ATHLETIC FIELDS

Athletic field care re-evaluated by Harper

Recent research is re-evaluating the way we look at caring for athletic fields.

Penn State's Jack Harper, Ph.D., notes that a good natural grass field will reduce injury, but that a bad natural field is just as dangerous as an artificial turf field.

He points out certain requisites for a good grass field. Coring, he notes, has become a major concern on natural grass fields because it causes too much compaction near the surface. This same problem also plagues golf courses.

The problem stems from tines penetrating to their appointed range, two to four inches, but packing soil down to that depth while penetrating.

But Harper emphasizes that coring is still a necessity and it should be done as frequently as possible—a minimum of three times a year. "You need more than one pass in one direction once a year," he states.

For cool-season grasses he suggests a heavy coring in early spring just after the turf has ended its dormancy. Also a light coring in late August before football season, each time using a dragging instrument to break up the cores.

His third recommended coring would be a heavy one at the end of the season without dragging, letting the elements break up the cores.

Harper also recommends overseeding annually, some between the hashes on a football field and near the goals on a soccer or field hockey field. He found over the last 10 years that early spring overseeding recommendations are changing from the too slow tall fescues and bluegrasses to the rapid turf-type perennial ryes.

The new turf types are the best, he says, but not perfect. The current recommended rate is 5 to 7 lbs./1000 sq. ft. For broadcast seeding, aerate, put down the seed and then drag so that the seed will fall into the holes and be covered. For slit seeding, aerate, slit seed in at least two directions then broadcast some also. Fertilizer should be added according to soil tests.

Penn State publishes a guide to athletic field construction and maintenance. The booklets are available from Dr. Harper at the College of Agriculture Extension Service, University Park, PA 16802.

Harper spoke on athletic fields at the Ohio Turfgrass Conference.

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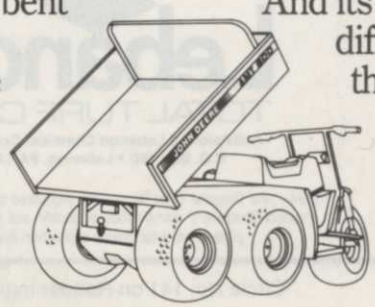

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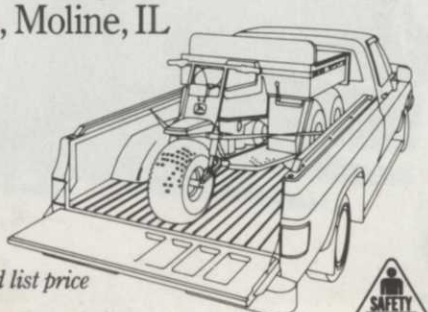


SAFETY live with it

THE GREAT COVER-UP

When the Pope visited San Franscisco last fall, he appeared on a day between two baseball games. The athletic field managers at Candlestick Park used a special fabric to save the turf.

by Heide Aungst, managing editor

Papal pageantry filled the air. On September 18, 1987, Pope John Paul II would bless the city by the Bay.

San Fransiscans could think or talk of little else. While the city anxiously awaited the visit, however, Candlestick Park's field managers prayed the turf would hold up to the 10,000 people seated on the field, to say nothing of the Pope's entourage (including the Popemobile driving across it).

Barney Barron, superintendent of parks and recreation for San Franscisco, spoke with confidence the day before the big event: "I have great respect for the crew. They're used to working under pressure with time constraints. Sometimes we'll have a football game Sunday and a baseball game Monday," Barron explained.

The pressure Barron referred to meant laying 286,000 square feet of the Warren's TerraCover ground blanket. It would be the first time in history that a stadium would use two layers of TerraCover to protect the turf from wear injury.

"TerraCover is a 100 percent nonwoven polyester needlepunched fabric," explains Emory Hunter of Warren's. The fabric originally was made from recycled plastic pop bottles. But the company has since switched to a virgin polyester fiber. Candlestick used some of both types of the geotextile.

In the beginning

"We had heard nine months earlier that he (the Pope) would be coming to San Franscisco and that Candlestick was a possible site," Barron explained. "About six months ago, we heard officially."

