Dating back to horse-and-buggy days, Athletic Park thrives on space-age technology.

Diamond of the Year

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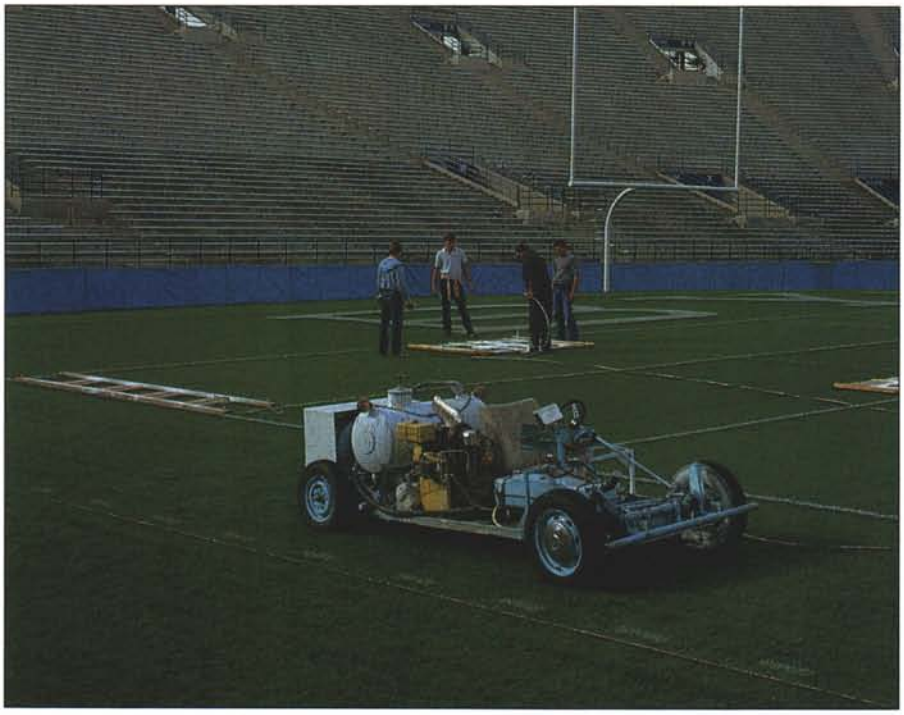
hand, using a one-inch hose attached to the quick coupler located behind the pitchers mound. More extensive irrigation is managed with a traveling Rain Train sprinkler, but even running overnight, it can only water from 1/5 to 1/6 of the outfield. The sprinklers are used when turf conditions warrant during the critical, heavy-play period in June and again in the fall if there is a lull in play.

"Because of the shaded area right behind home plate created by the shadow of the grandstand, we frequently have a problem in the early spring with snow," reports Freix. "One year, the snow was piled up to the dugout fence as our April 15th season opener approached. Crews ended up hand shoveling that snow into wagons, hauling the wagons to the outfield, and hand shoveling the snow back out, spreading it in shallow layers across the outfield so the sun could melt it. But that's all part of our 'do what it takes' approach to field care. It's all worth the effort when coaches and players tell us that this is their favorite place to play because they don't have to worry about field problems and can really concentrate on their game."

Bob Tracinski is the manager of public relations for the John Deere Company in Raleigh, North Carolina, and public relations co-chair for the national Sports Turf Managers Association.

The Beam Clay Baseball Diamond of the Year Awards are sponsored by the Sports Turf Managers Association, *sportsTURF* magazine, and Beam Clay in recognition of excellence and professionalism in maintaining safe, professional quality diamonds. Winning diamonds are selected in three categories: (1) professional; (2) college; and (3) schools, municipalities and parks.

Entrants are judged by four major league groundskeepers each year. Judges for the 1996-1997 Beam Clay Baseball Diamond of the Year Awards were Joe Mooney, Boston Red Sox (AL-East); Tom Burns, Texas Rangers (AL-West); Barry Foley, Pittsburgh Pirates (NL-Central); and Steve Peeler, St. Louis Cardinals (NL-Central).



The main delivery system used at BYU is a modified four-wheel VW buggy.

Striping and Marking Athletic Fields

By Michael DePew and Gilbert Pulley

The materials and the equipment available to mark sports turf areas vary greatly. Primarily, the level of use and budget of the sports facility determine the types of materials and the delivery systems used to apply them. The types of equipment and materials to perform the same function from the recreational level to the professional sports level may be strikingly dissimilar or remarkably alike.

