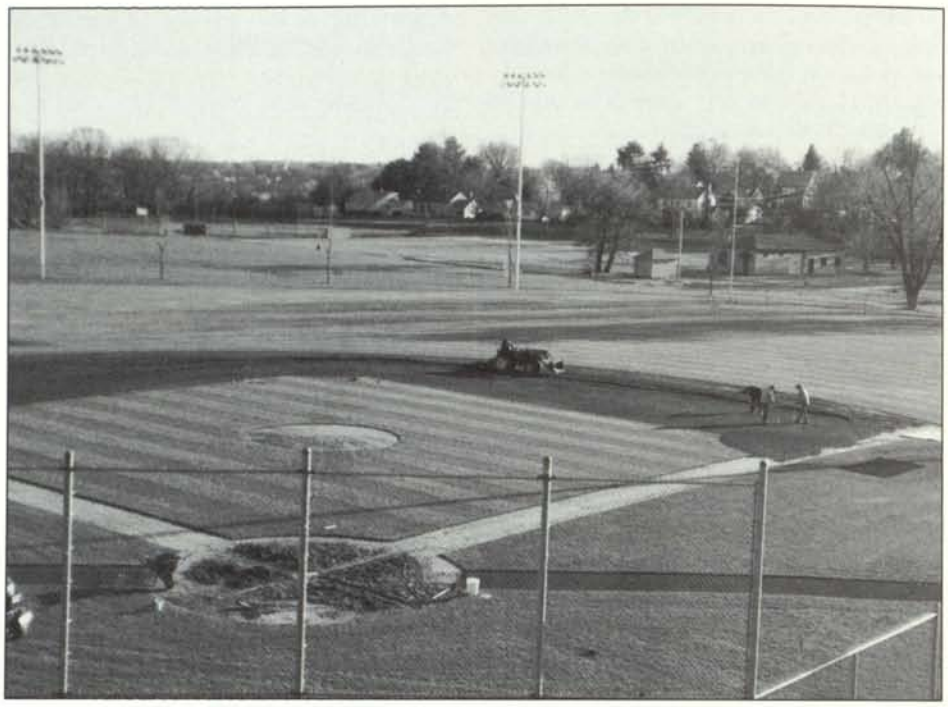
Making Athletic Fields Safer



By Eric Nelson Ph.D. and Barry Larson

We need to pay more attention to maintenance programs on athletic fields. In a survey of 12 high schools by Penn State University, the firm of Harper, Morehouse, Waddington & Buckley (1984) found that more than 20 percent of the injuries to football players was possibly related to game or practice-field conditions. If we expand the survey to other sports, including field hockey, lacrosse and soccer, we would see similar results. If we can relate injuries to field conditions, and if there are ways to make fields safer, then school districts might find themselves liable for damages to an athlete who was injured on a poorly-maintained field.

How can we make fields safer? Too often, most of the attention goes towards maintaining game fields, with complete neglect of practice fields. The Penn State study found that although 90 percent of the athletes' time may be spent on practice fields, 80 to 90 percent of available money and effort was used to maintain game fields. Since *half* of all injuries occurred on the practice field, we also may need to focus on practice facilities before charges of negligence are made.

The first step to achieving safer fields is to make or get an objective evaluation of surface smoothness and turfgrass cover — two characters that are indicators of potential problems. The second step is setting priorities to rectify the situation. Timing and cost will factor into some solutions.

Drainage and Surface Smoothness

Poor surface smoothness can be related to problems caused by construction, maintenance practices and overuse. It is important to determine which of these alone, or in combination, is the source of the problem. Poor surface characteristics can decrease turfgrass survival, due to drainage problems. Rough, undulating athletic fields also can result in serious injuries to athletes. Many times an athlete will run at top speed with little attention to where his next step will be. If slight mounds, depressions, grass clumps or stones are present on the field, then loss of control and injury due to missteps are likely.

The best solution to maintaining a smooth surface begins with careful construction to provide good surface (and subsurface) drainage. Small depressions that hold water are responsible for poor traction, soil compaction due to traffic and resultant loss of turf cover. These holes are much easier to see and should be filled, graded and settled before turf establishment begins. Stones larger than a half-inch should also be removed from the rootzone soil prior to establishment. Proper construction will make future turfgrass establishment and maintenance easier and less costly—and will provide a safer facility.

