1. Rolling back sod where TerraFlow lines will run. 2. Cutting 2" wide trench. 3. Laying TerraFlow lines in 12" deep trench. 4, 5. Joining TerraFlow lines using only a utility knife and duct tape. 6. Fully installed TerraFlow System. Workers backfill with site soil, puddle with sand. 7. Replacing sod. 8. Completed TerraFlow System. Installation time: about 100 ft. per hour. 9. Green was back in play in 2 hours with TerraFlow. (Photos by Greg Fast, Turf Irrigation Supply, Englewood, Colorado.)

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7557

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essential with soil-injected systemic insecticide applications.

Pesticide use rates. The amounts of insecticide used in soil systemic application are extremely high. For example, the amount of Metasystox-R2 used for insect control on a single one-foot diameter tree approach the use rates of equivalent insecticides used on an acre of an agricultural crop. The high use rates have expensive product costs and must cause some pause when considering the amount of pesticides being applied in the environment.

Precautions

Using soil-injected systemic insecticides clearly has strong advantages that will increase their future use in landscape plant protection. However, limitations also exist. It is suggested that certain precautions, preferably included on label directions, be followed.

Labelling. Labelling soil systemic insecticides for use on woody plants is quite limited at present (Table 1). However, there is evidence that many manufacturers are now giving increased attention to ornamental pesticide labelling. In the past, this has been a highly neglected area in marketing plans of many insecticide manufacturers. It is being corrected, due to sluggishness of the traditional agriculture markets and the green industry's increased visibility. Availability of soil systemic insecticide uses can be expected to increase.

Protective clothing needed. Because of the innate toxicity of systemic insecticides and their use in concentrates, full protective clothing should always be required.

Hazards involved in handling and applying soil-injected soil systemic insecticides require special applicator training. By making these products Restricted Use pesticides, use by certified, trained professional applicators is ensured.

Elimination of pressurized application systems. Accidental exposure and injury is greatly increased by application of insecticides under high pressure. Equipment breakage and blowing of pesticide from injection holes are two likely means of inadvertent exposure during application.

Restriction of applications near groundwater sources. The extreme attention and interest in groundwater protection from pesticides and pollutants requires that all pesticide applications be made in a way that eliminates pollution risks. Use of soil injections near wells and low-lying aquifers should be restricted until their safety is demonstrated. **LM**

