

Advances in Golf Course Irrigation Design

For more than 20 years a small group of dedicated individuals has been quietly leading the golf industry through a revolution in irrigation technology. With little recognition for their contributions, they have helped the industry solve some serious challenges presented by rising water costs, increasing energy costs, and environmental issues, including conservation and the use of effluent water. They are irrigation design consultants.

While most golf course superintendents know who designed or remodeled their course, few know the name of the individual who designed their irrigation system. Part of the reason is that irrigation distributors and manufacturers have long provided design as a service to builders or courses doing their own construction. They still do. Every manufacturer today has golf specifications managers on staff to recommend products or changes to meet your irrigation needs.

However, with the high cost and complexity of advanced irrigation technology, golf course builders and architects have found that it's worth paying an irrigation design consultant a fee for his knowledge and experience in the field. Designing an irrigation system that's right for a major customer is no easy task. More and more companies are subcontracting this detail-oriented work to those who specialize in keeping abreast of competitive products and irrigation technology as a whole.

Most golf course builders and architects have a list of irrigation consultants they have worked with in the past. They have discovered that the irrigation designer can give them greater freedom in course design and a better grasp over budgets. When water and energy issues are raised, the irrigation designer is there to address them.

Roger Gordon, president of Gordon Irrigation Consultants in Laguna Hills, CA, was one of the first to specialize in golf course irrigation design in the late '60s. That was after he served as an irrigation designer for Automatic Irrigation Company, which designed and installed numerous golf

course irrigation systems in the Southwest. "It struck me then that there was a need for independent consultants," Gordon says.

"It really happened in phases," he adds. "Originally suppliers did most of the design. Then construction companies, mainly in the West and South, got involved by hiring their own designers. Eventually, markets like California had enough work for designers to break out on their own and make a living. Now we are more than designers, we are consultants who can provide an assortment of services from the initial planning stage through construction."

As golf course architects began to take advantage of their skills, irrigation consultants started getting jobs in Florida, Texas, the Carolinas, Illinois, Arizona, and Nevada. Today they travel the world to custom design irrigation systems for golf courses.

"I give Robert Trent Jones, Jr. a lot of credit for setting an example for other golf course architects to follow," says Gordon. Jones, who has the clout to insist that he be involved in all phases of construction, began to require that his irrigation consultants have the authority to oversee their designs in the field. "Architects don't want to be limited by a set of irrigation plans," revealed Gordon. "By keeping the consultant involved during construction, he can adapt the irrigation plans to fit changes the architect feels are important to the course."

A different version of the consultant's involvement through the golf course architect is provided by Cal Olson of Newport Beach, CA. Olson is one of very few architects that do their own irrigation design. "The architect needs a broader understanding of irrigation today to do his job," says Olson. "The list of items you need to analyze during design is growing. I feel it's important that I understand how my designs impact other costs. Since irrigation is a significant portion of the construction budget, I owe it to my clients to know as much about it as I can."

Golf course developers have also changed their attitude about irrigation con-

sultants. "Years ago many developers just wanted to get the course built to attract buyers for their real estate projects," reveals Dave Davis from Fontana, CA. "When the course had done its job, they sold it. There was little concern about the long-term cost of operation.

"That's changed, at least in the West and Southeast," he continues. "The cost of operation has become more important than the initial construction budget. Water, energy, and long-term quality are major issues today."

Gordon cringes when he thinks of the number of golf course irrigation systems that need to be replaced after a few years. "I've seen ten-year-old systems that were a disaster and had to be replaced, pipes and all," he warns. When you consider that the average cost today of an irrigation system for an 18-hole golf course is more than \$800,000, a consultant's fee of \$30,000 seems very reasonable.

Furthermore, courses which employ irrigation consultants once can go back to them for updates. Gordon cites Pasatiempo Golf Club in Santa Cruz, CA, as an example. "It was one of my first projects in 1969," he points out. In 1989, 20 years later, Gordon returned to Pasatiempo to bring the irrigation system up-to-date. After finding the pipes and hydraulics adaptable to new technology, the course was able to update his previous design just by changing heads and the control system.

Golf courses today are also changing their character by using different grasses, Davis remarks. Wall-to-wall bermuda courses are converting greens to creeping bentgrass and roughs to fescues. "More attention is being paid to roughs," he points out. "Private courses are treating the rough as a penalty. They want the grass in the roughs to be taller and lower maintenance. On the other hand, the rough is in play on municipal courses. Each requires a different type of irrigation."

Meanwhile, water shortages are forcing superintendents to restrict irrigation to greens, green banks, tees, and target areas of fairways. This requires greater control over the irrigation for each portion of the course. Outdated battery systems often don't provide the control needed by the superintendent to irrigate his course efficiently. They also prevent him from using new maintenance technology such as fertigation, matching irrigation schedules to weather conditions, and overseeding without wasting water.

