

later with a screen drag. It was a never-ending battle to keep a little cushion. Now, every time I drag I use the new device with the brooms and it gets done handily. Even when the clay is wet, the brooms don't collect much clay," he said.

To accommodate the area's fluctuating weather conditions, Brown has developed a set of infield maintenance procedures and schedules. If it does rain and some standing water remains on the skinned areas, he uses a long hose to remove the water, first thing in the morning. Later he drags and tire-rolls these areas to make them firm, and then drags them again to put a finish on the infield.

If rain is threatening, he doesn't drag or open up the clay until an hour before practice. If the weather is steady and clear, he works the clay in the morning while it is still moist. "The fall is more forgiving," he added. "It is our rainy season, so I moisten the clay less frequently."

The Bermuda 419 field is cut almost every day, and often twice a day, during the playing season. The same Ford tractor used for infield dragging also pulls a Roseman five-gang mower which cuts the outfield grass to a 3/4-inch height.

Brown mows the outfield in two directions. The first is from second base to center field. The second is from foul pole to foul pole. "It's difficult to get the stripes with the gangs, but by cutting every day I am able to get that effect," he said.

The infield grass is cut at one-half inch with a Toro Series Five 22-inch walk-behind greensmower. It is cut in three directions: home to first, home to second, and home to third. According to Brown, this gives the stripes their strong, sharp appearance.

Every two or three days and every game day, the grass between the baselines and dugouts is also cut with the greensmower. It is mowed in one direction down each baseline.

During the season, reels are back-lapped once a week. A tarp is put down in front of home plate during batting practice to protect this area from divots. When game day arrives, both dugouts are swept out and the foul lines, bases, pitching rubber, and home plate are painted white. Each grass area is cut in its specific direction for the striping effect, and the clay is kept moist. After batting practice, Brown lines the field with the help of several members of the team.

Although irrigation of the diamond by Toro 690 heads is automatic, it has been anything but problem-free, due to unique soil conditions. When the field was converted from softball to baseball, the outfield was extended and sprigged on top of sugar sand. The older, front half of the outfield, in which the previous groundskeeper added muck to amend the soil, retains moisture and drains poorly, whereas the outer half drains well and requires large amounts of water.

The irrigation system has only three zones. One zone waters left field, the second waters center field, and the third

Like the improvements to the field, equipment upgrades have been gradual because of the school's limited budget.

waters right field. During dry, windy spells, Brown has to run portable sprinklers with hoses for about an hour on the outer portion of each zone a couple of times a week, because the automatic sprinklers don't provide complete coverage in these areas due to the soil. Wetting agents have also been used to help solve the problem.

"Deep watering with the portable sprinklers is done on days when the team doesn't play," said Brown. "I live about a mile-and-a-half from the ballpark and will drive down and move the sprinklers about every half-hour, and go back home."

The infield and areas between dugouts

continued on page 32

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The awards were presented at the STMA's awards dinner in Houston, Texas, January 20, 1990.

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and baselines are watered manually. Keeping the grass moist and baseline dry is a challenge all baseball field groundskeepers must face, according to Brown. The grass around the home plate area takes a lot of punishment, and therefore requires more moisture to battle stress.

Edging the field, fertilization, and protecting the field from weed and insect invasion round out Brown's maintenance program. Using a power edger and string line, he edges the field every two-and-a-half weeks. He takes out the unwanted grass using what he calls a "hula hoe."

"At the beginning of each season, when there is more grass to remove, I fill in the low areas with clay," Brown said. "I keep the clay and the grass almost flush with each other so the ball will roll true. The sharp edges and parallel lines add to the beauty and distinction of the field. During the off-season, I use Roundup after I edge and I don't use the hoe."

The outfield is fertilized approximately nine times a year at one pound of nitrogen per 1,000 square feet, with 14-3-9 fertilizer mixture. Ten-and-a-half percent of the nitrogen is ammoniacal, and 3.5 percent is water-soluble organic nitrogen. The fertilizer also includes many micronutrients. For televised and other special games, iron is used to promote a dark green color in the



Brown stripes infield with greensmower.

turf.

Because of leaching and the difficulty of keeping the back half of the field moist, it receives almost two pounds of fertilizer per 1,000 square feet. The area is more susceptible to stress poor irrigation coverage, and requires more nutrients.

