CONSTRUCTION AND MAINTENANCE OF ATHLETIC FIELDS IN EUROPE VS U.S.

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INTRODUCTION

In many aspects, the application of existing technology to the maintenance of sports turfs is more advanced in Northern Europe than in North America. This is true in spite of the fact that a great amount of the basic principles and information on which these practices are based has been generated from research conducted in the United States. Much of this can be attributed to poor decisions made by those responsible for establishing budgets and specifications concerning sports field construction and maintenance. The two major areas where drastic errors occur are: (1) failure to provide a proper root zone for turfgrass culture in terms of optimum drainage and minimum compaction proneness and (2) a tendency to employ inexperienced, untrained personnel to supervise the maintenance of these sports fields. This is done with the false hope that money can be saved by hiring the cheapest man available. In most cases a knowledgeable, properly trained individual can more than pay for a higher salary through proper decision making processes which will provide the best functioning, highest performing sports turf at the lowest possible cost. One of the major distinctions between North American and Northern Europe is that there is a grand tradition of professional grounds maintenance personnel who have devoted their lives to the field and have "come up" through the ranks as apprentices and have sought out the available educational opportunities. A similar system exists in golf course operations in the United States, but the U. S. is decidedly deficient in the area of qualified sports grounds maintenance personnel.

CHARACTERISTICS DESIRED FOR SPORTS FIELDS

As a basis for the following discussion it is important to recognize those characteristics of most concern in developing a turfed sports facility which will provide the best possible playing conditions for the particular game involved. The major characteristics generally include the following:

1. Moderately close mowing of 0.5 to 1.2 inches.
2. Firm footing.
3. High shoot density.
4. Good wear tolerance.

5. Tolerance to the action of cleats and spikes.

6. Good recuperative rate from divot damage.

7. A moderate resiliency or cushion.

8. Uniform, level surface.

9. Rapid removal of excess water.

The cutting height employed on soccer fields in Europe is generally considerably shorter than that practiced in the United States. No doubt as the game continues to increase in popularity and we become more sophisticated in the techniques of soccer play, the shorter cutting height will be recognized as being of increased importance to the game in North America. A number of the subsequent criteria listed relate to traffic effects and recovery from traffic stress. The effect of resiliency or cushion is important in terms of minimizing injury to participants caused by falling on the turf surface as well as to cushion the tiring shock effect to players legs when running on the surface. Rapid removal of excess water, both by surface runoff and subsurface drainage, is extremely important in terms of maintaining a quality, playable surface since many sporting events are continued regardless of the weather conditions. The excess water removal also minimizes the chance of mud problems developing.

CHARACTERISTICS DESIRED IN TURFGRASSES FOR SPORTS FIELDS

Relatively few turfgrass species are well adapted for sports turf use. Characteristics desired include the following:

1. A low, prostrate growth habit and tolerance to mowing.

2. Excellent wear tolerance.

3. Good recuperative rate.

4. Uniformity.

5. No surface runners (stems) which can entangle cleats.

Fortunately, those in the southern U.S. have bermudagrass (Cynodon spp.) which is one of the better adapted turfgrasses for use on sports fields for such recreational activities as soccer, football, softball, and baseball. Bermudagrass possesses outstanding wear tolerance, a rapid recuperative potential, and tolerance to close mowing, which are particularly desirable traits. A potential limitation is the restricted late fall shoot growth and recuperative potential caused by the bermudagrass entering dormancy due to mid to late fall low temperature stress.

In the northern cool climates, Kentucky bluegrass (Poa pratensis) is widely used on sports fields. The more recent development of turf-type perennial ryegrass (Lolium perenne) cultivars has stimulated an

increasing interest in their use on sports field turfs in polystands with Kentucky bluegrass. Also, tall fescue (Festuca arundinacea) is used in the transitional climatic zone.

