



Christley (right) explains some of the capabilities of the central computer controller.

tion. Personal computers for central control now have a firm hold in the golf and commercial irrigation industry.

The computer is only limited in capability by your imagination. In the past, central

control equipment was built for one specific purpose. Termed "hardware" today, upgrading this equipment or adding new features was very costly, not only to the owner, but to the manufacturer as well. As old dedi-

cated systems became outdated or obsolete, you were stuck with a dinosaur.

The personal computers used in irrigation today operate with a combination of hardware and software. The software is constantly being updated, making it possible to upgrade your system or increase its capabilities without the need to replace your hardware. Within seconds a system can be upgraded simply by inserting a new program disc into the computer. Even amateur programmers can customize their systems to best meet their needs.

Now that these high-tech systems are available at our fingertips, we must use our imagination to take full advantage of their features. With a little training, you can open the door to all kinds of new system capabilities without leaving your desk. Some of these include; flow monitoring, field satellite monitoring, individual station control, total or partial system water budgeting, repeating cycles, pauses, link start capability, and sensing (and reacting to) changes in wind or rain. The list grows monthly.

Computers make various in-field sensors more practical by utilizing two-way communication. They can alert the water manager to specific problems in the field, such as a pressure loss caused by a ruptured pipe or a malfunctioning sensor. Important water-saving devices, which once required a trip to the field to check, can now be monitored

continued on page 34

"NEW" P.V.C. HAMMER ARRESTOR

Water Hammer Arrestors (pigmented)

The P.V.C. arrestor has been designed to protect the fittings and joints from the destructive hydraulic shock caused by quick closing solenoid valves—valves often found in commercial or home lawn sprinkling systems or larger commercial irrigation systems.

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P.V.C. material conforms to ASTM specification D1785-64T. Manufactured to pipe size, no special adaptors required.

Normal operating pressures: 35 to 500 PS.I.G.

Size

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4"
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The T108. Precision Power for Do-It-Yourselfers.

The Bobcat T108 walk-behind trencher was designed with the do-it-yourselfer in mind. Compact. Lightweight. Powerful. Maneuverable and easy to operate. It's just right for running electrical and water lines as well as cable TV and telephone lines.



The T108 is engineered for simplicity with grouped, easy to reach, finger tip controls. It's also versatile, with hydraulic ground drive and infinitely variable forward and reverse speeds. The 7.5 hp gasoline engine

powers a 20,000-lb. digging chain that can trench 30 inches deep and up to 6 inches wide. And the specially designed outboard headshaft bearing offers greater reliability and easy service, which means less downtime on the job.

The T108 packs all these features on a compact frame that maneuvers easily through gates, around shrubbery and close to walls or sidewalks, with variable speed drive to give you precision power when you need it, where you need it.

The Bobcat T108 Trencher. The trencher for do-it-yourselfers.



The T114. The ultimate walk-behind trencher.

The Bobcat T114 walk-behind trencher is so advanced and easy to operate, do-it-yourselfers can do a professional job. It's



ideal for light construction or landscaping, and for running electrical or plumbing lines. You can trench as deep as 48 inches and 8 inches wide (36" boom) in even the toughest soil con-

ditions. The fully hydrostatic T114 combines infinitely variable propulsion AND digging chain speeds for trenching power on demand. Bobcat hydrostatics also eliminate the potential trouble spots found on mechanical trenchers.

The T114's operating ease and safety reflect Bobcat's commitment to engineering excellence. All controls are within easy finger tip reach at the operator station, safely away from the digging chain and exhaust.

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T108
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GROUND DRIVE
TRENCHER

The T114 features a 14 hp gasoline engine, 2-speed axle with a high range for transport and low range for work, and infinitely variable speeds in both ranges. A constant 2 wheel drive ends the hassle of repeatedly locking and unlocking the wheels.



The T114 is easy to load and unload for transport, and simple to service and maintain. An optional backfill blade is available with the T114 to provide even more flexibility and save time.



The Bobcat T114 Trencher.
Technologically advanced. Simple to operate.

The T136. Rugged. Powerful. Reliable.