The infield is fertilized at a rate of one pound per 1,000 square feet, about every three weeks. This area receives more fertilizer because of its lower cut, wear and tear, and ball divots. In addition, the area in front of the pitcher's mound receives extra fertilizer.

Goosegrass and crabgrass are the diamond's biggest weed problems. Brown explained, "Some broadleaf weeds pop up, but 2,4,D takes care of these quite well. When killing the goosegrass in the spring, a mixture of MSMA and 2,4,D is used. We get a pretty good kill after three applications.

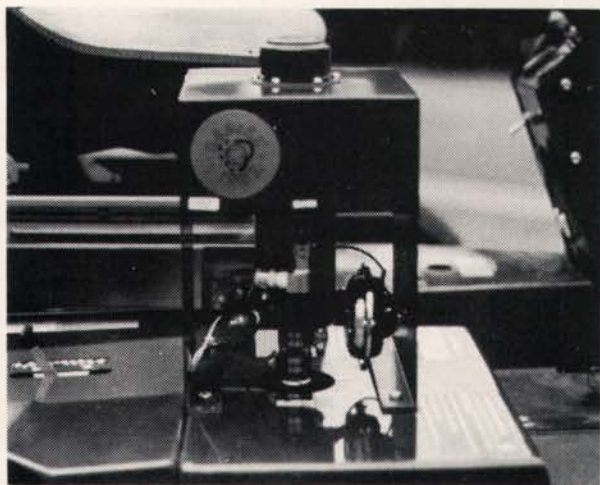
"Last winter, we had a problem with *Poa annua*. One application of Sencor wiped it out. I used Basagram to kill nutgrass and Roundup along the fences and under trees and bleachers. Each year, weeds have become less of a problem because of consistent cultural practices," he said.

Mole crickets are the field's most troublesome pest problem. According to Brown they are a constant nuisance for Florida groundskeepers. He has used baits, Oftanol, Orthene, and Nemicure to try to defeat them. Although the problem is currently under control, he expects them to return shortly.

"Grubs were a problem this summer, but the Nemicure took care of them," said Brown. "Sod webworms have been a continuing pest. Diazinon controls them for a period of time."

Last summer was especially busy for Brown. With Patterson's help, open coring tines were acquired for the university's aerator. He cored the field in two directions once a month, and broke up the cores by

continued on page 42



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BASEBALL DIAMOND WINNERS ANNOUNCED

The Baseball Diamond of the Year Awards were announced in January with ballparks in Canada, Florida, and Minnesota winning top honors. The awards are given each year to three professional, college, and municipal baseball parks in recognition of excellence in maintaining safe, professional-quality baseball facilities.

The professional award was given to Mike Regan, head groundskeeper at Labatt Park, home of the London, Ontario Tigers of the Class AA Eastern League. The college prize was garnered by Jerry Brown, head athletic groundskeeper for Barry University's Buccaneer Field in Miami Shores, FL. Mark Altman, facility consultant to the Marshall, MN, Parks and Recreation Department, captured the award in the school, municipal and parks category.

Four major league head groundskeepers served as judges for the contest. They included Jim Anglea of the Texas Rangers, Pete Flynn of the New York Mets, Harry Gill of the Milwaukee Brewers, and Steve Wightman of the San Diego Padres. The awards were presented by Gill during the banquet at the recent Sports Turf Managers Association (STMA) Conference and Show in Houston, TX.

The Baseball Diamond of the Year Awards are sponsored by Partac Beam Clay, STMA, and Golf & SportsTURF magazine. Each winner will be featured in an upcoming issue of the magazine.

LOCKOUT LOOMS OVER SPRING TRAINING

As professional baseball players prepare to report to spring training camps in Florida, Arizona and California this month, they face the grim likelihood of a lockout. Their agreement with management expired at midnight on New Year's Eve.

A lockout will not only impact players and team owners, it would seriously hurt the gate at spring training stadiums for exhibition games. Anticipating a stoppage, players and owners have amassed war chests to cover their losses, according to Baseball America. But communities depending upon baseball tourism during spring training may be caught in the lurch.

Owners would like to come to terms before the regular season begins. The players, on the other hand, seem to be leaning toward a strike after the season has started.