SPORTS FIELD CONSTRUCTION

The foundation of successful, efficient turfgrass culture on intensively trafficked sports fields is a root zone soil mix of sufficiently coarse texture so that rapid downward internal drainage of excess water will not be impaired and thus minimize proneness to soil compaction. The typical scenario in sports field construction in the United States is to spend generous sums of money on the construction of a stadium, but at the same time, try to find the cheapest "dirt" available for the sports field itself. Within the last 8 to 10 years the northern Europeans have awakened to the need for coarse textured root zones in order to achieve a favorable environment for turfgrass culture. Investigations have been conducted by the Europeans utilizing a wide range of synthetic soil amendments with little success. A sand of the proper particle size distribution range still remains the most widely available material for use in root zone modification of sports fields. Unfortunately, the Europeans do not have easy access to a physical soil analysis lab as in the United States since the main laboratory for this type of work is located at Texas A & M University under the direction of Dr. Kirk Brown.

Fortunately, we in the United States are also seeing an encouraging awakening of the "directors" of sports grounds to the need for root zone modification. Much of this seems to be related to the backlash from the high cost of artificial turfs. Suddenly, the amount of expenditure required to construct a sports field with the proper root zone for optimum turfgrass culture does not look prohibitive when compared to that required for an artificial surface. Still, all too many fields in the States are being constructed with impermeable root zones of high compaction proneness. Continual educational efforts will be needed to correct this problem.

There are two other key aspects in sports field construction that are required to insure adequate drainage. They include (1) a properly designed subsurface drain line system and (2) a sufficient surface contour or grade to allow rapid removal of excess surface water.

SPORTS TURF CULTURE

Assuming the proper turfgrass species has been selected and the appropriate root zone, surface contours, and subsurface drainage system provided; then the subsequent cultural practices utilized will be simplified and of lower cost.

Mowing. The specific cutting height selected will range from 0.5 to 1.2 inches, depending on the particular turfgrass species involved and the type of sports activities for which the turf is to be utilized. Bermudagrasses respond quite well to cutting heights in the 0.5 to 1.0 inch range, whereas the Kentucky bluegrasses and perennial ryegrasses should be mowed somewhat higher. Raising the cutting height of the latter species during the off-season will

enhance the recuperative rate of badly thinned areas. However, the cutting height must be lowered back to the desired height for the playing season and should be achieved in gradual increments initiated sufficiently early so that the adjustment can be achieved with minimum negative effects on the turf. Soccer fields should be mowed lower than football fields for optimum playability. The European sports fields are maintained at a closer mowing height than those in North America. As a result, a relatively high population of annual bluegrass is present in many of the fields, particularly where soil drainage is poor.

Fertilization. In comparing fertilization practices between North America and Europe there is not a great deal of difference in the basic principles involved. Adequate phosphorus and potassium levels are maintained based on soil tests. In terms of nitrogen nutrition, there is a tendency for Europeans to fertilize their sports fields with lighter amounts applied at more frequent intervals than is practiced in the United States. An important principle to keep in mind is that there is a minimum level of nitrogen needed to maintain good overall health and vigor. At the same time, there is always the potential problem of a restricted root system and sod strength due to the application of excessive amounts of nitrogen fertilizer. This can be due to the nitrogen applications being made at too high an annual rate or too much in any one single application. Slow release forms of nitrogen are receiving considerable interest in Europe as is the case in the United States. Iron deficiencies are generally not as great a problem in Europe as in those parts of the U.S. where alkaline soil conditions exist.

Irrigation. The irrigation of sports fields is not as critical a need in northern Europe as in much of the U.S. If anything, too much water is a greater problem than too little. As a result, the sophistication of the irrigation systems that are being utilized is not at the level found in the United States. It is important to plan irrigation timings such that the field is relatively dry just prior to scheduled dates for individual sporting events. High soil moisture contents during periods of anticipated intense traffic only increase the potential for soil compaction. This dimension of sports turf culture is of most concern on soils having a relatively high clay content, unless root zone modification has been accomplished.