Three things have helped advance the state of irrigation design today, according to Gaylon Coates, president of Coates Irrigation Consultants in Scottsdale, AZ. They are better maintenance practices by superintendents, improved irrigation products, and better design concepts. "When one person does something well in any of these areas, competition motivates the rest of us to respond," Coates states.

continued on page 36

Golf Course Irrigation Design

continued from page 34

"It's incredible the places that golf course architects want to water," he adds. "It becomes the job of the consultant, the manufacturer, and the superintendent to make the architect's vision a reality. All of us are amazed at what we can do to improve the quality of our courses, especially when you take into account the increased efficiency of irrigation systems today."

How does a golf course builder or superintendent justify the cost of improved control over irrigation to the owner or club members? You start by concentrating on

the cost of operation, says Davis.

First determine how many man-hours are spent by the maintenance staff just on operating the system. Quick-coupler systems are extremely labor-intensive. Battery systems with multiple field controllers can take hours to adjust to changing weather conditions.

Solid-state satellites trimmed adjustment time by providing greater flexibility with programming. Their expanded capability made practical the use of valve-in-head sprinklers. Now these satellites can be linked to a central computer at which the superintendent or irrigation specialist can

"Many times I have to ease the concerns of owners about the complexity of advanced irrigation systems...before they will commit to advanced designs."

CSI

CHEMIGATION SYSTEMS INTERNATIONAL, INC.

P.O. Box 247

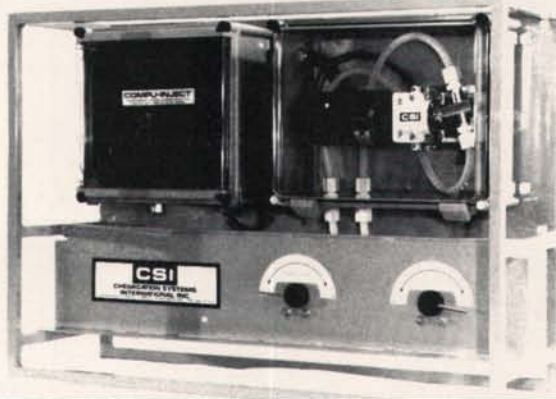
Montello, WI 53949

(608) 297-2041

PRESENTS:

THE COMPU-INJECT® STATE-OF-THE-ART – DESIGNED FOR TURF

- Programmable Modes (Proportional/Ratio, Batch, Continuous, Sequential)
- Multiple Pump Modules
- 0.5% Accuracy
- Wide Flow Range (Handles slurries, solvents, viscous & corrosive fluids)
- Liquid Crystal Display of Operational Data & Instructions
- Simple & Quick Calibration



Circle 143 on Postage Free Card

make field adjustments in a matter of seconds.

Next consider the pressure at which your system operates. Golf course irrigation systems used to operate at roughly 150 psi at the pump and 90 psi at the base of the head. Pumps have to work harder for each extra pound of pressure they produce, expending energy in the process. Manufacturers now make heads which operate at pressures as low as 50 to 60 psi. Pressure savings translate into energy savings.

Advances in pump design and controls also produce considerable savings in energy. By regulating the demand on the pump, one or more pump motors can function at their most efficient levels. Prefabricated pump stations designed specifically for golf courses have gone a long way to improve the supply end of the problem, says Coates.

Then there is water consumption. How can you deliver just the amount of water the turf, trees, and ornamentals on the course require under constantly changing weather conditions? There are two basic approaches. The first is to use moisture sensors in the root zone. If soil moisture levels are determined to be sufficient for healthy plant growth, then this information can be used to temporarily halt irrigation. This information is very site-specific, requiring a large number of sensors for a golf course.

The second approach is the weather station. A weather station is really a combination of sensors for rainfall, wind speed, humidity, solar radiation, and temperature. Data from all these devices can be used to calculate the approximate amount of water lost by turfgrasses to the environment during a given period of time. This amount, termed the evapotranspiration rate (ET), can be used to adjust normal station run times so that just the amount of water lost during the previous 24 hours is replaced.

Even if you have a grasp on the water needs of plants, you still need a way to deliver water where and when it is needed. Shaded, windy, sloped, and heavily trafficked areas have special water needs. Different soils, drainage, turfgrass types, and maintenance levels all need to be considered. Furthermore, any changes made



THE PROFESSIONAL'S CHOICE
... SINCE 1922

THE BASEBALL DIAMOND MIXES USED BY OVER 50 PROFESSIONAL TEAMS PLUS TOWNS AND SCHOOLS ACROSS THE U.S.A. AND CANADA. SPECIAL MIXES FOR INFIELDS, PITCHER'S MOUNDS, HOMEPLATE AREAS & RED WARNING TRACKS.

Terra-Green®

REDUCE RAIN DELAYS!

WITH
THE REDDER, LESS DUSTY
SOIL CONDITIONER & DRYING AGENT
THAT RETAINS MOISTURE
IN HOT WEATHER

PARTAC® GREEN SAND FOR DIVOT REPAIRS

The Ultimate Solution to Unightly
Divots at Televised Golf Tournaments
and other Sports Events!