Meanwhile, league expansion plans are on hold until an agreement is reached. A

number of cities are anxious to land an expansion team for the 1991 season. The sooner the players and owners settle, the sooner these cities can compete for an expansion franchise.

THEME PARK CLOSED

Boardwalk and Baseball theme park has been closed to the public and is currently in the process of being dismantled. Along with Sea World and Cypress Gardens theme parks, the Orlando, FL, baseball theme park was purchased by Anheuser Busch Corporation of St. Louis, MO, from Harcourt Brace Jovanovich. According to a public relations official at the theme park, the new owner cited unprofitability as the reason for the closure.

Baseball City Stadium will remain open and continue to host baseball events including the Pizza Hut All-Star Softball Game, February 1-4; the ABCA 1990 Hall of Fame Tournament, February 9-11; and the Kansas City Royals spring training, March 3-30.

"Our sports complex operations were not affected by the closing," said Floyd Perry, Kansas City Royals director of baseball. "The Royals pitchers and catchers are scheduled to arrive February 18, with the rest of the team reporting February 23."

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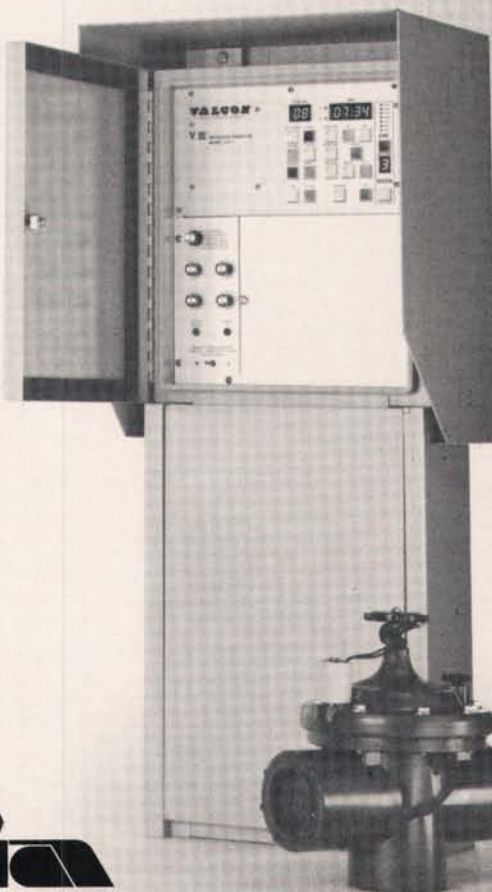
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Advances in Golf Course Irrigation Design

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

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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."

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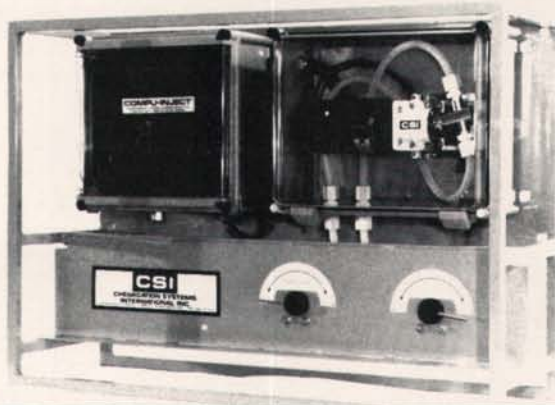
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make field adjustments in a matter of seconds.

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



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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.

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Parts Finding Made Simple

"Parts is parts" may be a clever saying created by ad men trying to sell chicken sandwiches. But when it comes to irrigation repair parts, a more apt expression might be, "The whole is no greater than the sum of its parts."

In the past, sprinkler heads, valves, and other components were often replaced for the failure of a single part. It was just more convenient to stock backup components in case of a breakdown than to try and repair a broken unit with new or rebuilt parts and place it back in service. As a result, many components were discarded before their useful life was over, or thrown into a box with the idea that someday you'd have the time or the parts to fix them.

Depending upon how knowledgeable golf course superintendents or turf managers were about sprinkler repair, there were three options: replace the whole head, valve, backflow device, or controller; send the offending unit to a repair house; or fix it themselves. Those opting to make their own repairs needed to have new or rebuilt parts. Unfortunately, these parts were not always readily available.