Bobcat's T136 Rider Trencher combines the best of two worlds - the performance of advanced hydrostatics plus the reliability of a tough diesel engine with the power and versatility to handle a wide range of trenching jobs. Utilities. Construction.

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Electrical and more.



The T136's fully hydrostatic system propels and steers the unit, and raises and lowers the boom and backfill blade. It also provides infinitely

variable digging chain speeds no matter what the unit's ground speed. Bobcat hydrostatics eliminate jackshafts, exposed gears, clutches and other parts likely to fail on other trenchers. This means less down time and more profits to you.

An easy to service and maintain 36 hp, water-cooled Kubota diesel engine powers the T136. It trenches as deep as 60 inches and 12 inches wide in the toughest soil conditions.

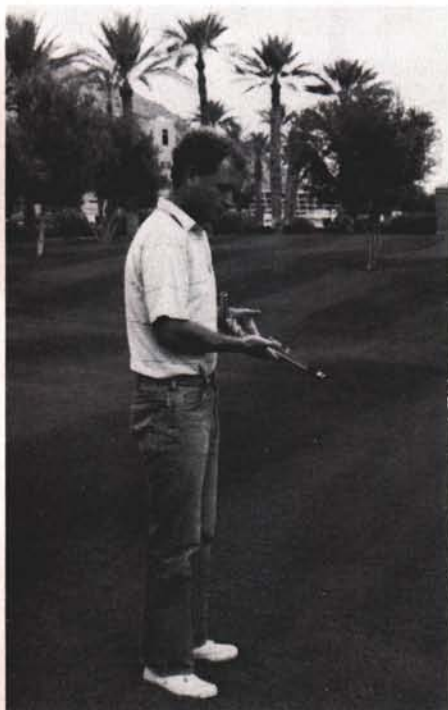


You'll trench straighter and faster with the T136. It's loaded with design features that cut time and boost performance. Automotive-type steering. Easy to reach, responsive controls. Solid, stable frame, and outstanding 360 degree visibility.

The Bobcat T136 Trencher.
The best trencher in its class.

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IT'S BUILT
WITH QUALITY






Steve Collins, irrigation manager for The Phoenician Golf & Tennis Resort, checks the moisture content and root depth in a core sample.

at the computer terminal.

Most critical to the success of making these "tools" work for you is making a few adjustments in your thinking. First of all, remove the fear that a computer is too complicated to learn. Secondly, get over the myth that a computer is supposed to do everything by itself. Although computer commands are very basic today, you still have to give it certain precise instructions before it will respond.

Learning these commands takes time and practice. One of the best things you can do before installing a computerized control system is take advantage of training for yourself or your personnel. The computer has the ability to do much more than most operators know how to tell it to do. Training gives

the water manager a big advantage on the system against those who chose not to be trained.

By getting the absolute maximum benefit from your computer control system and incorporating a full time water manager, in turn, you will be well on your way to enhancing your own professional career. 

EDITOR'S NOTE: Kenneth B. Christley is a water management consultant based in Phoenix, AZ. He is a member of the Turf Growers Advisory Committee of the Department of Water Resources, State of Arizona, and the American Society of Irrigation Consultants.

A FEW GOOD WATER MANAGEMENT PRACTICES

1. Separate monitoring and recording of water use for turf, landscape and lakes.
2. Obtain evapotranspiration (ET) data for your area and follow these guidelines for irrigation purposes.
3. Always maintain the pumping system and the irrigation system in top condition (set up and follow a schedule).
4. Place a high priority on monitoring pumping costs and operation.
5. Keep a constant watch on individual irrigation zones, cutting back on the application until minor stress is noted. Then, adjust the cycles to just above that level.
6. Use soil probes to physically and accurately measure soil moisture levels.
7. Use all of your central control's system capabilities.
8. Develop water conservation techniques and guidelines and stick to them.