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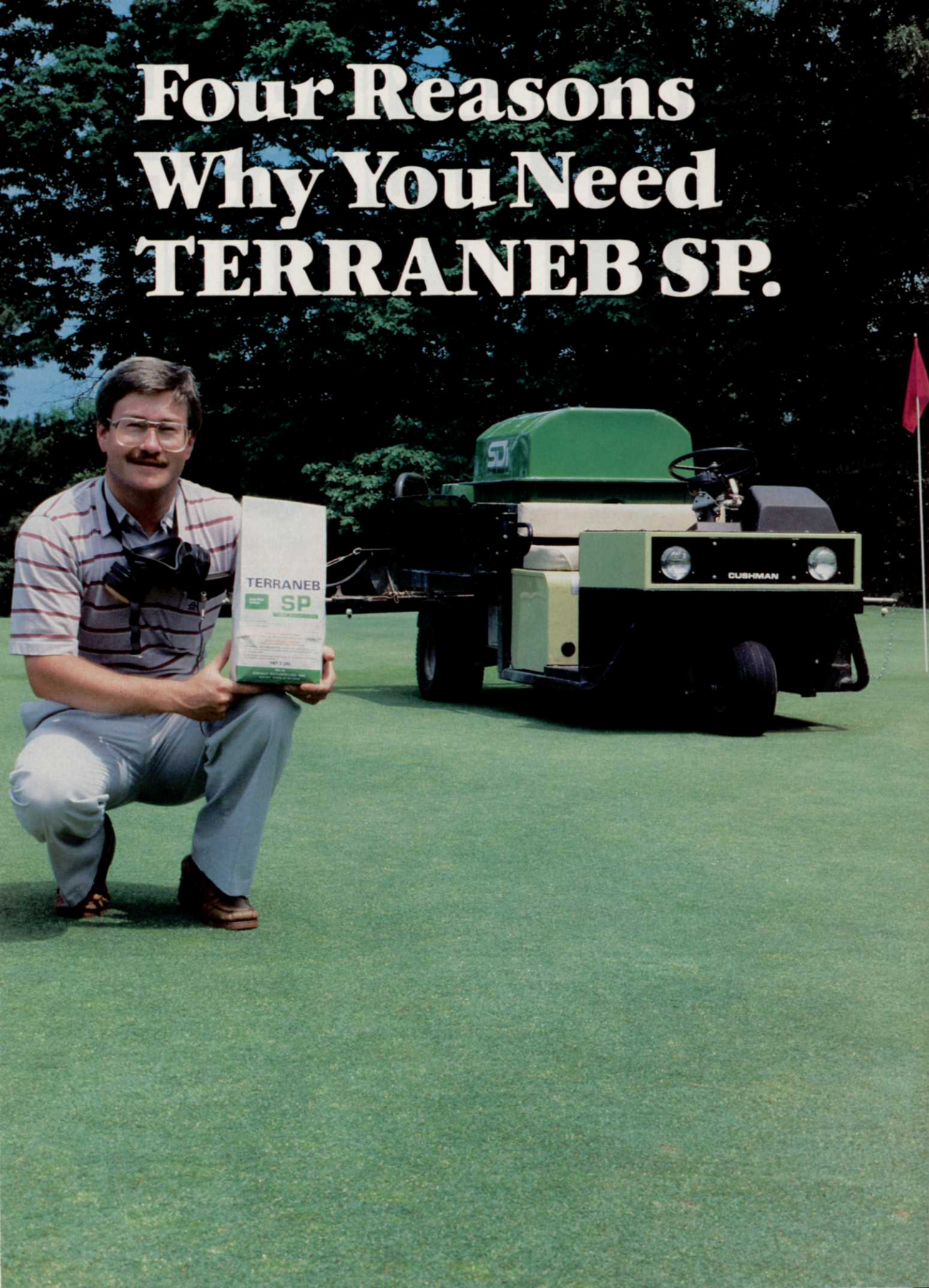


1 BROWN PATCH

The most common turf disease, Brown Patch, can destroy a stand of bentgrass within a few days. Prevalent during extended periods of high temperature and humidity, the disease is also encouraged by poorly drained soil, lack of air circulation and excessive nitrogen. At first it appears as a circular area of light brown grass, ranging from a few inches to several feet long. The circular areas grow and turn brown.

2 SCLEROTIUM BLIGHT

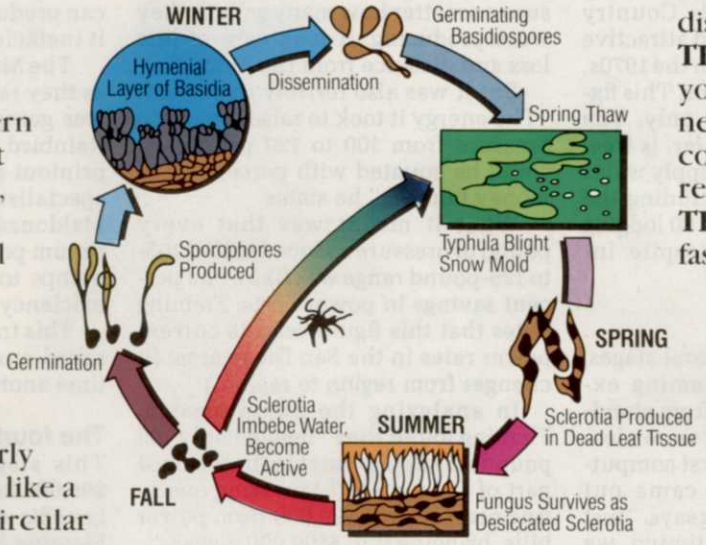
Also called Southern Blight, Sclerotium Blight attacks annual bluegrass, Kentucky bluegrass, ryegrass and bentgrass in all sections of the country. The fungus begins to spread from the soil and surrounding debris to the grass during hot, humid weather. In its early stages, the disease looks like a frog-eye, having small, circular dead areas with tufts of apparently non-diseased grass. The circles may grow up to three feet in diameter.