In 1981, Bill Hayes Jr. recognized that irrigation products distributors often did not have a particular part that a person was seeking, and that normal delivery time for parts took anywhere from two to four weeks. It wasn't that manufacturers were neglecting service or didn't care about the customers. They simply had not placed a heavy emphasis on parts.

To help fill this void, Hayes created Arco Parts as a division of the Automatic Rain Company in Pleasonton, CA. By establishing the firm as a separate division, Hayes saw an opportunity to service superintendents, turf managers, municipalities, and contractors through their irrigation product distributors.

His goal was to keep an inventory of all brands of irrigation products and to acquire as much information on new, late-model, and out-of-production products as possible. What's more, Hayes visualized a nationwide distribution network for parts and eventually for service as well.

Let's say you're a groundskeeper and



Supplying repair parts is an important service of irrigation distributors.

need to replace a diaphragm in one of the older valves on a baseball field. The valve is located right in front of a dugout and you have a tournament starting in a few days. You can see that the valve is leaking. In order to replace the valve and repair the pipe, you'll have to pull the valve box and dig a larger hole. Suddenly a simple fix becomes a major project. If you could get hold of a new diaphragm you could keep the repair simple.

You call your local irrigation distributor. He doesn't stock the diaphragm for that particular valve so he has to order it. From a business standpoint, dealing with a small order for a hard-to-find part is time consuming and expensive for both the manufacturer and distributor. The manufacturer has devoted a great amount of time and money to developing new and improved products. He tells your distributor it may take two weeks to fill the order.

Now there's a quicker solution. While at one time the irrigation market wasn't large enough to support companies that specialize in replacement parts, that's no longer the case, as Arco and other companies have discovered.

Your distributor can now call one of these specialized firms and receive your crucial

part within a week. Since Arco is an irrigation parts supplier and repair shop as well, it protects the integrity of other distributors by not selling direct. It only supplies legitimate wholesale distributors, such as Wickham Supply in Texas, Banks Supply in Florida, Turf Irrigation in Colorado, United Pipe and Supply in Oregon, and Hydroscape, Smith Pipe and Supply, and Normac, all in California. The company services more than 180 wholesale distributors in all.

"What we're trying to do is pay attention to maintenance and troubleshooting," said Mark Witzke, the company's sales manager. "Our job is not to try to sell new products. We're concentrating on the repair and parts market for products that are already out there."

A parts distribution network serves several purposes. By facilitating the search for the right part, it makes in-house repair of components more practical for the users. It also takes some of the pressure off the manufacturers.

For Arco, the first step in establishing this network was to create a parts catalog. In 1981, this catalog had 77 pages. Today it has 316 pages, and includes parts from more than 20 irrigation product manufacturers such as Buckner, Champion, Febco, GEE, Griswold, Hays, Hydro Rain, Imperial, IrriTrol, Moody, L.R. Nelson, Neptune, Rain Bird, Royal Coach, Safe-T-Lawn, Superior, Thompson, Toro, Valcon, and Weather-Matic. To help customers identify diaphragms, the catalog includes six pages of photographs and dimensions on many of the diaphragms available.

The catalog and the company grew simultaneously. Eventually Arco began to manufacture its own brand of irrigation product replacement parts and sell them to other wholesalers around the country.

The parts manufacturing process begins with the product manager, who takes a sample of an original part to an independent laboratory to identify its composition. Bids for production of the part are then solicited from various manufacturers. To maintain quality, Arco Parts receives the first article of approval from the manufacturer it has selected. Of course, patented



Old Internal assemblies can be repaired or rebuilt.

parts cannot be reproduced.

The company's own products include diaphragms, solenoids, brass and stainless-steel stems, bleed plugs, gaskets, washers, solenoid wrenches, and other assorted rubber and brass items.

Repair kits, which can help reduce downtime in the field as well as inventory cost for the wholesaler, have also been introduced by the company. Kits for remote control valves, vacuum breakers, quick-coupler valves, and rotor repair are among the more than 100 kits currently available.

These kits offer several advantages for both the wholesale distributor and its customer. With as many as 15 individual parts per kit, they cut down on a wholesaler's need for extensive stocking and inventory of each individual part. In turn, by purchasing the whole kit, the customer avoids repeat trips to the wholesaler.

With the groundwork for its parts supply and distribution network laid, the company ventured into the controller repair and sprinkler rebuilding. Actually it has been working on controllers since its inception, but the growing popularity of solid-state controllers posed new challenges.