After that word came, Barron met extensively with various city agencies, the U.S. Secret Service and San Franscisco's Archdiocese. "Once the date was chosen, it was up to Arch-

Pope John Paul II walks on the TerraCover fabric at Candlestick Park to greet worshippers.

Candlestick's crew, along with volunteers, starts to unroll the TerraCover to protect the field against wear.

diocese to get the Giants to give up a date," he said.

The Giants were scheduled to play the day before the visit, the day of the visit, and the day after the visit. By giving up the game on the day of the visit, they had to play a double-header over the weekend.

Once the date was chosen, the next step was to figure out how to put people on the field without hurting the turf.

Good and evil

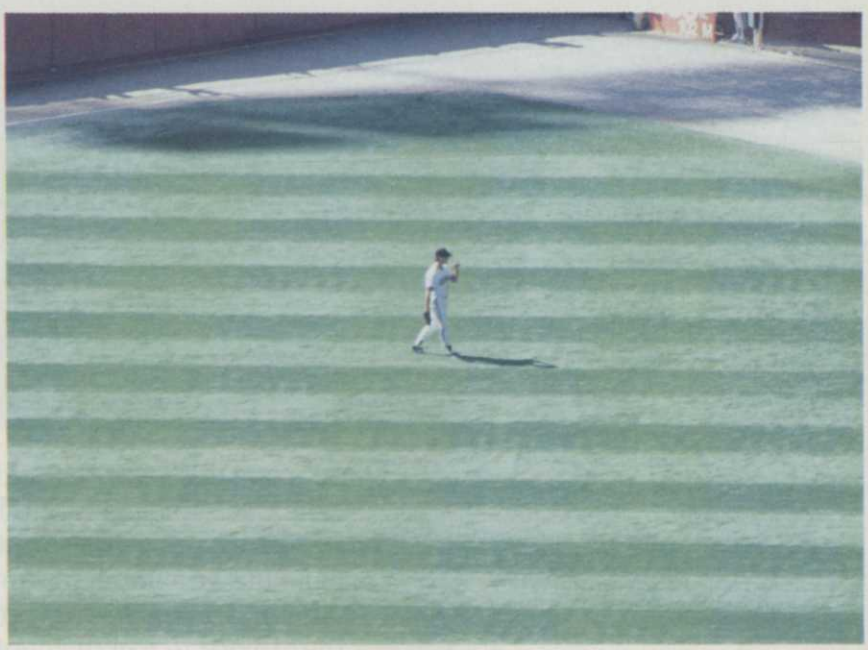
"We thought the only way to do it was to put plywood on the field, then cover it," Barron said. "But when the Archdiocese priced plywood and the labor cost involved..."

Chairs couldn't be used without first covering the field. Nightmares of a Rolling Stones concert in October 1981 haunted Barron. "We weren't prepared for the event and didn't have a cover of any sort," he said. "The field was severely devastated."

Barron didn't want the primarily A-34 Kentucky bluegrass/sand-based field destroyed again. He called Steve Wightman, field manager at Denver's Mile High Stadium, for advice.

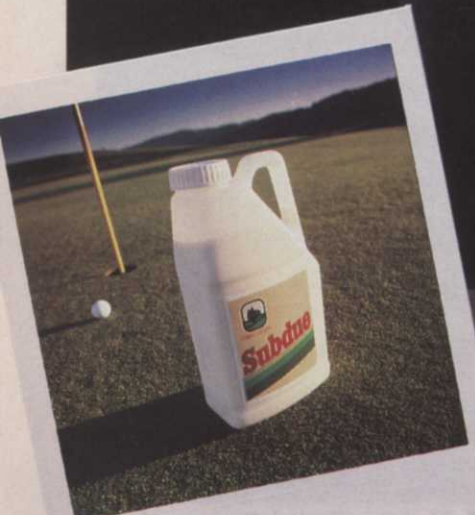
Wightman told Barron that he had successfully used TerraCover for rock concerts and along bench areas in Mile High. Wightman, however, uses only one layer of fabric as protection. "If you put chairs on one layer of fabric, the leg can push in and give a dimpling effect, like a golf ball," explained Barron. "That's not bad if you have time after the event to work on the field. So the Archdiocese suggested we use a double layer of the fabric."