3 PYTHIUM

Pythium attacks all cool season turfgrasses and Bermudagrass, especially grass seedlings, which will die (damping off), resulting in irregular dead patches in the turf. Normally, it is a high temperature, high humidity and wet weather disease. Mower movement will spread fungus from diseased areas to healthy areas, thereby quickly spreading the disease. Late stages of pythium can spread very quickly and can kill large, irregular sections of turf in 24 to 48 hours.

4 GRAY SNOW MOLD

Also known as Typhula Blight, Gray Snow Mold attacks most northern turfgrasses. The disease usually develops under a snow cover and is seen as the snow melts. Fungus development is favored by high soil moisture and temperatures between 32° and 40° F. Usually visible at the first spring thaw, it appears as circular dead areas up to 6 inches in diameter, but can grow to 2 feet or more and eventually kill large irregular areas of turf. Typhula Blight not only attacks foliage, but infects deep into the crown area, completely destroying the grass plant.



HOW TO GET CONTROL

Keeping your turf looking good all year long is a tough job. The turf invaders such as Brown Patch, Sclerotium Blight, Pythium and Gray Snow Mold can easily destroy all your hard work. Any of these four most common turf diseases are reasons enough to find help, and with one product, **TERRANEB SP,** you get fast, effective control.

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IRRIGATION ECONOMICS

Efficient irrigation pump use and precise cycle scheduling cut power costs in half for Singing Hills Country Club and Lodge.

by Jeff Sobul, associate editor

Dehesa Road winds up, around and down one of the numerous hills east of San Diego, Calif. About two-thirds of the way down the east side, the road winds around a corner. For the first time, the valley below comes into view.

The green-carpeted valley is a sharp contrast to the surrounding brown, scrubby hills. The cost to keep that carpet—Singing Hills Country Club and Lodge—green and attractive was about $140,000 a year in the 1970s, based on today's power rates. This figure reflected power costs only. The water, taken from an aquifer, is free.

Since 1980, the cost to supply water to the 54-hole facility, including the clubhouse, tennis club and 80 lodging units, was cut in half despite increased power costs.

The first cut

The decrease came in several stages, superintendent David Fleming explains. In 1980, "we went from stand-alone field controllers that were electrical/mechanical to the first computerized system Rainbird came out with, the Maxi II," Fleming says. "Just by getting more accurate timing, we reduced our power bills to $120,000."

Efficient scheduling also reduced the time it took to water the 320 acres from 12 hours to eight.

The second cut

Fleming and his staff took aim at the pumps in 1982. His was a traditional pump system rated at 110 to 125 psi. "For some reason years ago," he says, "(manufacturers) decided pumps would produce 125 pounds of pressure no matter how many gallons they were producing. It took care of line loss and distance from the pump."

But it was also terribly inefficient. "The energy it took to raise the pump pressure from 100 to 120 psi almost could be equated with percentage of money burned," he states.

What it meant was that every pound of pressure reduced in that 105- to 125-pound range was like a one percent savings in power costs. Fleming notes that this figure reflects current power rates in the San Diego area. (It changes from region to region.)

In analyzing the pump system, Fleming found they "needed only 105 pounds to supply water to the weakest part of the system." Lowering operating pressure cut $20,000 from power bills, bringing it to $100,000 a year.