Low Budget

Recreational areas with limited budgets may often use herbicides or petroleum (kerosene or diesel) to stripe and mark fields. Pump-up canisters or backpack sprayers are often utilized with hand-wands to mark the play area. Spray shields or spray guards can be used on the nozzles to precisely direct the spray in a specified spray-band width. This type of marking system allows for long periods of time before the need arises to remark the field.

The problem with this type of striping system is that it creates stripes and marks that are "un-turfed." An un-turfed surface is more prone to compaction and may also become slick (in finer textured soils) or loose (in sand or coarser textured soils). The loss of the vegetative crown and degradation of thatch (in sod-forming turf systems) result in a change in elevation along the striped patterns. This has the potential to create an unsafe situation where "tripping" over the lines could become a problem.

Medium Budget

Higher use facilities such as high schools often use a lime or whitewash system. Lime (chalk) can be applied in a dry powder form or as a liquid slurry (whitewash) that is sprayed on.

The dry powder form is widely used as a marker for the skinned areas of baseball and softball fields. It is applied in various types of "drop-box" spreaders often referred to as "chalkers." These spreaders have a specified slit-width opening and will apply the material in a band or stripe. These chalkers may be either hand held or a wheeled push-type applicator. Chalk for these uses has many times been replaced with fine marble dust. Limited use of chalk is desirable due to its potential for eye irritation to athletes.

Whitewash lime slurries are made by mixing the lime with water and applying it through spray equipment. The lime must be fine ground and of uniform size and kept well agitated as a slurry to provide even-flow output and to prevent nozzle clogging. Lime will leave a live turfed system under the stripe, although over time it may build up and cause turf thinning or death. The lime-striping system has a distinct advantage in terms of its low cost.

High Profile

Higher profile athletic facilities such as college and professional fields

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Striping

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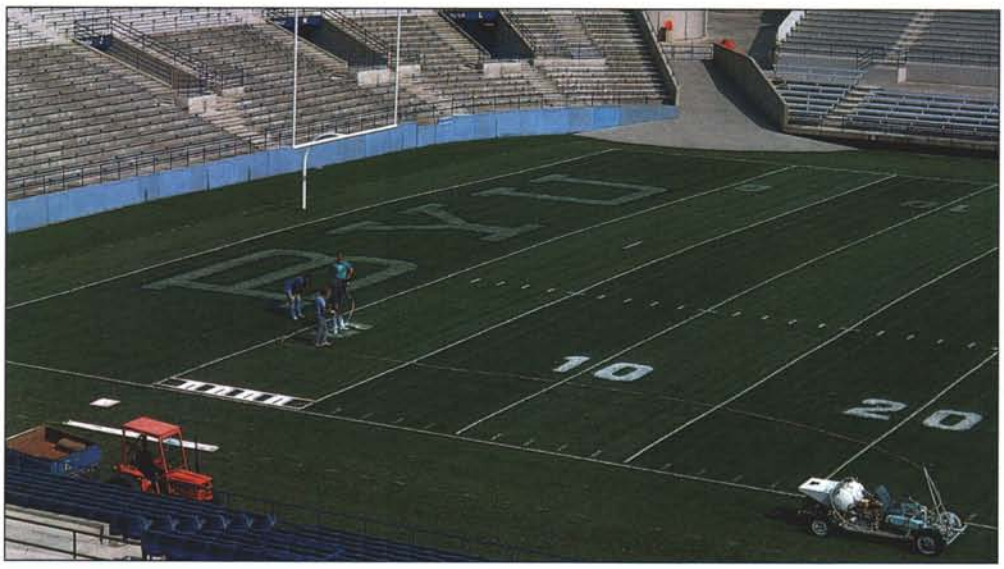
commonly utilize water-based paints specifically formulated as turf colorants. The common delivery system utilized at these institutions consists of compressed air or an air-less spray or pumping system on a motor-driven, wheeled vehicle. The use of paints reduces thinning and die-back of the turf and therefore reduces the potential for tripping.

The down side of paints is that it requires frequent reapplication due to removal of the paint with mowing of the actively growing turf. The removal of painted turf can be reduced by lowering the mowing height of the turf to be striped just prior to painting or by using a plant growth regulator added to the paint.



After painting numbers and hash marks, the paint crew will move into the end zones and paint the "BYU" letters.

The Evolution at BYU

Brigham Young University (BYU), like most institutions, has gone through an evolutionary period since the latter 1970s in the materials and methods it's used for marking and striping. In the '70s, whitewash was the preferred marking material, which was applied through a modified three-wheeled Volkswagen (VW) striping buggy. The buggy was equipped with a motorized compressor and paint sprayer, tank, and a nozzle mounted to a front guide used to keep the lines straight. This provided an off-white line with a live turf.