Since no one had done it before,



The A-34 Kentucky bluegrass/sand-based field at Candlestick Park was in top shape during the Giants' game the day before the Pope's visit.

"Someone put a cart in the 7th fairway pond. My next-door neighbor bought his kid a set of drums. And I just found out my mother-in-law is moving in. But what really concerns me is Pythium."



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Barron and head field manager Joe DeDelCarlo set up a test at San Francisco's old Kezar Stadium. The crew put two layers of fabric on part of the field, then set up 20 chairs on top of the fabric. On top of the chairs, they piled 80-lb. sacks of fertilizer.

"We left it overnight," Barron said. "The next day we had an in-service training class sit on the chairs and get up and down." Then they pulled the fabric up. "Don Foreman (Giants' stadium manager) couldn't find one single depression," Barron said. "Based on the test, he gave us permission to use the fabric."

Workers bundled up, sipped coffee, but never stopped rolling and tacking the fabric.

Candlestick and the Archdiocese struck a deal. They would split the $60,000 cost of the fabric and each group would own one layer.

Judgment day

On Thursday, Sept. 17, the Giants beat the Cincinnati Reds. When fans cleared out of the stadium at 5 p.m., Candlestick's crew of eight and about 100 teenaged volunteers from the San Francisco Conservation Corp. gained possesion of the field.

Security tightened. No one could enter the stadium without passing metal detectors and showing proper identification.

The workers laid the first layer of TerraCover, staking it down every foot or so. Each roll measured 300 ft. by 15 ft.. Some rolls were cut to size.

With one roll down, another worker started to mark the fabric, 12 inches in, so that the next layer could overlap. After an hour or so, however, the crew got the hang of laying down the fabric without marking off the 12-inches first. It saved time, too.

As the sun set, the winds off the frigid Bay whipped through Candlestick. "We can get gusts of 80 to 90 miles per hour," Barron said. Workers bundled up, sipped coffee, but never stopped rolling and tacking the fabric.

They layed fabric over turf and over a plywood altar support. The altar would be built from scratch. As the night wore on, the turf disappeared under a double layer of TerraCover.

By 8 a.m. Friday morning, as devoted Catholics began to arrive by the busload, the workers finished the job. Most didn't even get to stay for the mass.

As expected, the Popemobile drove over the TerraCover-ed field. People rose up and down out of their seats in hopes of getting a chance to touch the Pope. Eucharistic ministers passed through the aisles giving communion.

The resurrection

Within several hours, mass ended. By about 4 p.m. Candlestick was clear.

continued on page 29

Emory Hunter of Warren's checks out the fabric before it is laid on the field.

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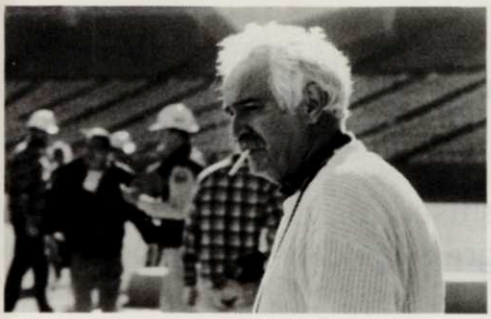
COVER-UP *from page 27*