The third cut

In 1985 the course installed the updated Maxi III system. "With the Maxi III controllers we were able to analyze the pump stations," Fleming says. "Each pump can produce so many gallons of water at its optimum point on a pumping curve. If you're pumping fewer gallons, you're running the pump at an inefficient point. If you're asking for more water than the pump can produce, then you're also running it inefficiently."

The Maxi III monitored the stations as they ran and told how much water was going through the course's 3700 Rainbird 51 SAM sprinklers. A daily printout gave Fleming and irrigation specialists, Mitch Glanis and Tamo Maldonado, the data to reach that optimum point. "We could schedule the pumps to be run at their maximum efficiency point," Fleming says.

This translated into another $5,000 saved annually. It also cut watering time another two hours, down to six.

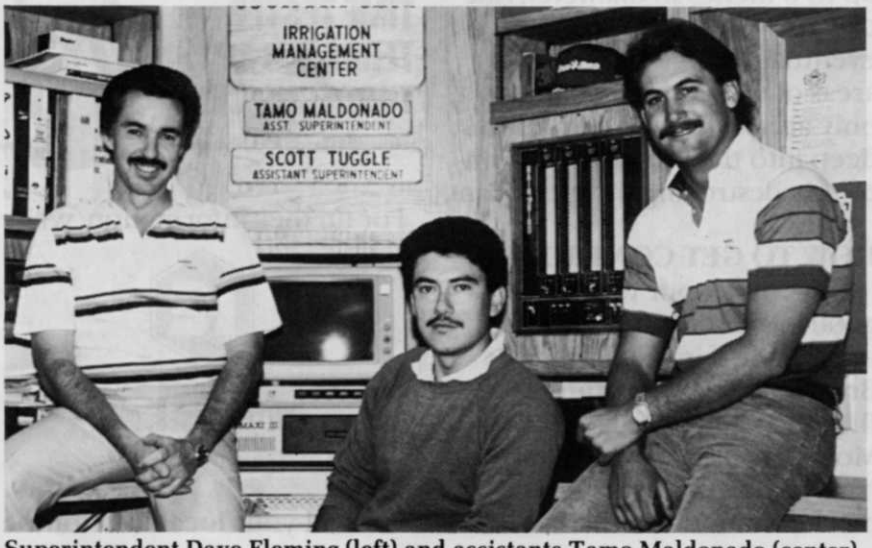
The fourth cut

This stage, which cut costs from $95,000 to $78,000, illustrates well the benefits of efficient watering cycles. Fleming began a system of what he calls "blanket application," based on soil infiltration rates, "not based on technical data on soil but on what actually happens in the field; not what happens on one cycle but on the total irrigation time. How do you get that water on and avoid runoff?" he asks.

The key was matching the application rate to infiltration rate. This keeps applied water on target, not running off into low spots and causing localized hot spots in higher areas. If they were watering a green for 10 minutes in five two-minute cycles, the computer could "introduce pauses so that the last few cycles don't go on at the same interval," he explains. "There's a little more soak time before we bring on another blanket." And less water wasted.

The final cut

Singing Hills cut another $4,000 from its power bills in the second half of 1987 by taking advantage of off-peak power rates offered by the local util-



Superintendent Dave Fleming (left) and assistants Tamo Maldonado (center) and Mitch Glanis used the Rainbird Maxi system to halve irrigation power costs.

ity. Rates between 10 p.m. and 6 a.m. dropped to six cents a kilowatt hour (KWR) from 13 cents/KWR at peak (10 a.m. to 6 p.m.) and eight cents/KWR at semi-peak (the four hours on either side of off-peak). "That's a real motivation to get all my irrigation done in that period," Fleming says. Day watering is kept to the bare minimum because stiff penalties are levied for peak-hour watering. "We take the Maxi and program our irrigation to start at one minute past 10 p.m."

Thus, the savings came in three ways, Fleming says. Proper scheduling reduced water used, which saved in pumping power cost. The water savings, though not translated into cost per gallon or acre-foot, were huge, especially since semi-arid area has limited water sources.