Pest Control. Those responsible for sports turf maintenance in Europe are faced with weed, disease, and insect problems just as we experience in North America. The specific causal species need not be discussed as they vary considerably from those occurring in Texas. However, it should be mentioned that a national law exists in the Netherlands which prohibits the use of most herbicides on public recreational and sports turfs. This situation emphasized the value of the turf manager in selecting and executing turfgrass cultural systems that will provide maximum competition by the desired turfgrass species in order to minimize the invasion of potential weed problems.

MINIMIZING TRAFFIC EFFECTS

The effects of traffic include (a) turfgrass wear or the above ground bruising and thinning of the turf, (b) soil compaction which is a "hidden", below ground increase in soil density, and (c) divoting of the turf caused by the

twisting and turning of cleated shoes. Preventive and corrective approaches that can be used in minimizing these traffic effects include:

1. Use a coarse textured (sandy) root zone.

2. Provisions for rapid removal of surface water.

3. Providing as dry a turf and root zone as is practical during periods of intense play.

4. High shoot density.

5. High potassium level.

6. Moderate to minimal nitrogen level.

7. Soil cultivation by coring or slicing as needed.

8. Capability of alternating play between several sports fields, as dictated by the degree of turfgrass wear.

9. Constant, open communication with coaches and recreation personnel concerning your approaches and objectives in relation to their needs.

Compaction is best prevented by means of a coarse textured root zone combined with an adequate subsurface drain line system and proper surface contours to insure rapid removal of surface water. Unfortunately, budgets are not available to provide the desired degree of root zone modificaton on all sports fields. In this situation where a compaction problem has developed on a fine textured soil, it may be necessary to utilize turfgrass cultivation techniques. This typically involves either coring or slicing. Both are generally preferred to spiking due to the deeper penetration and greater degree of lateral shattering that can be achieved. Keep in mind that soil compaction is most severe in the surface 2 to 3 inches. The frequency of soil cultivation will vary depending on the intensity of traffic and degree of compaction that is developing. It may range from once a year immediately following the playing season to monthly intervals throughout the off-season. Soil compaction can be assessed by means of two primary indicators. One is a lack of surface resiliency indicated by a hard feel when walking over the area and difficulty in pushing a soil probe into the soil surface. A second very good indicator is a declining rate of water infiltration into the soil, providing the same rate of irrigation water application is provided. Soil cultivation is best accomplished when the soil is moist, but not water saturated; the intensity of use is low; and the weed invasion potential is minimal.

Insuring a relatively dry turf and root zone during periods of intense play through the proper timing of irrigations is very beneficial in minimizing soil compaction problems. In large stadiums the effective use of tarps can also be very important in insuring a dry root zone during scheduled sporting events. Both approaches will minimize compaction proneness and the chance that mud problems will develop.

Maximum turfgrass wear is achieved by providing a high shoot density or

large a surface biomass as is practical. In addition, providing high levels of potassium and modest to minimal levels of nitrogen during the actual playing season can be important contributing factors in enhancing wear tolerance.

A very significant difference between Europe and the United States in their approaches to minimizing traffic effects is the use of alternate fields. It allows a periodic resting period as needed so that the turf can recover before the wear becomes so great that the turf is thinned beyond a point of recovery without extensive renovation. This approach of alternating sports fields may be one of the key reasons that Europeans tend to be more successful in maintaining adequately turfed sports fields in comparison to the typical situation found throughout the United States with bare soil existing from the mid-point of the season onward. Obviously we in the United States have a long way to go in this regard.

CORRECTING TURFGRASS WEAR AND DIVOT DAMAGE

It is a widespread practice in Europe to continually replace divots and/or overseed these damaged areas immediately after each sporting event. Such an approach is used much less commonly in the United States. There are many sports fields in North America which would benefit from such a program.