The lime whitewash system was

not without distinct drawbacks. The most serious was irritation and even injury to the eyes of athletes. The second most serious problem was turf thinning and die-back as the season progressed. The length of time before turf damage occurred was shortened by application of the lime to the local native soils, which have high pH and high lime content. The thinning and die-back of the turf required the considerable time and expense of annual resodding of the striped areas of the field.

With the emergence of paint on the market, it was used to mark game fields. Due to the initially high cost of these paints, their use on practice and recreational fields was limited. These fields continued to be striped mostly with the slurried lime whitewash. After a few years, the market began to open up and turf paints became more affordable. As the cost dropped, the use of paints at BYU rose.

Along with the switch from the lime whitewash to paint, a change was made on the baseball and softball fields from lime chalk to a fine marble-dust "chalk." The three-wheeled buggy was worn out about this time and was replaced with a newly modified four-wheel VW buggy.

Paint Problems

The use of paint for field marking was not without some problems. In the early years, many paints contained chemicals and petroleum distillates that were toxic to the turf. After a few years, the products had reduced toxicities and were more consistent.

Also during this time period, of the mid-1980s, a trend was noticed — some batches of the preferred turf-paint brand caused more damage to the turf than other batches. After some investigative work, it was recognized that the batches of turf-damaging paint were being shipped with ethylene glycol added as an anti-freeze. Ethylene glycol is supposedly not toxic to turf, but experience at BYU is that it is not as inert as promoted. Since that time, BYU has specified and accepted only non-glycol paints, ordered and shipped during the summer and stored in a heated area.

Typical Scenario

A typical scenario for marking the field at BYU's Cougar Stadium for football starts with laying out guide strings. The guide strings are 3/8-inch nylon rope.

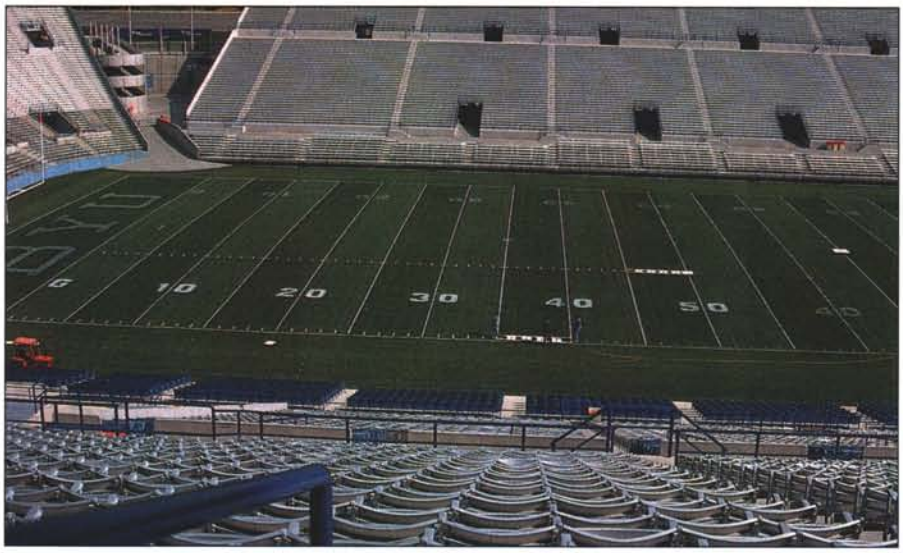
The guide strings are strung between appropriately placed guide posts. The guide posts are 3/4-inch by 15-inch galvanized steel pipe driven into the ground at strategic locations. The strings are tied to large gutter spikes that are then placed in the guide posts. The string is drawn taut and wrapped around a large gutter spike placed into the opposite guide post.

The guide lines are drawn across the length of the field first for the sidelines and to line up the hash-mark, number and directional-arrow stencils.

Next, the guide strings are drawn width-wise for the end line, goal line and 5-yard-line stripes in 15-yard increments and painted twice from alternate directions. Stringing and painting in 15-yard increments allows for room to turn the spray buggy around in the sideline area without tires gouging the turf from excessively tight turns.

The sidelines are painted following the yard lines with two coats of paint applied in opposite directions. Rags are placed over each of the damp yard lines during the sideline painting operation to prevent tracking of the damp paint.

The stencils are then laid for the hash lines and numbers, beginning from the end of the field painted first,



Stencils are laid for the hash lines and filled in with a hand-wand.

as the paint will normally be dry on that end. The stencils are filled in by spraying with a hand-wand that runs off the paint sprayer from the spray buggy.

While two crews are painting the hash marks and numbers, a crew will lay out the "BYU" letters in the end zones with gutter spikes and baler twine. After painting the numbers and hash marks, the paint crew can move into the end zones and paint the letters.