In the 1970s, Singing Hills used 2.7 million gallons a night, about eight acre-feet a year per acre. With the Maxi III, that figure is down to 1.2 million gallons per night, 4.15 acre-feet a year per acre.

Secondly, using the Maxi system, the staff vastly improved the operating efficiency of existing equipmemt. The final savings came with the switch to off-peak power use.

Future efficiency

Fleming admits that his current pump system is somewhat obsolete, though the pumps are tested yearly for efficiency. "Variable frequency (VF) pumps, right now, are the best things going for big water users and big pump people," he says. The system's computer varies pump pressure to match the amount of water being pumped.

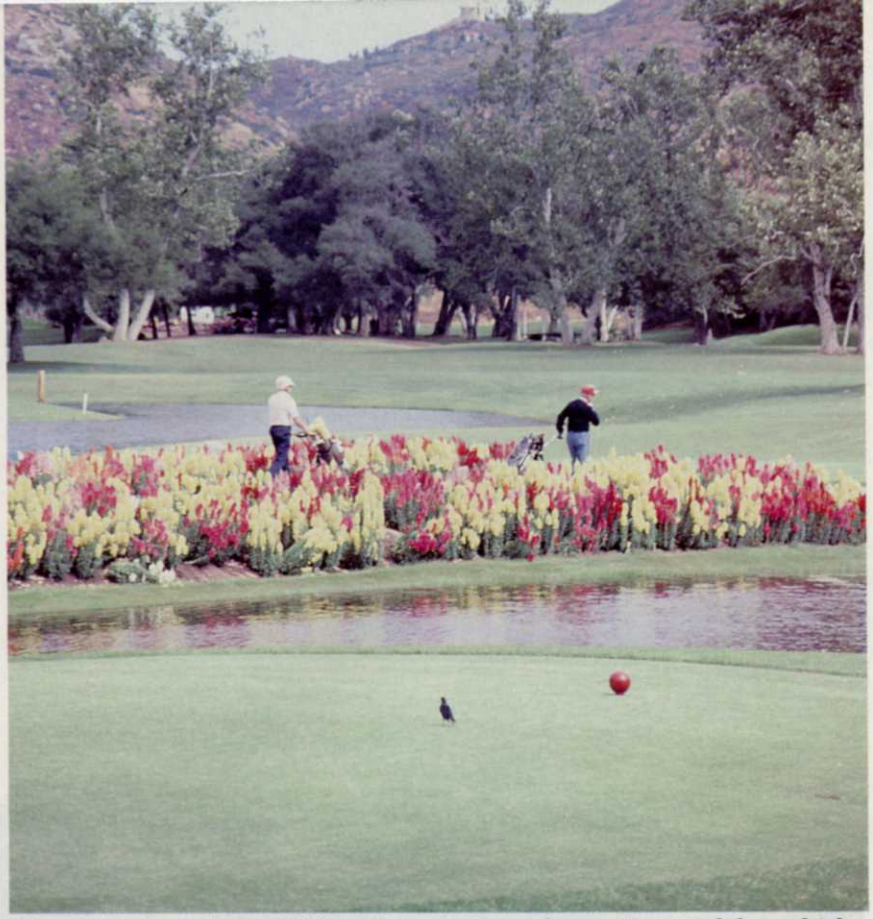
"Whether you're putting down 200 GPM or 700 GPM, you're using the pump at its most efficient point because of the change in frequency," he explains. "I don't have that, so the only thing I can do is schedule my pumps with the computer."

Fleming estimates that a VF pumping system can pay for itself in three to five years on an inefficient course like Singing Hills was in 1979.

Last year, Fleming upgraded to Maxi ET software, which uses a weather station to monitor evapotranspiration (ET). So far, he has allowed the station to control irrigation on only one hole at a time. But he sees the day when weather stations will control all 54 holes.

