Researchers see golf applications for subsurface drip irrigation

By PETER BLAIS

Subsurface drip irrigation of greens and tees could be the wave of the future, according to companies and researchers involved in the cutting edge technology.

"By the year 2000, water is going to be **the** major environmental issue for golf courses," predicted Karen Ferguson, vice president of Sausalito, Calif.-based Geoflow Inc., which has been in the drip irrigation business for 20 years. "Golf is an expensive business to get into. But in the next two years, we plan to go after it hard."

Geoflow is busily testing its subsurface grid of 1/2-inch drip line on turf plots in California, Texas and Hawaii. It has been installed on a green at Point Grey Golf Course in Vancouver, Canada, and tees at the Mid-Ocean Club in Bermuda. Canyon Crest Country Club in Riverside, Calif., plans to install the system on a green sometime in the near future, according to superintendent Michael Rohwer. Netafim Irrigation Inc. of Fresno, Calif., recently installed its Techline subsurface drip system along a steep bunker face at the Country Club of Rochester (N.Y.), according to Regional Sales Manager Mike Stoll.

"The water from sprinklers was passing through the bunker and splashing sand on the faces," Stoll said. "We installed the system along with a moisture-sensing probe that checks moisture levels every 20 minutes and opens the water valve as needed. The goal is to not have to aim the sprin-

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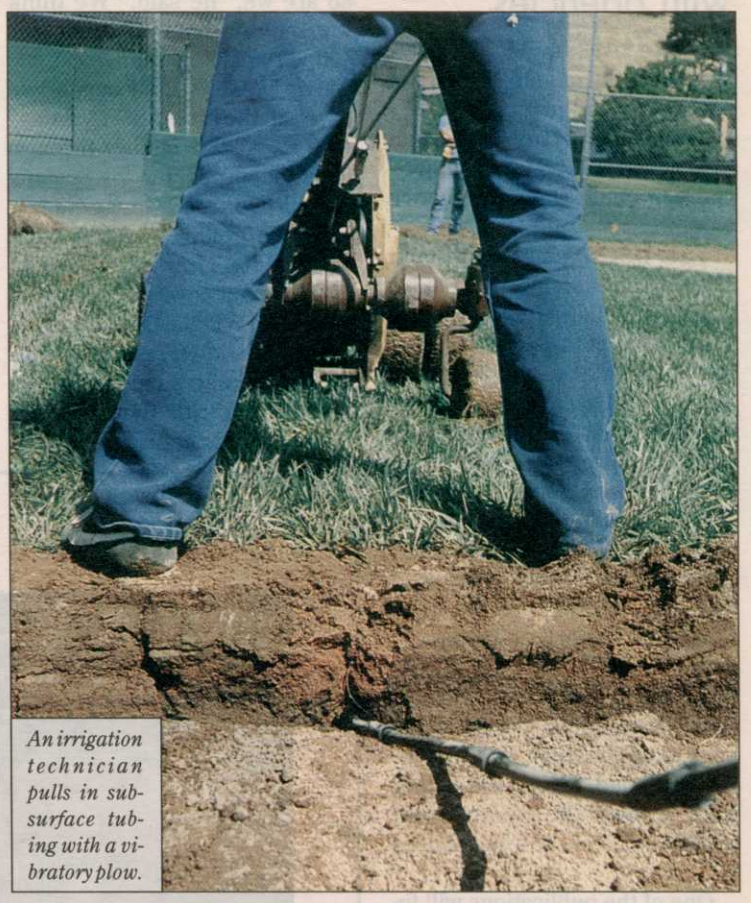
Research conducted on this plot at the Center for Irrigation Technology at California State University in Fresno, Calif., points to numerous golf course applications for subsurface irrigation.

