation has been to move from a manual or semi-automatic system to a fully automated system, controlled by central control software.

There have been key technological advances in central control software for the golf industry in the past decade. Today, you can "fine tune" your irrigation system to perfectly match turfgrass water needs on a daily basis, and this article explores some of the newer "Intelligent" technologies that allow water savings to occur.

CENTRAL CONTROLS

Central control software was originally developed to automatically turn sprinklers on and off, but as with most technology, today's central control software, depending upon which model you purchase, can do many more things than just turning sprinklers on and off.

Newer software packages will allow an irrigation manager to adjust the irrigation schedule for every irrigation head on the golf course, based on the soil type involved, the grass species, the delivery rate of the irrigation system and any unique microclimate effects. This allows the irrigation system to automatically adjust irrigation schedules based on specific site factors.

For example, a typical fairway runtime might be 12 minutes. On one portion of the course, where the fairways have hot dry southern exposures, the system is capable of automatically adjusting the 12 minute runtime to 14 minutes, due to the increased need for water in this specific location of the fairways. At the same time, in heavily shaded areas of the fairways,



combinations that show consistently higher DU values will greatly conserve how much watering has to be done.

A simple example for an average Canadian golf course, irrigating 110 acres, is shown here. It clearly illustrates the enormity of the waste involved with poor DU values.

DU values can quickly be determined through irrigation audits which are an essential tool in assessing system performance.* If poor system performance is being caused by older outdated technology in the sprinkler heads, then a full system upgrade may be the best solution. Poor sprinkler performance, as measured by DU, cannot be fixed by changing the control software.

CHEMIGATION / FERTILIZER INJECTORS

In the last decade, more and more golf courses in Canada and the US have switched over to chemigation and/or fertigation systems. These injectors allow the use of chemicals or fertilizers to be spread through the irrigation system and then out onto the golf course.

Chemigation systems have become very popular due to water quality problems. In western Canada, for instance, where a lot of minerals and bicarbonates tend to show up in "hard" water, chemigation systems can treat the water to minimize the negative effects of this poor quality water.



Chemigation / Fertigation systems are only as accurate and effective as the irrigation system's Distribution Uniformity (DU).

Irrigation water pH levels can be adjusted and corrected through this technology very cost effectively; and this, in turn, will solve or minimize soil related pH problems.

DU value	Annual Irrigation H ₂ O demand (inches)	H ₂ O used / night (gallons)	H ₂ O used / year (gallons)
50%	9.6"	431,197	57,349,248
65%	9.6"	331,690	44,114,803
80%	9.6"	269,498	35,843,280

Fertilizer injectors are used throughout the country as liquid fertilizers create very quick turfgrass responses to fertility adjustments. Injector technology can be retrofitted to any irrigation system and allow the irrigation system to become a 'problem solver' for soil and water related problems. While injector technology is relatively inexpensive, the ongoing chemicals / fertilizers are not and costs of product should be considered.

Injector technology is only as good as the uniformity of the irrigation system. If an irrigation system has low DU, it will result in poor distribution of fertilizers and soil altering chemicals. Excessive fertilizers applied anywhere to the golf course, due to poor distribution patterns from the irrigation system, can create whole new problems with colour differences, maintenance headaches, etc. Poor DU also contributes to increased consumption of chemical and fertilizer solutions required for injector system effectiveness.

IMPROVED COMMUNICATION LINKS

As technology inevitably creeps into everything we do nowadays, communication management becomes critical, and in the world of golf course irrigation, this communication is critical to achieving water savings.

Communication between pumps and central controls, communication between the irrigation manager and individual controllers, communication between pumps, manufacturers and their pump stations – all of these links of communication can facilitate greater and greater water savings.

Having a communication link between the central control and the system in the field is important to know exactly what is happening in the field – which heads turned on and off, which ones didn't, which ones turned off before they were supposed to, which heads came on which weren't supposed to, etc. etc. Straightforward lower costing control systems tend to have simple one way forms of communication i.e. they tell you what you programmed to happen last night but do not tell you what actually happened last night. Larger, more complex control systems (which cost more) tend to have two way communication capabilities that allow you to know what you programmed and what actually happened.

That said, it is quite valuable to know what the irrigation system on the golf course actually did last night when it ran through its irrigation program.



New weather station technology greatly aids in providing an accurate ET date which is essential for proper irrigation management.



Handheld digital soil moisture sensors are becoming more common in golf irrigation management

Knowing what the pump is currently pumping and having accurate records of actual pumping loads is critical to proper irrigation management. The most up to date technologies do this consistently, where older or more basic systems may simply print off what was programmed to release and not detail actual performance glitches.

Today, pump manufacturers can adjust their pump stations' operating parameters remotely (via telephone or satellite signal) allowing for peak pumping capabilities and reduced electrical consumption.

Handheld devices, which eliminate walking over to controllers or the central control system to make system adjustments, are today the norm. Plus, handheld devices have now been routed through the central control system to allow much more flexible and easier changes to irrigation schedules.

Without a doubt, the convenience of these handheld devices have greatly increased irrigation managers' willingness to go to that extra degree of commitment in saving water by doing regular system

updates and changes to schedules, but in these days of increasingly steep operating costs, it will soon seem even more convenient to save money, as these systems have proven they do...