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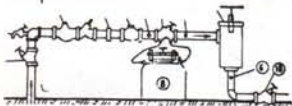


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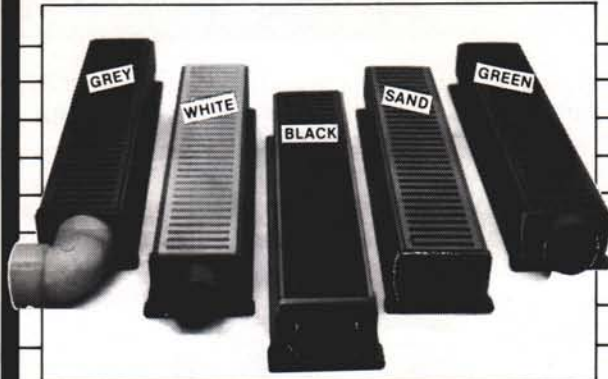
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MORE THAN 12,000 EXPECTED AT PHOENIX GCSAA SHOW

The Golf Course Superintendents Association of America (GCSAA) expects more than 12,000 golf course superintendents, turf managers and suppliers to converge in Phoenix, January 26—February 2, for its 58th conference and show.

Attracting the crowd is this country's largest exhibit of turf management equipment and supplies, a week-long assortment of seminars and educational sessions, keynote speaker and former Green Bay Packer quarterback Bart Starr, Marie Osmond and her brothers, famous Golf Course Architect Robert Trent Jones, Howard Keel of the television show Dallas, and a host of events.

A wide assortment of allied associations hold programs in conjunction with GCSAA. These include the Sports Turf Managers Association (STMA), the United States Golf Association (USGA), the National Golf Foundation (NGF), the American Society of Golf Course Architects (ASGCA) and the Golf Course Builders of America (GCBA).

More than 300 manufacturers and distributors will display their golf course and turf products on nearly five acres of exhibit space inside the Phoenix Civic Plaza. The trade show will be open all day Jan. 31 and Feb. 1, and half a day on Feb. 2.

Although seminars and a golf tournament precede the conference, the official open-

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GCSAA CONFERENCE AND SHOW SCHEDULE

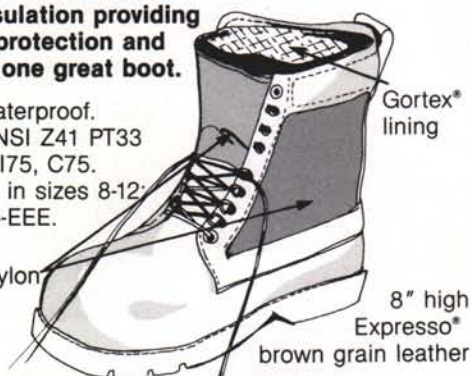
	Thursday, January 29
5:15 pm	Opening Session/Keynote Address-Bart Starr
	Friday, January 30
7:00	Registration Opens
8:00	Concurrent Educational Sessions-Part I
1:00	Concurrent Educational Sessions-Part II
5:15	Meet the Candidates for GCSAA Office
	Saturday, January 31
7:00	Prayer Breakfast
8:00	Registration Opens
	Sports Turf Managers Association Workshop
9:00	Trade Show Opens
1:00	Concurrent Educational Sessions-Part III
	American Society of Golf Course Architects Conference National Golf Foundation Workshop International Golf Course Management Sessions
4:00	Golf Course Builders of America Annual Meeting
7:30	STMA Banquet-Joe Torre
	Sunday, February 1
7:30	Registration Opens
8:00	Major Speaker Sessions
	Rita Davenport, Jack Kaine, Dr. James Melton
8:30	STMA Stadium Tour
9:00	Trade Show Opens
6:00	GCSAA President's Reception
	Monday, February 2
7:00	Registration Opens
8:00	Trade Show Opens
1:00	Trade Show Ends
1:30	GCSAA Annual Business Meeting
6:00	Reception
7:00	Banquet & Show

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Golf Course
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LEISTER

GCSAA Show

continued from page 35

ing is Thursday evening, Jan. 29. Bart Starr, former quarterback and coach of the Green Bay Packers, will "kick off" the show with a motivating adaptation of a pre-game locker room speech. More than 70 concurrent educational sessions follow on Friday and Saturday.