He further expanded ET monitoring by using Standard Oil's ST-27 Turf

Keeping Singing Hills Country Club and Lodge green in the arid Southern California climate is still a costly task even with an irrigation system at peak efficiency.



After irrigating, Singing Hills pulls water from the aquifer into lakes which act as settling tanks. The process takes 12 to 15 hours.

Monitor. The portable unit functions much like a weather station and is good for diagnosing local hot spots before visible symptoms occur.

Fleming and his staff continually test different irrigation equipment on a small scale. He is testing Toro and Hunter low pressure heads and has the Hunter I-44 Sod Cup Sprinkler installed on one green.

"It's going to be one of the real innovations of the future," Fleming says. The I-44 has a living plug of turf in a cup in its top. When retracted, the head disappears into the putting surface." It will allow a freedom of green design which in the past was constrained by head spacing patterns."

Fleming, who has begun a management group called Golf Properties Management, says future irrigation efficiency will involve weather stations, low pressure systems, bigger mainlines to reduce watering time and pressure loss and off-peak hour watering if lower rates are available.

The main philosophy of his company is its ability to cut a course's irrigation costs, sometimes by 50 percent, using new computerized systems like the Maxi. In Southern California that can be a pretty big chunk of change. **LM**

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The 2020 is a compact 20-HP-class riding trencher that gets into hard-to-reach places to trench and backfill where other riding trenchers can't go. It maneuvers around

The 2020 can go through a 36-inch yard gate to enter backyards or other confined jobsites.

obstacles in backyards, easements and other confined work areas. The 2020 is easy to operate and maintain. An enclosed gearbox, a one-piece rigid frame and a simple hydraulic system ensure reliable production.

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Some jobs only require narrow, shallow trench. The 510 disc trencher can dig 10-inches deep at widths from 1½ to 2 inches. Simple design makes it dependable and easy to use. The trenching disc is equipped with a protective shield, and the unit has an operator presence control system. The 510 is so compact it will fit in a station wagon or van.

The compact 510 digs trench 10 inches deep, 2 inches wide.

The HT100 is a 100-HP-class track machine that can either be a vibratory plow, trencher or earth saw.

HT100 Trencher/Plow

The HT100 is a 100-HP-class vibratory plow, trencher or earth saw that is mounted on tracks for flotation and effective traction. It is a tough, hard-working machine that accommodates most R100 Modularmatic® modules. It has a tilting frame for vertical wall trenching or plowing on slopes, and a 3-speed hydrostatic ground drive system with counter-rotating tracks that allow it to turn in its own length.

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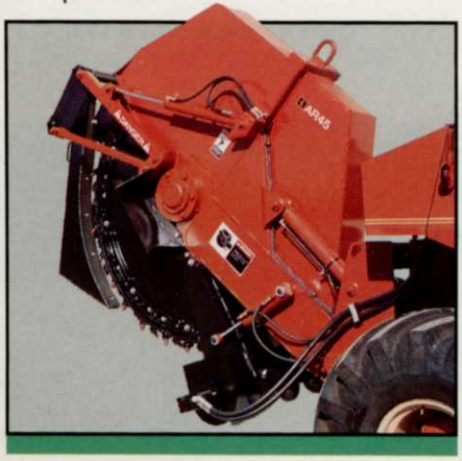
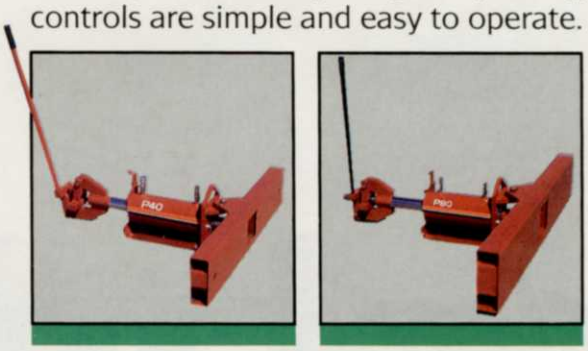
Cut trench in frozen earth, rocky soils, asphalt, even concrete with Ditch Witch earth saws. Four models now provide saw modules for Ditch Witch equipment from 30- to 100-HP-class machines. The Ditch Witch rigid frame lets you cut straight trench. New models offer a trench cleaner and auger spoil removal system as options.