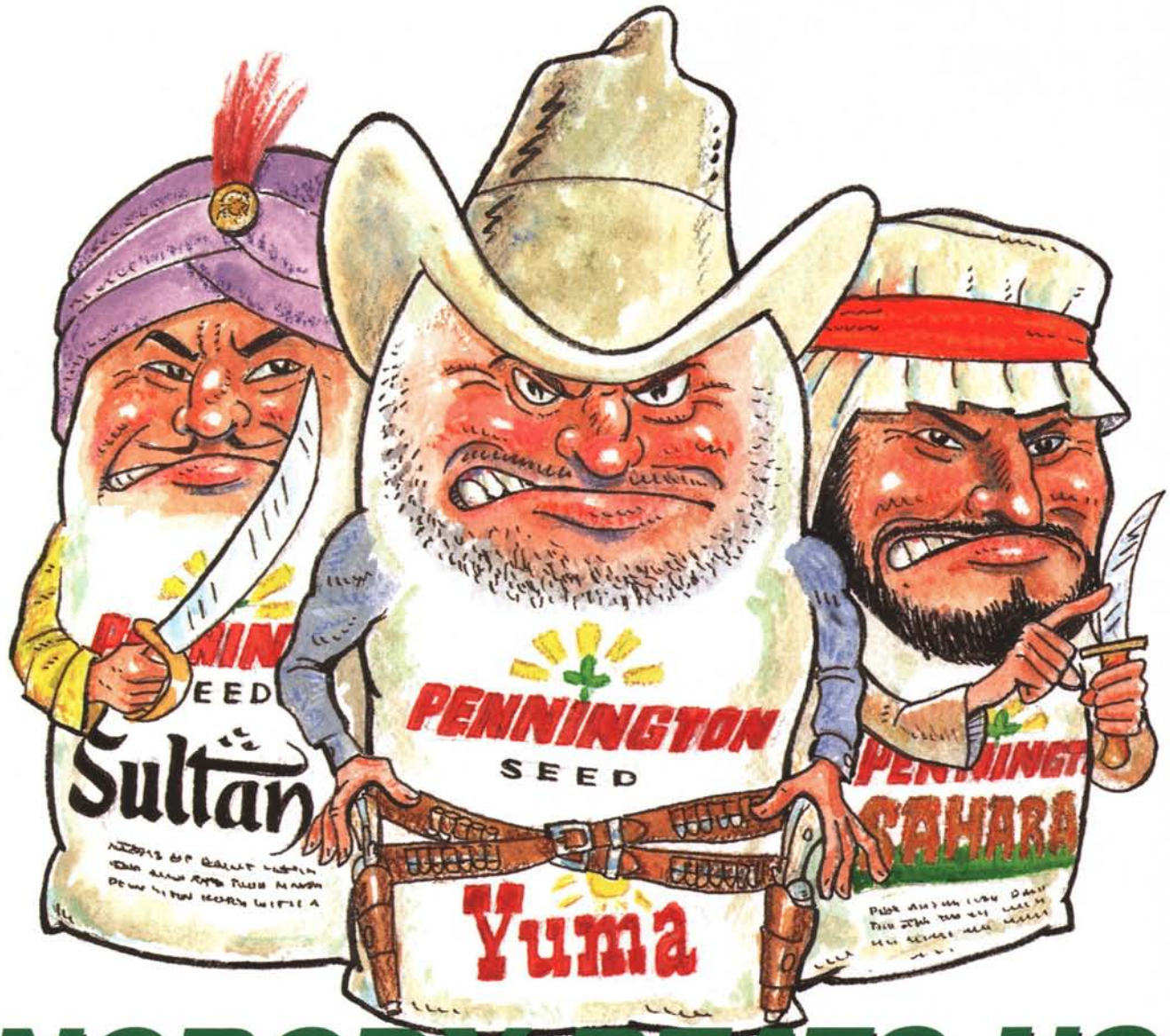
The sideline areas are painted next with appropriate stencils and strings from the coaches box, team area, and "no-man's land" area. The blue outline around the numbers, letters and directional arrows is painted next. The outline around the letters is sprayed while the numbers and arrows are brush painted with three-inch brushes. The field is now completely marked and ready for play.

Striping and marking of sports turf areas can be accomplished by using many diverse or similar materials and equipment. The end result is a function of the care and precision used to apply the material. Straight lines, crisp edges and reduction of overspray go a long way to mark your work as a sports turf professional with an attitude of "and then some."

Michael DePew is an STMA member and an agronomist for ProTurf Environmental and Sports Turf Services, L.C., Provo, Utah.

