



Striping trial research at the University of California at Davis evaluates current striping techniques with one possible new approach, which involves the addition of a plant growth regulator (PGR) to the marking paint.

Photos courtesy: Bob Milano.

Sports Field Marking:

By Bob Milano

Consider the Alternatives



Initial striping application.

A sports turf manager must strive for a smooth, uniform turf surface to provide maximum safety, playability and aesthetics. Yet today's turf managers face ever-increasing demands as the level of expectations for playing fields rises to meet those portrayed by televised sporting events, while, for most of us, resources to manage our facilities continue to diminish. Still, innovative sports turf professionals often manage to meet and exceed expectations.

Field marking and striping is an important aspect of a playing surface. Marking and striping are the final touches that transform a green canvas into a football field or baseball diamond. Striping is the key element that lays the framework and sets the tone for the entire facility.

Current Options

In most instances, there are three alternatives, sometimes used in combination, for field marking:

- White latex paint.
- Powder-type (chalk) materials.
- Herbicides (contact and systemic).

Latex paint provides an outstanding visual quality, optimum playability, excellent safety and good facility flexibility. In most cases, painted lines will be removed by normal maintenance activities in 10 to 14 days. Overall, painting is the preferred method, but it is also the most expensive. Materials, equipment and labor, combined with an average weekly application requirement, can stretch the average maintenance budget to the breaking point.

Powder-type marking materials generally have poor visual qualities on turf as the material sifts into the turf thatch and is easily disrupted by users, irrigation and maintenance activities. Although the material is reasonably safe, it can cause eye or skin irritation to event participants. It also can build up over time to damage the turf. One striking advantage of this method is flexibility. The chalk can be washed easily from the turf surface immediately after completion to accommodate a different activity.

Herbicides are the final and most widely used field marking material in California and other areas. Herbicide applications, both contact and systemic, result in adequate playability and moderate visual quality but in the long run have serious drawbacks. Although this technique at first may appear to be the most economical, it can reduce overall facility safety and limit facility flexibility. Converting a soccer layout to a softball layout may take weeks since new turf establishment in the bare lines will be required.

Problems and Solutions

The application of non-selective herbicides to sports field marking is in direct conflict with the primary function of field management: growing grass. Unfortunately, most limited resource agencies utilize glyphosate as field marking material for reasons of economics and convenience. Initially, this approach appears reasonable, but many times we fail to calculate the cost of increased user injuries, additional repair costs and an overall lower quality facility. Safety and increased attention by both recreational and competitive users will require all sports turf managers to respond to this challenge.

The eradication of turf strips for field marking creates "vegetationless" trenches. These bare areas are prone to erosion, slickness and hardness similar to most bare soil. Repeated applications trans-

form the intended narrow 4-inch lines into larger, poor-draining bald areas or even deep ruts, thus magnifying the hazard. In most instances, these trenches are located at critical points on the playing surface such as the sideline, goal mouth or end zone, further increasing injury potential.

A study by the Sports Research Institute, the National Athletic Injury/Illness Reporting Service and Pennsylvania State University revealed:

- 20 percent of sports injuries are field-related.

- 44 percent of ankle, foot and knee injuries are field-related.

- 10 percent of sports-injury-related lawsuits claim inadequate maintenance.

Although striping and marking comprise only a small percentage of the entire turf playing surface, any reduction in injuries is beneficial. In addition, continued use of broad-spectrum herbicides for striping increases weed invasion into these areas, limits the flexibility of the facility, and will eventually require expensive turf renovation of the areas.

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Field Marking

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Facility managers must begin to factor in these costs when calculating the overall cost for field marking and striping until a better alternative is found.

One possible solution to this problem is now being studied at the University of California at Davis. In a joint effort, the Division of Plant Biology Cooperative Extension, UC Davis, UC Davis Grounds Division and the Sports Turf Managers Association are conducting a field trial. The research is evaluating the most prevalent current striping techniques with one possible new approach, which involves the addition of a plant growth regulator to the marking paint. The objective of this new approach is to extend the visibility of striping by slowing the growth rate of the painted turf, and thus the loss of painted turf to mowing.

Methods and Materials

A uniform tall fescue/bluegrass sports turf area adjacent to the UC Davis soccer field was selected for the trial. The work evaluates traditional marking compounds, including white latex paint, Diquat and glyphosate, with paint mixed with PRIMO plant growth regulator.

Evaluations were made utilizing light reflection values as a comparison tool. This method was selected to correspond with the function of the line, which is to provide a contrast with the turf and define an area or zone on the playing surface.

Preliminary Data and Observations

Although only a portion of this research is complete to date, a few early observations can be made:

- Fourteen days after the first treatment, the paint was only 26 percent lighter than untreated turf, while the PRIMO-modified painted turf ranged from 45 to 55 percent lighter (in essence, twice as visible).

- The PRIMO-modified paint applications were, statistically, significantly lighter than paint alone after repeated mowings.

- PRIMO-alone treatments showed no difference in turf coloration and light reflection.

- Some regrowth of desirable turf occurred in the Diquat-treated areas.

- As expected, the glyphosate application resulted in a 50-percent wider strip (plus or minus 6 inches).

- Weed invasion of the glyphosate lines is beginning.

Continuing Research

Although no final conclusions can be drawn at this time, the potential for growth regulators to be applied with latex paint for sports field marking looks bright. The preliminary data and visual observations clearly indicate that PRIMO is working and has the potential to help provide safer athletic fields. (However, the product is not currently registered for use in California and is only being researched and studied at this time.) In order for this technique to become common, the benefit it provides must be balanced by increased convenience and costs equal to, or less than, current modes. It's hoped that the results of the continuing research will help evaluate feasibility.

Field markings are as critical as uniformity, smoothness and texture of the overall turf surface. As turf managers, we must respond to challenges and provide the safest, most cost-efficient facilities possible. Specifically, we must evaluate our current marking techniques as part of our overall program and select the wisest approach. For example, chalk-type marking might be the most appropriate choice for a one-day soccer festival, while several light applications of Diquat on a practice football field might allow some regrowth for safety. Large trenches, devoid of vegetation, will soon become unacceptable from both a liability and user point of view.

We must all accept the challenge and consider this an opportunity to provide the safest, most playable and aesthetically pleasing facilities possible. I believe we can accomplish this through innovation and professionalism, combined with public and user educations. □

Editor's note: Bob Milano is grounds operations manager, UC Davis Physical Plant, and a board member of the national Sports Turf Managers Association.

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