Earth saws are designed to dig in tough conditions, and feature carbide bits that are easy to change.

P40/P80 Rod Pushers

These new rod pushers from Ditch Witch operate in narrow trenches where larger equipment can't be used. They are compact and lightweight, yet powerful enough to push longer distances than similar types of equipment. P40/P80 rod pushers are bidirectional and have equal force for pulling and pushing. The controls are simple and easy to operate.



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Circle Reader Service # 125.

PZ1

Phil Cavotta (left) wears many hats. Here, he and foremen Tony Gabriele (center) and Fran Cavotta examine blueprints of the recently-completed Galleria (background).

CAVOTTA'S CLEVELAND

In the competitive Cleveland market, one name means landscaping: Phil Cavotta tells how he keeps his business successful.

by Heide Aungst

Phil Cavotta is more than a landscape contractor. He's a philosopher, of sorts.

"I'm like the guy who complains about having no shoes, until he sees a man with no feet," says Cavotta, one of Cleveland's leading landscapers. "I might do a big job of say $100,000, but I'd like to do a million. The next goal might be a million and three-quarters."

Although he's a high goal-setter, he's quick to come back to earth. "It's not the gross, it's keeping your reputation and it's your rapport with people."

Where he comes from is Cleveland, Ohio. Cavotta, vice president of CLI (Cavotta Landscapers Inc.), runs the company started by his grandfather in the 1920s. His grandfather passed the business on to Cavotta's uncle, who ran the garden store, and his father, who ran the landscaping operations.

Cavotta, 35, learned his profession by working closely with his father. Today, the company is 75 percent installation, 25 percent maintenance. To his credit are big jobs, such as the world-famous Cleveland Clinic, which hosts the King of Jordan during his checkups

A CORPORATE DECISION

Phil Cavotta has learned only too well the truth behind the old adage, "When it rains, it pours."

Not only were Cavotta's crews tied up trying to finish landscaping Cleveland's Galleria last October, but they also had to cope with installation of a giant retaining wall at the city's 40th Street Service Center.

And the weather didn't help.

"We made a corporate decision to take on two jobs totalling close to $1 million at the same time," says Cavotta. "But to coordinate two jobs that size, together, was some task."

The Galleria posed the most problems while the Service Center was the more labor-intensive.

"We worked 24 hours a day," Cavotta remembers. "I had to wear a lot of hats. I was at the Galleria an average of 18 to 20 hours a day for two straight weeks."

One of the problems the Galleria posed was that the landscaping was done over an underground garage. Because of the excessive weight on the garage roof that would be created by soil, $100,000 worth of styrofoam was substituted. The styrofoam was topped with a one-third peat, one-third sand and one-third shredded topsoil combination before plant materials were brought in.

Another problem was the Galleria's location—right in the heart of downtown Cleveland where there was no parking available—and the timing—all the contractors were working to make the same deadlines. ("I must have have $1,000 worth of parking tickets," Cavotta says. And his feelings about working with the continued interference of other contractors: "If we would've had baseball bats, we would've beaten each other to death.")

The Service Center retaining wall was 38 feet high and more than 200 feet long. It took 10,000 cement blocks, each weighing 108 pounds. Also involved was the installation of hundreds of trees and shrubs, a sprinkler system and 11,000 yards of bluegrass sod.

