

NATURAL GRASS ATHLETIC FIELDS

by Dr. Henry W. Indyk

A natural grass athletic field too often consists of a barren soil surface with remnants of a turfgrass cover infiltrated by knotweed, crabgrass and goosegrass. In dry weather, this playing surface is hard from compaction, rough from previous activities, dusty from lack of a grass cover and resistant to the penetration of an athlete's spikes or cleats. In rainy weather, the surface becomes slippery, muddy and soft. Fields in this condition justifiably stimulate visions of miracle grasses, super products of synthetic grass surfaces as effective ways to provide an ideal playing surface.

Synthetic surfaces composed of fibres manufactured to approximate a turf cover have been frequently used to alleviate the difficulties encountered with a natural grass surface. However, experience with these synthetic surfaces has proven them to be costly in installation, maintenance, replacement and player injuries.

Athletes prefer natural grass

The surface is hard, harsh and hot in high temperatures. It becomes a horizontal water slide in heavy rain and, if the temperature hovers around freezing with a light drizzle, it reverts to a skating rink. Admittedly, some success has been achieved with these surfaces in difficult situations under very intensive use. However, if given the choice, athletes generally prefer a natural grass surface.

A dense, vigorous and wear-resistant turf can be a suitable athletic field surface. It forms a cushion that helps protect the player from injuries, aids his footing and improves conditions of play by eliminating mud and dust. It also has a more pleasant appearance than synthetic turf.

Because a turf cover has greater potential to fulfill these functions than do other surfaces, interest is developing in natural grass as a superior surface for athletic fields. With proper procedures in planning, construction, establishment, maintenance and use, a highly satisfactory performance by a natural grass field can be expected.

Common Problems

Failure of turf areas to support the rigorous activities of various athletic events commonly occurs because of:

Improper Specifications. The same standard specifications are used repeatedly in the original construction of an athletic field, which does not take into account the varying conditions relating to the specific site. A critical evaluation of each proposed site should be the basis for formulating accurate specifications. If this approach is not properly implemented, it is highly possible the field will have built-in problems that are very difficult or impossible to correct, even using the best maintenance procedures.

Improper Enforcement of Specifications. The best specifications are useless unless construction procedures adhere to the stipulated requirements. Frequently, athletic fields are built without proper supervision. Without supervision the temptation to bypass or eliminate critical procedures becomes too great for proper construction, particularly when the contracts are awarded to the lowest bidder.

Improper or Inadequate Maintenance After Successful Establishment. Once a satisfactory turf of properly selected grasses has been established, its future performance depends upon the type and amount of attention devoted to a maintenance program. The investment in establishing a

turf cover is wasted unless it receives proper maintenance. A well-planned program should include an adequate budget and appropriate equipment, materials and personnel. In addition, supervisory responsibilities should be entrusted to an individual knowledgeable in turf management principles and techniques.

Abuse in Use of the Field. A well-established and maintained turf can withstand a considerable amount of use without serious damage. However, there are limits to the turf's tolerance of continued intensive use. Serious damage can result from heavy daily use with no allowance for recuperation. Damage will be most serious when proper construction procedures have been bypassed, particularly in situations of excessive soil moisture. Under such conditions, use should be reduced or minimized to limit turf damage.

Inadequate Facilities: The surging interest in outdoor athletic activities has increased pressures on existing facilities; economic reasons and the unavailability of open space for construction reduce the likelihood of building new facilities. Most of the existing fields are improperly constructed and are unable to accommodate more intensive use without serious deterioration of the turf cover. As the intensity of use increases, the survival and wear tolerance of the turf depends more heavily on proper field construction.

Restoration

When the construction of an athletic field does not meet the required or desired standards and the field has become severely scarred from intensive use, a dense, vigorous mat of natural grass can restore the field. Recent advances in turf breeding have made available superior varieties of turfgrasses, particularly among the Kentucky bluegrasses and fine-textured turf-type ryegrasses, that can be effectively established in existing fields with renovation techniques.

In the process, core aerifiers are used to relieve compaction. Vertigrooving machines prepare an ideal seed bed without destruction of grade or established turf. With adequate lime, fertilizer, supplemental irrigation, mowing and restrictions on use, the newly introduced seedlings can be nurtured to a mature dense turf. If needed, protection can be provided against weeds, insects and diseases.

With a restricted-use period of at least 6 months, such efforts can provide a fully restored field. If the time necessary to develop the seedlings into a turf capable of supporting athletic activities cannot be sacrificed, restoration with a high quality sod can provide instant results.

As effective as these renovation procedures may seem, another important factor needs to be considered — the use of the field. When subjected to use, the field will again exhibit symptoms of poor construction: low wear tolerance of the turf; a hard, compacted surface when dry; a soft, soggy surface when wet, and a rapid deterioration in the turf cover. Repeated renovation efforts will follow this same pattern.