SENSOR TECHNOLOGY

Great advances have been made in the use of sensors to assist in controlling irrigation water use. The list of sensors used would include weather stations, as well as rain, soil moisture and wind sensors.

Weather stations have become a mainstay for golf course irrigation systems in that they give you accurate and up to the minute weather data that is crucial to proper irrigation planning and management. Weather station technology has grown much more sophisticated and reliable and yet has dropped in price to the point where most clubs can afford their own.

Used to their full advantage, weather stations are relied upon for accurate daily adjustment to irrigation schedules and to act as a weather log for developing customized historical weather records. Weather stations

Waterloo Biofilter Sewage Treatment Systems

- flexible modular design
- re-use for irrigation option
- low maintenance, low energy
 - no aerobic sludge
- seasonal or year-round operation
 - remote monitoring service
 - on-course comfort stations

143 Dennis Street
 Rockwood Ontario Canada N0B 2K0
 Ph: 519-856-0757 Fax: 519-856-0759
 www.waterloo-biofilter.com

BURNSIDE

Serving the Needs of the Golf Industry

We can help with:

- Approvals for Golf Course Development and Operations
- Irrigation Water Supply
- Sewage Treatment and Disposal
- Environmental Management Plans
- Building and Clubhouse Design Services
- Irrigation Design and Consulting
- Environmental Impact Assessment
- Drinking Water Assessment

Toll Free: (877) 799-8499
 E-mail: vcirone@rjburnside.com
 Website: www.rjburnside.com

Offices located throughout Ontario
 Members of OGSA, CGSA and Golfmax Suppliers to the NGCOA

are capable of accurate site specific ET calculations that are the core of good irrigation scheduling, and weather station technology has now become “seamless” in terms of how they connect to and communicate with central control systems.

In this sense, total automation of irrigation systems is possible.

Rain sensors greatly reduce over watering due to rain events and integrate with control systems to prevent unnecessary irrigation from occurring. This is the principle reason many US states have now legislated that rain sensors be hooked up to controllers, but it should be noted that it is important for these sensors to be installed correctly for them to be accurate and useful.

Soil moisture sensors have dramatically improved in technological sophistication and reliability in recent years. Historically, soil moisture sensors were used successfully in agriculture while the “new generation” of soil moisture sensors

integrate seamlessly into central control systems to prevent over watering.

Handheld digital soil moisture sensors are becoming more common in golf irrigation management as they provide instant analysis of soil moisture levels. These devices can quickly give you very accurate soil moisture readings which then form the basis of daily irrigation adjustments. In addition, all readings are recorded into ‘dataloggers’ for future downloading and record keeping.

LEADERSHIP BY DESIGN

Given the multitude of irrigation techniques, practices and new technology applied at golf facilities nationwide, the golf industry in Canada is truly leading the way with water conservation efforts. The combination of a number of newer technologies, combined with judicious water management practices, creates the scene for intelligent use of water, setting the scene for the future of the golf industry in the long run.

**The Canadian Golf Superintendents Association has organized and sponsored the Certified Golf Irrigation Auditor seminar numerous times across the country. For more information on Golf Auditing programs, contact your local CGSA Provincial Director.*



**DENNIS
McKERNAN**

Dennis is a former golf superintendent and is now the Education Director for the Irrigation Association (IA). For more information on irrigation technology or to see about IA Education classes throughout North America, view their website at www.irrigation.org or contact the author directly at dennis@irrigation.org.



**Improve your
Internet
Strategy**

Free Consultation!

**Your GolfmaxOnline
account is ready to go!**

GolfmaxOnline offers state-of-the-art Internet marketing and business tools exclusively to NGCOA Canada members. It has been developed in consultation with golf course owners by Golfmax Inc., the official technology partner of the NGCOA Canada. Every NGCOA Canada golf course has an account. You are invited to use the services that interest you. Contact us to discuss what services fit your needs.

- Create your own customer database
- Email your customers – target and send
- Post promotions to high traffic Websites
- Create new business with e-ticket offers
- Build and maintain your own Website
- Find discount opportunities from suppliers

**Set-up an appointment for a free
one hour telephone consultation.**

Call our toll free number now!



**What is at the root
of the success of so many great
Canadian Golf Courses?
Driving growth together...**

par ex **2 Strong Brands – 9 Great Partners!** **nu-gro**

www.nu-groturf.com

EXCLUSIVELY REPRESENTED BY:

East-Chem Inc., Newfoundland 709.747.3777	Halifax Seed Co. Inc., Nova Scotia, New Brunswick, PEI 902.455.4364
Eastern Turf Products Ltd., Nova Scotia, New Brunswick, PEI 902.468.8873	Keso Turf Supplies, Alberta and British Columbia 604.940.2240
Early's Farm & Garden Centre, Saskatchewan 306.931.1982	Turf Care Products Canada Ltd., Ontario 1.800.561.1432
Even Spray & Chemicals Limited, Manitoba 204.237.9095	Plant-Prod Quebec, Quebec 450.682.6110
	Ritchie Feed & Seed, Ottawa Valley / Quebec 613.741.4430

1-866-GOLFMAX (465-3629) golfmax@golfmax.ca www.golfmaxonline.com