Not all manufacturers offer controller repair and PC board rebuilding. In the past, a superintendent or sports turf manager faced with the problem of a broken or faulty clock might replace the whole unit, even when such a practice was not completely necessary. Controller repair and PC board rebuilding presents an alternative to discarding controllers that can be salvaged.

PC timing board rebuilding is a relatively new addition to the company's services, and it could almost be called a timing board "exchange." When a wholesale distributor sends its customer's board (which in many cases is connected to the back of the control panel) to Arco, the rebuilt PC board the customer gets back is not necessarily the original that was sent. To keep repair time down, the company stocks rebuilt boards.



Rebuilt assemblies with remount kit.

So while your original board is being rebuilt for another customer, a rebuilt board has your controller up and running.

To help the customers of its wholesale distributors with troubleshooting and repair, the company offers a series of four seminars. The seminars are open to interested persons in the wholesale distributors' areas. While they are currently offered only in California, the company plans to hold them nationwide eventually.

The first seminar covers general irrigation. It is designed for those unfamiliar with irrigation. According to Witzke, the seminar discusses irrigation "from the point of connection," and includes an overview of piping, sprinklers, valves, backflow devices, and controllers.

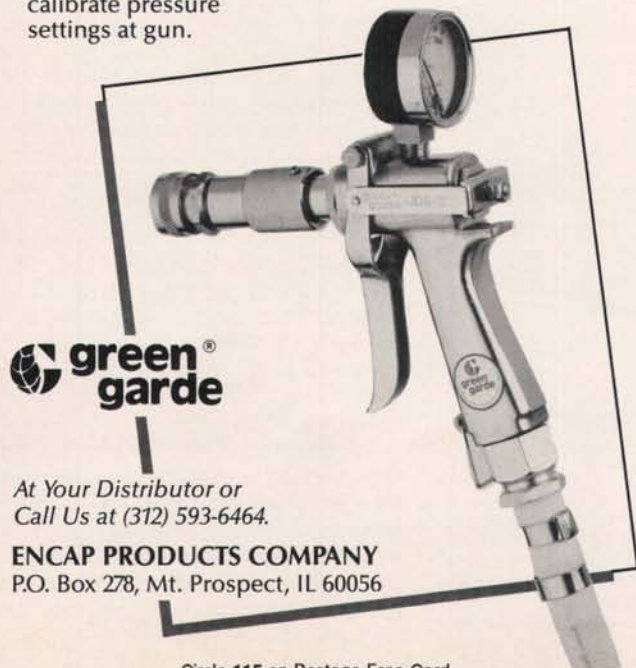
Remote-control valve troubleshooting is the focus of the second seminar. "We start

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Why wetting agent users are turning to Pene-Turf soil treatment.

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Parts Finding

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with valves that are outdated, go all the way through the current production models, and teach hydraulics," said Witzke. "We teach how the valve works, how water gets on top of the diaphragm, how water exits the valve through porting, and what prevents a valve from opening and closing."

The first 5½ hours of the second seminar is taught in the classroom. The second part is strictly hands-on. Arco Parts sets up working manifolds in the field, complete with booby-trapped valves. The job of the student is to troubleshoot and repair them. In this manner, classroom learning is reinforced by hands-on application.



Many turf managers are not aware that controller circuit boards can be repaired.

The third seminar deals with controller programming and troubleshooting. It covers the basics of electromechanical, hybrid, and solid-state controllers. Programming comprises 70 percent of the discussion. The remaining 30-percent is concerned with troubleshooting. Witzke said that of all the solid-state controllers his company receives, 40 to 50 percent are in perfect working order. The problem is often a user's inexperience with programming.

Seminar four is relatively new and covers backflow device troubleshooting. According to Witzke, it is a "touchy" topic. "In certain areas of California, if you even open a backflow device it has to be recertified," he said. "We're not trying to teach people how to be certified. What we are trying to teach is that if there's a problem with a backflow device, you can repair it and then call someone out to certify it."

For the growing number of irrigation managers who repair their own equipment, improved parts availability saves time and money. Through the cooperation of product manufacturers and wholesale distributors, a national parts network helps take the frustration out of irrigation product repair, because finding the right part should never become a full-time job. ●

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