Three major speaker sessions are being offered on Sunday, Feb. 1. "Success on Your Terms" by James Melton encourages listeners to set personal and professional goals that lead to greater satisfaction and reduced stress. "Who's in Your Driver's Seat" by Jack Kaine explains the forces that control human behavior and how they effect leadership and management. Time management consultant Rita Davenport will provide effective concepts to help managers keep on top of paperwork, handle interruptions, delegate work, prioritize tasks, conduct shorter meetings and utilize periods of peak productivity.

After a full-day USGA Green Section program on Monday, Feb. 2, the Old Tom Morris Award will be presented to Robert Trent Jones during the banquet. Jones has designed more than 400 golf courses in 42 states and 23 countries. He joins Arnold Palmer, Bob Hope, Gerald R. Ford and Patty Berg as recipients of the award. The evening will be topped off with the performance of Marie Osmond and the Osmond Brothers.

Interested turf managers should contact

GCSAA as soon as possible by calling 1-800-GSA-SUPT. Some seminars are already sold out and GCSAA will need to help you with housing.

TORRE WILL GIVE THREE VIEWS OF TURF DURING STMA CONFERENCE



Few players were closer to the turf than Joe Torre when he was catching for the Atlanta Braves, the St. Louis Cardinals and the New York Mets. He applied this familiarity with baseball turf later as coach of the Braves and the Mets. When he ended up behind the microphone for the California Angels, his comments about turf management went beyond the dugout into millions of homes in the Los Angeles area.

Sports turf managers can hear Torre's remarks when he gives the keynote speech at the Sports Turf Managers Association banquet, Jan. 31, at the Hyatt-Regency, Phoenix. The banquet caps off a full day of educational sessions held in conjunction with the Golf Course Superintendents Association of America Conference and Show.

STMA has arranged for more than 25 experts to speak on key aspects of sports turf management. Specific attention will be paid to fields of each major sport played on turf, as well as polo fields, horse race tracks and lawn bowling greens. Speakers are traveling to Phoenix from more than 15 states and three countries. As a result, regional differences in turf management will be covered.

A tour of Phoenix sports facilities and stadiums has been arranged for Sunday, Feb. 1. Buses will take the sports turf managers to Arizona State University's Sun Devil Stadium, a softball complex in Tempe and the spring training camps of the Milwaukee Brewers and the Chicago Cubs. When the tour returns to the Phoenix Civic Center, the delegates can review more than 300 exhibits of turf management products covering nearly five acres of floor inside the Civic Center.

For more information contact Dr. Kent Kurtz, STMA, 1458 N. Euclid Ave., Ontario, CA 91764. (714) 984-4677. STMA has its own block of rooms reserved for those attending its conference.