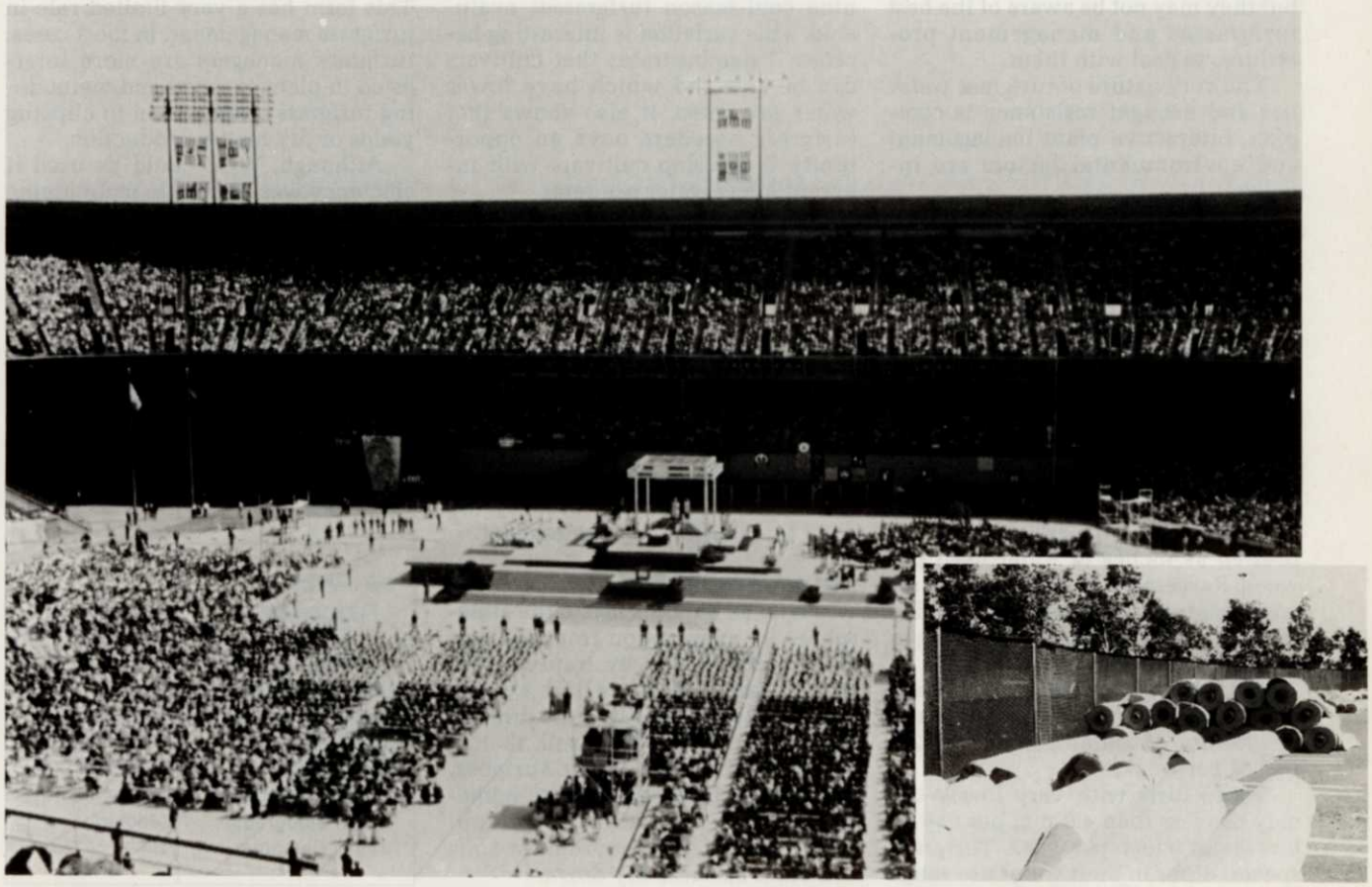
Barney Barron, San Francisco's superintendent of parks and recreation, oversees fabric laying.

The crew gathered long PVC pipes to re-roll the fabric and save it for the next big event. They rolled back each layer with eager anticipation. Would tire tracks show? Would there be dimpling from the chairs? Would the field be severely compacted from the traffic?

When exposed, the turf appeared slightly matted. It would need to be brushed upright. But no tire tracks or dimpling or severe compaction were evident. The TerraCover worked. "We'd definitely do it again," Barron said.

The next day the Giants played on the field. It looked striped and healthy. No one could tell that 10,000 people had trampled it the day before.

And the Giants won. **LM**



Two layers, totalling 286,000 square feet, of TerraCover, protected Candlestick's turf against wear.