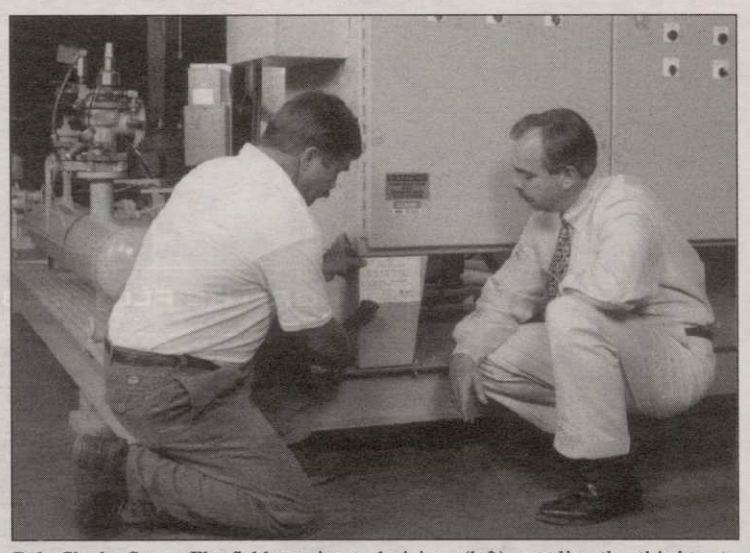


An irrigation technician pulls in subsurface tubing with a vibratory plow.

SyncroFlo ships 1,000th third-party tested unit

NORCROSS, Ga. — SyncroFlo has marked its 1,000th pump station to be shipped with third-party certification.

Third-party system certification is required by OSHA regulations. Compliance with these regulations lowers owner liability because operating and maintenance personnel are less likely to be injured since all safety and environmental protections are included. Course designers, specifiers and contractors are also protected by third-party certification should any job site accidents attempt to place liability elsewhere.



Bob Clark, SyncroFlo field service technician (left), applies the third-party certification plaque, as SyncroFlo golf sales manager David Thrailkill looks on.

SyncroFlo first signed on to have its pump stations third party listed in October 1992. Since then, more than 1,000 pump stations have been produced under this certification.

Specifically, SyncroFlo system components are regularly evaluated by ETL to meet the following internationally accepted standards: ANSI/UL-778 water pumps; ANSI/UL-1004 electric motors; ANSI/UL-508 electric industrial control equipment; ANSI/ASME B73.1M-1990 and ANSI/ASME B73.2M-1990 horizontal-end suction or vertical in-line centrifugal pumps for chemical process; ANSI/SAE J745-APR87 hydraulic-power pump test procedure; ASTM F336, vol. 09.02 gaskets for severe corrosive service; and ASTM G74, vol. 14.2 dynamic-pressure testing of O-rings.

For more information, contact SyncroFlo's David Thrailkill at 800-886-4443.

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GLENDORA, Calif. — Rain Bird's Golf Division recently announced winners of The Freedom System Giveaway Contest. The Freedom System is engineered to give golf course superintendents direct access and control over irrigation operations through a convenient hand-held radio.

The six winners are:

- Manuel Delgado, Crystaline Country Club (Liano, Calif.)
- Robert K. Ellis, Indian River Club (Vero Beach, Fla.)
- Doug Falk, Indian Springs Golf Course (Litchfield, Mo.)
- Howard Hamaoa, Pearl Country Club (Aiea, Hawaii)
- Larry C. Hantle, Country

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Market Briefs

Matching your course with the right pumping station

By DAVID B. BECK

A properly designed pump station responds to the water demands of an irrigation system with little hesitation and minimal fluctuation in pressure and power consumption.

Every golf course is unique in its pump station requirements. Site factors like elevation changes, the location and elevation of the water source relative to the pump station and total irrigated area shape the individuality of pumping systems. Down the line, the number and type of sprinkler heads, as well as variations in pipe type, sizing and routing help to more precisely define pumping needs. Finally, the way the individual irrigation systems are operated from course to course and season to season clarify site-specific pumping requirements.

When sizing a pump station, all operational and system characteristics must be analyzed and coordinated to calculate a maximum expected flow rate and total pressure requirement. Pump stations should meet, but not significantly exceed, the capacity needs of the course. Excess flow capacity is money spent on horsepower that's never used, while the pump station consumes more power than is actually required. This excess pressure also unnecessarily stresses other system components and can lead to failures later.

Sizing for Pressure

Excessive pressure in piping can be as much a problem as inadequate pressure. High pressure, usually the result of a pump station elevated above the rest of the irrigation system, can exceed pipe, valve and sprinkler pressure capacities and create a hazard with quick-coupler connections at lower points on the course.