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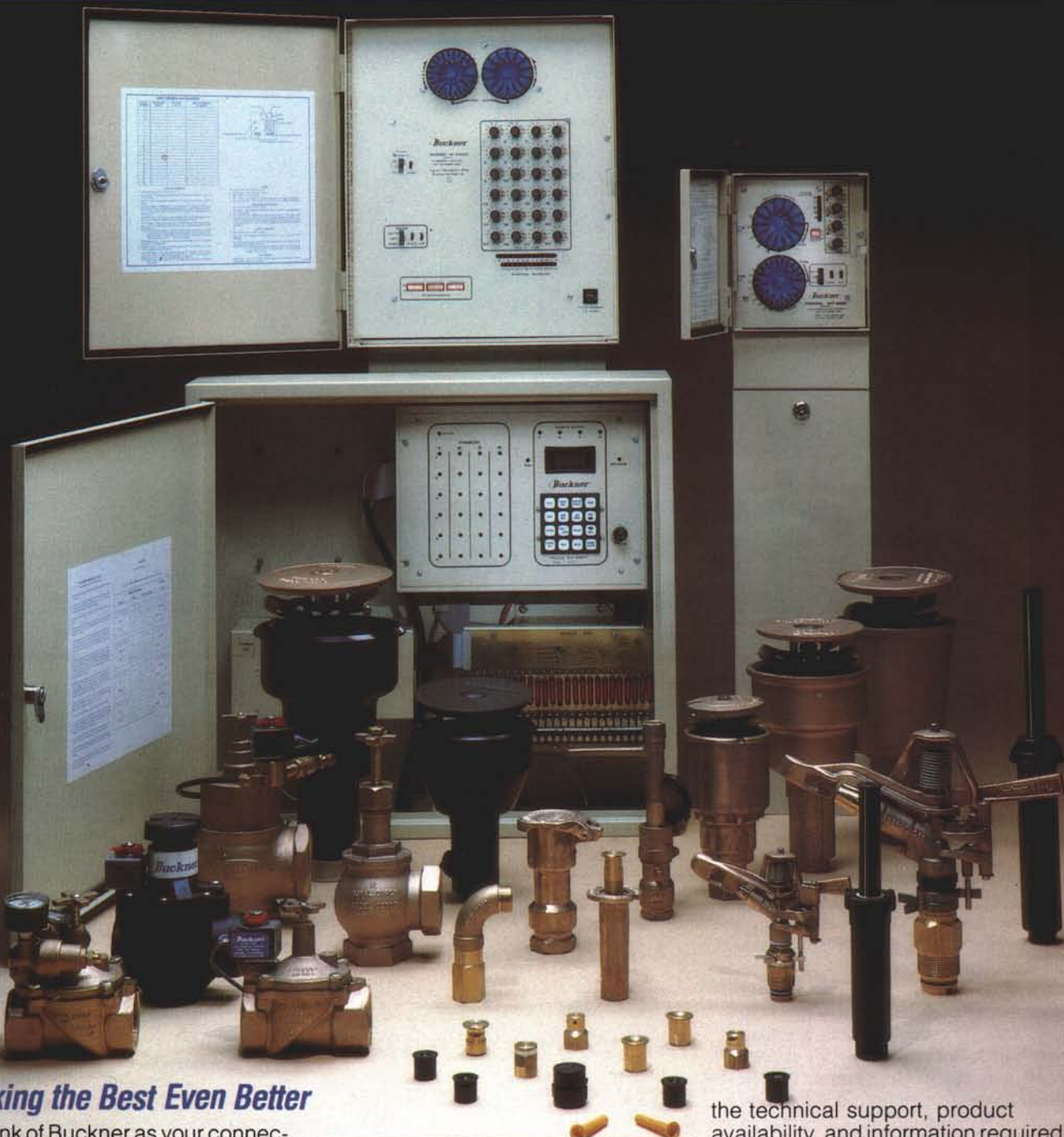
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Covers Become Multi-Faceted Tool

Bentgrass underneath the fabric cover greened-up more than two weeks before the uncovered turf.

One late winter day John Roberts, extension turf specialist at the University of New Hampshire, was evaluating his turf plots for winterkill when he noticed that the nearby vegetable plots were covered with a sheet of fabric. He put turf winterkill and the covers together in his mind. He obtained a spare cover from the vegetable specialist and pegged it down over one section of his turf plots. That section of turf greened up more than two weeks earlier than the uncovered turf.

That was the first use of a new tool for management of both cool and warm season turf. Uses for these portable, ventilated greenhouse-like covers quickly spread from golf courses in New Hampshire to Alabama. It wasn't long before they could be found at Milwaukee Stadium and the Rose Bowl. Today, the 16-foot-long tubes of material are commonplace in the storage areas beneath the stands of stadiums and in the maintenance buildings of golf courses across the country.

The list of benefits attributable to covers has grown far beyond early spring green-up. Low-temperature damage to both bentgrass and Bermudagrass has been greatly reduced. Higher soil temperatures beneath covers enhance turf root growth,

help sod knit faster, and speed up germination of seed by as much as 50 percent. The controlled ventilation of the turf under the blankets conserves moisture and greatly reduces desiccation injury. Irrigation to covered turf can be cut nearly in half.

The list of benefits attributable to covers has grown far beyond early spring green-up.

Covers are much easier to install, remove and reinstall than straw or other types of mulches used to insulate turf during the winter. In case of a late frost after the covers have been removed, the blankets can be reinstalled on an average green in less than 20 minutes.