AVAILABLE NATIONWIDE
1-800-247-2326
IN N.J. 201-637-4191

PARTAC® GOLF COURSE TOP-DRESSING



AMERICA'S PREMIUM TOP-DRESSING HEAT TREATED

CONTROL THATCH,
PROMOTE HEALTHY TURF
& SMOOTH PLAYING SURFACES

NATURAL SURFACES AND SUPPLIES FOR BASEBALL, GOLF, TENNIS, BOCCIE, HORSESHOES, VOLLEYBALL, TRACKS, PLAYGROUNDS, EQUESTRIAN, FOOTBALL, SOCCER & OTHER SPORTS!

DIAMOND DRY® • SUPER SOPPER® WATER REMOVAL MACHINES • HOLLYWOOD® BASES
RIGID BASEBALL DRAG MATS • TAMPERS • FLEXIBLE TURF DRAG MATS
YANKEE® RAKES & SQUEEGEES • TENNIS COURT SUPPLIES • WHITE® DRY MARKERS
JIFFY® WET MARKERS • MAUTZ® PAINTS & STENCILS • GUIDELINE® MARKER

PARTAC PEAT CORPORATION, KELSEY PARK, GREAT MEADOWS, N.J. 07838

as the course matures will require adjustments in irrigation.

The bottom line is flexibility, and that results in complexity. "Many times I have to ease the concerns of owners about the complexity of advanced irrigation systems," admits Gordon. "They are afraid that running a complex system is too difficult. We have to get them through the issue of complexity before they will commit to advanced designs. For the most part, today's computerized systems have been designed for the superintendent and are, as the saying goes, more 'user-friendly.' I think irrigation consultants have helped the industry get over that hurdle."

Gordon admits the initial programming of a central computer may be a bit scary. That is why manufacturers and consultants frequently help out when these systems are brought on line. There are a few consultants, such as Ken Christley in Phoenix, AZ, who specialize in helping superintendents get programs up and running. They are also valuable in making sure the superintendent takes full advantage of the capability of his computer and software.

But perhaps the most complicated part of irrigation design is underground. Pressures, flow rates, pipe sizing, valving, and dealing with changes in elevation are critical decisions which greatly influence the flexibility of golf course irrigation systems. This is where consultants shine.

The tremendous demand for golf courses combined with the decreasing availability of water clearly points to the need for greater efficiency in irrigation.

Any changes that may be required for water conservation, energy reduction, head relocation, or rezoning must be balanced with the hydraulics of the supply lines. Heads are designed to provide a specific coverage and flow rate at a predetermined pressure. They simply will not perform as intended if this requirement is not met. With hundreds or thousands of heads on a course, irrigation system design is a complicated puzzle where all parts must fit.

"There are some major changes taking place in irrigation design that require a second look at basic hydraulics," warns Mike Jarvis, who works for Gordon. "Heads

with lower application rates are gaining in popularity. Application rates are falling from .65 inch per hour to as low as .14 inch per hour. These types of heads reduce runoff and more closely match the infiltration rate of some soils. Although they require longer to apply the necessary amount of water, they can also reduce the size of pipe and pump station. Fortunately, we have computerized controllers that can fit these station run times into the narrow time frame superintendents have to irrigate."

The tremendous demand for golf courses combined with the decreasing availability of water clearly points to the need for greater efficiency in irrigation. This has become the mandate of irrigation design consultants. By working with manufacturers, builders, and superintendents, consultants have become the quarterbacks in a very high-stakes game. Their visibility is increasing every year.

It won't be long before more superintendents know the name of the irrigation consultant for their course just as well as they know the name of its architect. Whether a golf course is new or needs to be improved, both types of designers are critical to its success in the future.

Golf is a viable industry only as long as there is water. Golf course irrigation design consultants have gotten us over some tough hurdles in the past and will continue to do so for decades to come.

The Choice Is Yours...



Whether you select grasses, legumes, wildflowers or ornamental plants to complete your landscape project, the new **PS100** mulch blanket from **PROSEED** can help vegetation get established. *Completely biodegradable*, the fibers of the **PS100** are bonded together by a high strength, flexible adhesive . . . no netting to affect the final appearance of your work or to bind up in mowers.

Each roll of **PS100** covers 50 square yards and the organic matrix of the blanket imparts excellent erosion control characteristics.

*So Choose Your Vegetation
and Relax*

**We've Gotcha
Covered!**

See us at Booth # 5605 at
the GCSAA Show in Orlando.



P.O. Box 1250
San Marcos, Texas 78667
(512) 392-1900

NEED A SOLENOID?



ARCO PARTS offers 8 different types of replacement solenoids — from 24 volt to 110 volt, large or small base, **ARCO PARTS** has a solenoid to fit your needs!

If you have several different types of valves, carry our "UNIVERSAL SOLENOID #24". Our "UNIVERSAL" fits all popular large and small base valves.

Call your local distributor and ask for "GENUINE ARCO PARTS" or call us for the distributor nearest you.

ARCO PARTS

Manufacturer & Supplier of
High Quality Irrigation Replacement Parts
1064 Serpentine Lane, Pleasanton, CA 94566
(415) 484-0382

Distributor Inquiries Invited