Position and pressure requirements of all turf heads on the course are needed to determine output from the pump station. It takes energy to move water uphill, and additional pressure must be provided for irrigation water to reach the highest locations on a course. Under static conditions, every 2.31-foot change in elevation equals 1 psi in pressure. If the mainline goes up 2.31 feet, pressure goes down 1 psi. If the main goes down 2.31 feet, pressure's up 1 psi. In extreme

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David B. Beck is a professional engineer and the president of David B. Beck & Associates, Inc., a golf course irrigation design firm in Ann Arbor, Mich. Article courtesy of the Irrigation Association, Fairfax, Va.

Is subsurface irrigation the cutting edge?

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kler heads into that area at all."

"We haven't gone strongly after the golf market, yet," added Netafim Director of Marketing Kurt Maloney. "But we think this can be very effective, particularly for irrigating rough areas with treated wastewater. "

Geoflow's subsurface grids of PVC tubing are installed 6 to 8 inches below the turf's surface. The tubes are laid in rows 15 inches apart. Water reaches the roots through pinhead-sized openings in emitters spaced every 18 inches along the bottom of the tubing.

The average green receives an hourly dose of less than a gallon of water per emitter, Ferguson said. Delivering water directly to the roots cuts water use by as much as 50 percent, according to company figures. "Most golf course water is wasted where sprinkler patterns overlap," Ferguson said. "Those areas receive at least twice as much water as needed and most simply runs off. Subsurface drip eliminates that situation."

According to Ferguson, subsurface irrigation systems also:

- cut back on water lost to evaporation, mist, surface runoff and wind interference;
- permit greens and tees to be watered during the middle of the day while play continues;
- require less electricity to deliver water through the low-pressure system than through pressurized heads;
- lower fertilizer costs by delivering dissolved materials directly to where they are needed rather than broadcasting them on the turf's surface where they can runoff and pollute the aquifer;
- allow use of effluent where the smell might be disagreeable if it were spread on the surface;
- eliminate damage to sprinkler heads caused by mowers, aerators and vandals as well as human and equipment injury caused by sprinkler heads;
- encourage root growth and reduce disease and damage caused by human and equipment traffic on wet turf;
- reduce compaction caused by the continual wetting of turf and soil;
- lower the potential risk of human disease caused by bacteria and viruses in reclaimed water by delivering the liquid below ground.

"In areas like Hawaii with shallow water tables, it allows courses to use effluent without worrying about contaminating the nearby water table due to over-watering," Ferguson said.

In fact, subsurface irrigation may solve the real and perceived problems of using effluent, according to David Zoldoske, a researcher with the Center for Irrigation Technology in Fresno, which is doing extensive research on the new technology.

"The first course to totally commit to subsurface drip irrigation will probably be one that uses effluent," Zoldoske predicted. "The public is concerned about pathogens that might be in reclaimed water. While many of those fears are overstated, it is undoubtedly safer to deliver effluent below the ground than for it to be airborne. It makes me a little squeamish to think about being sprayed in the face with effluent."

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Are there drawbacks?

Geoflow's subsurface grid work costs between 35 cents and 65 cents per square foot of irrigated turf area to install, Ferguson said. For a 6,000-square-foot green, that ranges from $2,100 to $3,900.

The system can be stripped into existing greens, she said. But the scarring takes a good two weeks to heal.

Then there is the potential of roots clogging the small emitter holes. Turf needs uniform irrigation. If one of the emitter holes clogs, that part of the turf will not receive water and the grass will die. Geoflow believes it has overcome that problem by infusing its emitters with the pre-emergent herbicide Treflan that keeps roots at bay for 20 years. Netafim relies on an air space between the roots and piping.

"It [subsurface drip irrigation] worked well on the tees, but I'm not sure I would use it under a green," said Norman Furtado, head superintendent at the Mid-Ocean Club, which has successfully installed subsurface drip under three tees.

"You still have to water materials into a green. And what if an emitter clogged? You'd have a dead spot in the middle of the green."

Geoflow and Netafim believe their technologies would overcome these problems and that technology will only improve in the future.

"Subsurface drip for golf courses is still in the fairly early stages of development," Stoll said.

"But in five to 10 years there will be many applications — greens, tees, clubhouse grounds, parking lot perimeters, around trees. You can bring a tree to maturity 30 to 50 percent faster with subsurface drip irrigation. It's just a matter of people getting used to the idea."