Part 4 of 4

TURFGRASS WATER USE

Only one percent of the water applied to turfgrass is used for growth. Scientists are studying 'water use rate' of some turfgrass species for improved water savings.

by Robert Shearman, Ph.D., University of Nebraska

With the onset of water shortages and a growing awareness that water is a critical resource needing careful management, turfgrass researchers have placed an increasing emphasis on this area of research. More information is available to turfgrass managers which allows them to deal with water shortages and drought stress.

In many parts of the country, water shortages are an annual event. In other areas, these conditions occur occasionally, and the need for water conservation is much less predictable than in areas of regular drought stress. Most turfgrass managers are aware of water stress conditions in their areas, but they may not be aware of the best turfgrasses and management procedures to deal with them.

The very nature of turfgrass water use and drought resistance is complex. Interactive plant management and environmental factors are involved.

With this in mind, some of the terms used in this article may be confusing to the reader. An attempt will be made to clarify terms that may not be commonly used or understood by the reader.

Water use by the turfgrass plant is dynamic and interactive with the plant, environment, soil and cultural practices. Turfgrass water use rate (WUR) is the amount of water needed for growth, plus that used in evapotranspiration. WUR is typically expressed as inches of water used per week. Research publications often report water use in millimeters per day (25 mm equal one inch). According to research by James Beard, Ph.D., at Texas A&M University, turfgrasses with very high WUR may use as much as 9.0 mm of water per day or 2.5 inches per week.

Those turfs with very low WUR may use less than 4.0 mm per day or less than 1.0 inch per week. Turfgrass species differ in their water use rates. For example, the Table 1 contains a relative comparison of nine cool-season turfgrass species water use rates.

Similarly, turfgrass cultivars differ in WUR. Studies at the University of Nebraska have shown as much variation in water use within cultivars of Kentucky bluegrass as between the nine cool-season turfgrasses evaluated. This variation is interesting because it demonstrates that cultivars can be selected which have lower water use rates. It also shows that turfgrass breeders have an opportunity to develop cultivars with inherently low water use rates.

Water loss through evaporation occurs from soil, thatch, plant surfaces and water surfaces.

Other studies have shown that tall fescue cultivars differ in WUR, particularly when forage-types are compared with the new, improved turf-types.

The term "water use rate" is often considered to be the same as evapotranspiration rate. An estimated 99 percent of the water taken up by the turfgrass plant is lost to the atmosphere by evapotranspiration. The remaining one percent is used by the plant for growth and development.

Evapotranspiration

When water vapor is lost to the atmosphere by evaporation from soil and plant surfaces and by transpiration from plants, it is called evapotranspiration (ET). Water loss through evaporation occurs from soil, thatch, plant surfaces and water surfaces. Evaporative losses are greater immediately after irrigation or rainfall. They become less important as soils and other surfaces dry down.

Under these conditions, transpiration becomes more of a contributing factor to water loss than evaporation. The turfgrass roots actively grow and extract moisture from the soil.

This water is transported in the liquid phase in the plant. It is subsequently lost to the atmosphere as water vapor through pores in the leaf blade (stomata). Evapotranspiration could be considered a highly inefficient system. However, it serves as a driving force for nutrient uptake, translocation of nutrients and a cooling mechanism in plants.

Water use efficiency

The amount of dry matter produced per unit of water lost by the plant is termed water use efficiency (WUE). This term has a very limited role in turfgrass management. In most cases, turfgrass managers are more interested in plant survival and maintaining turfgrass quality than in clipping yields or dry matter production.

Although, WUE could be used if efficiency was related to maintaining turfgrass quality. WUE in relation to turfgrass quality would vary for the particular turf. For example, the effi-

TABLE 1.

RELATIVE WATER USE RATES OF 9 COOL SEASON TURFGRASS SPECIES

SPECIES	WATER USE
Tall Fescue	
Forage-type	Very High
Turf-type	Medium to High
Perennial Ryegrass	Medium
Kentucky Bluegrass	Medium
Creeping Red Fescue	Medium
Chewings Fescue	Medium to Low
Hard Fescue	Medium to Low
Creeping Bentgrass	Medium to High
Rough Bluegrass	Medium
Annual Bluegrass	High

Comparisons are based on turfgrass evaluations conducted at the University of Nebraska