Stadium field managers are using these covers to speed up germination or regrowth

of turf between the hash marks or along the sidelines of football fields and around the goal mouths of soccer fields. One stadium field superintendent plans to place a cover over damaged portions of his football field that have been seeded with pregerminated ryegrass.

Football and soccer field managers can cover their fields between games in the fall to delay winter dormancy. Baseball field managers with early season openers can use the covers to bring the turf out of dormancy. Sod can be installed earlier in the spring and still knit before the first game when covered.

Landscape uses have just begun to develop. By covering a newly-seeded slope, germination can occur faster, wind and water erosion halted, and the amount of water to irrigate the slope reduced. The fabric can be reused on other sites as needed. Sub-surface uses for the fabrics, such as preventing rocks and debris from heaving into the topsoil, are just now being evaluated. Versions of some of these fabrics are used to wrap drainage structures to prevent siltation and clogging. Thicker sheets of the fabrics have provided tremendous temporary protection of turf against vehicle and foot traffic.

The three manufacturers of these covers are as amazed by the new uses of their product as anyone. Gary Anderson, marketing manager of DuPont's Turf Blanket, says demand is so great that many buyers don't want to wait for adjustments underway to make the covers more convenient and durable for golf course and athletic field use. "In the past three years we have increased the tear strength of the Turf Blankets six fold and the sunlight resistance three fold," state Anderson. "Now we are preparing to offer the blankets in sizes to fit specific sites and we are simplifying the process which holds sections of the blanket together."



Wire loops hold the fabric down and can be installed quickly.

The cover Roberts first tried was DuPont's Remy, a six ml spun-bonded polyester which allows 75 percent of light through. Today, Anderson recommends the company's Tytar blankets for sports turf uses. Because it is made of spun-bonded polypropylene and 12 ml thick, it is six times stronger than Remy while still 70 percent transparent. It also resists degradation by sunlight three times longer.

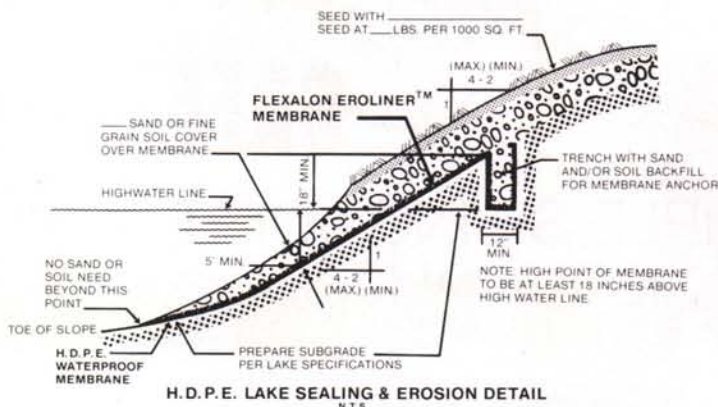
HPI Ltd. of Canada recently set up distributors in the U.S. for its Evergreen protective covers. These are made from woven polyolefin fabric and are 85 percent transparent. The Evergreen cover is made to order and comes as one piece in its own storage bag. This eliminates long storage tubes and joining different pieces together during installation.

Warren's Special Products Div. has been marketing TerraShield protective covers for more than two years. Made of polyester non-woven needle-punched fabric, TerraShield covers are not subject to degradation by ultraviolet light. The white material lets enough light through to allow turf underneath to tiller, avoiding the stemmy growth caused when a cover creates too much shade.

continued on page 41

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Installation is quick and easy, too. The Swing Safe Triple Swing Joint eliminates the problem of over torquing or bottoming out. And O-rings at each joint guarantee no leaks after the job is completed.

Manufactured in five sizes ($\frac{1}{2}$ ", $\frac{3}{4}$ ", 1", $1\frac{1}{4}$ " and $1\frac{1}{2}$ "), the Swing Safe Triple Swing Joint is available either as components or, for no additional cost, pre-assembled. The 1", $1\frac{1}{4}$ " and $1\frac{1}{2}$ " models offer the extra strength of Schedule 80 PVC. All models are available in either slip or threaded design.



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