Gilbert Pulley is an STMA member and the landscape specialty supervisor at Brigham Young University, Provo, Utah.

The authors thank Todd Munger and Mike Roundy, athletic area foremen for BYU Grounds Dept., for their assistance in providing information for this article.



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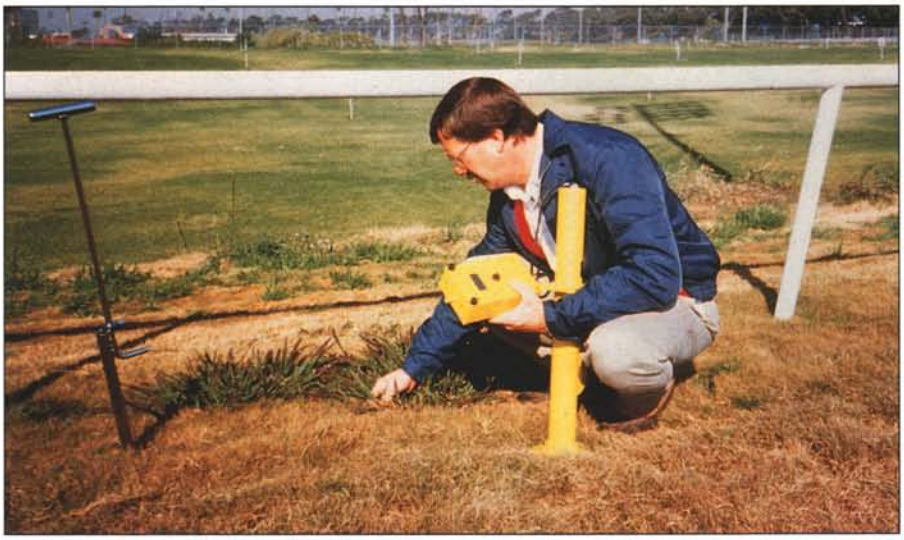

The author measures turf hardness with a Clegg Impact Hammer at Hollywood Park Race Track.

Trends in Fitting Fields to Stadiums

By Steve Guise and Dave Hanson

Stadiums and sports fields should fit together like hand and glove. While the aesthetic appeal and crowd-pleasing features of a stadium make it popular with fans and the seating and "sky box" capacity make it appealing to owners, ultimately it's field usability that gives the facility longevity and financial success.

"Usability" means the field must be able to host appropriate athletic events by providing a safe, highly playable surface that allows participants to play to the best of their ability. In addition, the field and stadium must be able to accommodate other revenue-raising events to justify the financial commitment necessary to build and maintain the facility.

To ensure all this, certain design elements of older sports stadiums are altered in today's stadium constructions due, in part, to the multi-use, high tech nature of the fields. Consider a few of the design elements due for change:

•Often, limited provisions were made for on-site storage of field maintenance materials or equipment.

•Frequently, stadium entry points, adequate initially, now are too small for today's large equipment and the materials needed for special events. In some cases, a single entry point serves the entire facility, acting as a bottleneck when multiple machines and materials must be moved onto or off the field. Constant heavy traffic through limited entry points causes compaction problems and excessive wear to certain areas of the field.

•Added seating often reduced the size of the field sidelines and increased traffic pressures. Stadium design, or redesign for additional seating, channeled rain from the stands down to the field. Drainage systems became obsolete or inadequate at best.

•Closed oval stadiums designed to reduce wind for better sports play and increased seating created an environment that encouraged turfgrass diseases. Shadows created by the stadium design hindered turf growth.

•Increased revenue demands created new opportunities for field use that further stressed the turf.

New Relationships

The art and science of turfgrass maintenance has advanced rapidly over the last century, creating new relationships for those involved.

With the complexities of today's high tech fields, architects of sports turf facilities are diversifying into this specialty or forming subcontracting arrangements with those who do specialize in field design and construction; landscape design; sound and/or lighting systems; seating and concessions; and the complex engineering elements necessary to accommodate the field's requirements for irrigation, fertigation, drainage, heating or cooling, and oxygenation.

Owners today frequently relate high tech field systems with performance guarantees, post construction maintenance, and long-term technical support. The failure of many field designs has increased the demand for product and system performance guarantees.

Sponsorships from key suppliers — such as the irrigation, mowing and maintenance, or fertilizer companies — may "synergize" field maintenance and the marketing of products. This relationship can become a major contributor to the facility's bottom line and, in some instances, can determine the maintenance equipment and fertility programs available to the sports turf manager.

New Systems

In recent years, laboratory technologies have advanced rapidly. A number of soil laboratories, led by the

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