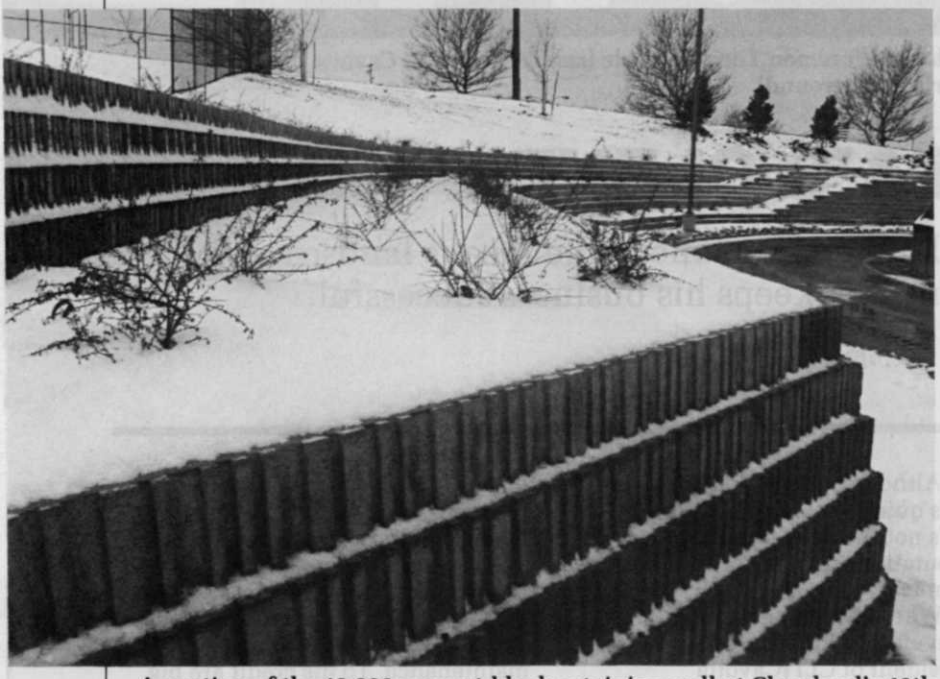
"The hardest part of that job, for me, was making the bid. It was the first time in the city's history that a wall like this was built," Cavotta recalls.

The job took five-and-a-half weeks.

And what did Cavotta learn from the hectic experience?

"There's no way a landscaper knows everything!"

—*Jerry Roche* □



A portion of the 10,000-cement-block retaining wall at Cleveland's 40th Street Service Center that took more than a month to install.

(see *Weeds, Trees & Turf*, Sept. 1986, p. 35). Cavotta also installed and maintains the Galleria, Cleveland's newest downtown shopping mall under glass.

Cavotta employs 23 people at peak-season, six in the off-season. He owns 14 trucks, from a pickup to a tractor/trailer. He swears by 21-inch Jacobsen mowers.

In 1987, Cavotta made more than $1 million. He plans for more growth by playing by the rules, and by making up his own rules.

Following the rules

Five of Cavotta's employees work five days a week for eight months on the Clinic's 80 acres. Because of the hospital's patients, Cavotta's crew follows strict guidelines. "We can't spray during daylight hours," he says. The crew sprays after midnight, when most everyone's asleep and not walking the grounds.

Another rule crews must follow is keeping equipment noise levels down. The Clinic dictates a certain decibel level which can't be exceeded.

Breaking the rules

Still, when Cavotta has a chance to use his ingenuity to get around a problem, he will. And the expressive Italian might just add a hint of rhetoric, too.

"We look at a job and ask, 'Can we do it?' Eventually we come up with an idea," he says.

One of his favorite jobs was the Galleria.

"At first, it was a nightmare," he recalls. That nightmare consisted of

When dealing with his employees and clients, tricks just won't do.

22-hour days to meet the owners' strict Oct. 15, 1987 opening. The weather simply wouldn't cooperate.

"You can fight labor problems...you can fight mechanical problems...but you can't fight the weather," he laments. "What are you gonna do, call God and say 'Hey, turn off the water on East 9th Street?'"

The architects designed the Galleria landscape so that 55 maple trees would be planted on top of an underground parking garage. But Cavotta quickly recognized that the