When basic construction problems exist, renovation procedures are somewhat cosmetic and at best can provide only temporary results. Reliance on such procedures to overcome weaknesses in initial construction over a period of years will prove to be discouraging and costly.

Drainage Systems

Improper drainage can be singled out as the most inf-

lue factor contributing to poor quality athletic fields. Inadequate drainage not only affects the playability of the field but also has a strong negative influence on the growing conditions for the turf, contributing to increased maintenance costs.

Various reasons can be cited for overlooking drainage as a critical factor in athletic field construction. Perhaps the most important reason is a lack of understanding of its importance in formulating the field's specifications. Unfortunately, in many instances economic considerations prevail in the decision-making process, eliminating provisions for adequate drainage — a relatively insignificant saving that will prove to be costly.

In some cases, poor drainage conditions prevail in spite of efforts to improve the system. Such failures can usually be attributed to improper specifications or deficiencies in construction. Some of the common faults contributing to inefficient or ineffective performance of drainage systems are:

Provision for surface drainage only. A crowned or turtle-backed field with a few catch basins on the sidelines can facilitate removal of surface runoff but will do very little to improve internal drainage.

Improper design of the drainage system. This problem involves pipe spacing, depth, grade and outlet.

Installation of drainage pipe on an improper grade.

Backfilling of drainage trenches with heavy textured material that restricts percolation of water to the drainage pipes.

Improper texture of topsoil above the drainage system.

The physical condition of the topsoil is a major factor limiting proper functioning of a drainage system. Soils containing excessive amounts of silt, clay and very fine sand are commonly used above the drainage system as the ideal growing medium for turf. These soils restrict proper drainage because they slow water percolation.

Consequently, during rainfall the soils become soft and soggy in spite of a properly installed drainage system. These soils also compact very readily when subjected to traffic. Air porosity is reduced not only because of the increased likelihood of moisture saturation but also because of increasing compaction. The result is a less favorable environment for proper root growth that is reflected in a shallow root system, weakened topgrowth, reduced wear tolerance, turf deterioration and eventually a barren athletic field.

Soils containing excessive amounts of fine particles can be improved and made suitable for athletic fields by adding appropriate amounts of sand with the proper texture. The resulting mixture should contain at least 80 percent sand which is predominantly medium textured. Such a soil will drain more quickly and resist compaction.

Increasing recognition of the advantages of natural grass as a desirable playing surface is generating greater interest in proper construction techniques. A concept receiving increased attention involves the use of uniformly graded sand as the soil medium. Different approaches are being used with varying degrees of success in the construction of natural grass athletic fields. Hy-Play Systems, based upon the concept of using uniformly graded sand as the soil medium, was selected for reconstruction of the Los Angeles Coliseum in preparation for the 1984 Olympics. Fulfilling these basic requirements in construction provides a foundation which in combination with proper maintenance procedures is the basis for superior natural grass playing surfaces.

ORGANISMS THAT CAUSE TURF DISEASES

Most diseases of turfgrass are caused by fungi. There are some bacteria and viruses that also incite disease. By and large, they live within the thatch and within the upper levels of topsoil all the time. Most of the time healthy grasses are not greatly affected by the presence of these pathogens. Often when infections occur they are of such minor nature that the turfgrasses recover with only limited injury. However, at other times, weaknesses within the turfgrasses and highly favorable conditions for the pathogen result in disease outbreaks of major proportion. At these times turf damage may be severe.

Unfortunately, by the time the disease is recognized and the pathogen identified, the infection has often run its course, the damage is done and no amount of fungicide can bring back the dead tissue. At best, the fungicide may reduce the spread of the disease.

Any condition that weakens the vigor of turfgrasses predisposes them to disease. It may be:

- too much water
- too little water
- too much fertilizer
- too little fertilizer
- too acid a soil
- too low a clipping height
- too much thatch
- hard, compacted soil — poor aeration
- use of too much pesticide
- a combination of two or more of these.

The most common turf pathogens are described briefly as follows to provide an indication of how they function within the ecological structure of the turf.

Dollar Spot — (*Sclerotinia homeocarpa* F T Bennett)

Dollar spot infection is more likely to occur during moderate temperatures and dry soil conditions. High humidity within the turf is needed to activate the fungus. Low levels of nitrogen in the soil make grasses more prone to infection. Light tan lesions that band the leaf create small patches of bleached turf — less than 3 inches in diameter.

Helminthosporium —

Netblotch — (*Helminthosporium dictyoides* Drechs!);

Leafblotch — (*Helminthosporium cynodontis* Margil);

Leafspot — (*Helminthosporium sorokinianum* Sac);

Melting Out — (*Helminthosporium vagans* Drechs!);

There are several blotch and spot diseases caused by one or more *Helminthosporium* fungi. Infection usually starts in cool, moist weather on lawns that are fertilized with too much nitrogen, irrigated too frequently, and cut at lower than recommended heights. As the weather gets warmer, root rots may develop and the turf