Surface smoothness can be maintained on heavily-used fields with regular core aeration followed by dragging with mats or weighted chain-link fence. Soil will move from higher mounds into low spots to even the surface. Core aeration will also reduce soil compaction to allow better movement of water, air and fertilizers into the soil—resulting in healthier turfgrass roots. Overseeding to thicken turf should be combined with aerification followed by a mechanical slicer/seeder to help get good seed-to-soil contact for strong establishment. These procedures should be carried out at least twice per year. More times may be necessary with heavily-used fields. Timing is critical to get grass well established before intensive use or environmental stress. Immediate post-game inspections and repair of torn sod and divots will keep fields smoother between aerifications.

Quality of Cover

Once sod characteristics and drainage are addressed, the quality of vegetative cover is another factor that can be dealt with to reduce injury risk. Better turfgrass cover provides better traction and softens the playing field (Rogers, et al., 1988). Powell and Schootman (1993) found increased incidents of ankle injuries on artificial versus natural grass. Turfgrass survival of athletic fields can be affected by species and variety selection, maintenance programs (including overseeding, core cultivation, irrigation and fertilization), soil properties (including drainage and aeration) and intensity of field use.

In northern climates, the most popular mixes for establishment and overseeding of athletic fields are Kentucky bluegrass/perennial ryegrass mixtures, which are by far the most wear-tolerant cool-season turfgrasses for athletic fields. They complement each other well. Typically, there should be a solid base of Kentucky bluegrass established, followed by semiannual overseeding with mixes containing a higher percentage of perennial rye. The choice of mix depends on location, maintenance programs, length of time between seeding and field use, amount of turf cover versus bare soil and intensity of field use.

Further south and into the transition zone, tall fescue blends and tall fescue/Kentucky bluegrass mixtures are gaining popularity for their improved heat and drought tolerance. Tall fescues perform best on limited-use athletic fields, such as softball and baseball diamonds, but they have done well on higher-use sports fields with good management. Tall fescues benefit from at least nine months of growth and development from establishment before allowing play on the field.

On fields with more concentrated use in the summer, cold-tolerant bermudagrass or zoysiagrass will provide very wear- and heat-tolerant turf with less irrigation. These are the best bets for quality athletic turf both within and south of the transition zone.

Several maintenance procedures alone or in combination can help improve grass retention on athletic fields. Weeds such as knotweed, *Poa annua*, crabgrass, goosegrass and clover, are indicators of soil compaction and drainage problems. Simply controlling weeds with herbicides will not fix the problem. Again, aerification is an important first step towards improving the environment for turfgrass roots. Core cultivation in combination with overseeding relieves compaction, improves water infiltration, increases soil aeration and thickens the turf. It is one of the most beneficial steps one can make to improve the quality of an athletic field.

Improving Wear Tolerance

There are several simple tricks to use for improving wear-tolerance, stress-tolerance and softer fields. Try raising the mowing height of grasses an additional half-inch to a full inch to improve all three. Sound irrigation intensity, uniformity and scheduling should strive to reduce plant stress without creating soggy soils. Timely fertilizer applications (especially nitrogen and potassium) will go a long way toward maintaining healthy, vigorous and wear-tolerant turf on athletic fields.

The single greatest problem with athletic facilities today is overuse. We simply do not have enough facilities to spread out the use and associated wear that could permit vegetative recuperation. This would allow time for performance of proper maintenance practices. There is no grass field made that can stand up to multipurpose and multi-season use by athletes (soccer, baseball, football, track and field, field hockey), marching bands, physical education classes, intramural sports and parks and recreation programs. Proper planning, scheduling, maintenance and administration are key to providing enough high-quality facilities to keep campuses and communities active and safe.

Giving the limitation on number and size of facilities, we need to do the best with what we have. Budgets should be set up to provide quality construction, with annual funds targeted for preventive maintenance. Safer athletic fields take commitment with constant monitoring and repair. However, the money and effort placed toward safety are really an investment, not an expense. ❑

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