

Sports Field Quality and Performance Levels Based Upon Resource and Management Investment*

S.T. Cockerham, V.A. Gibeault, and S.B. Ries, *University of California, Riverside.*

INTRODUCTION

Sports field use in our modern society is a function of the attention given to recreation, organized sports, and physical fitness. The *owner*, *user*, and *spectator* each have *expectations* for the performance of the facility. Sports fields are built with widely varied resources, but those that are well designed and constructed, and are also well maintained, are likely to provide optimum performance within the parameters of safety, playability, aesthetics, and durability. Heavy use, mistakes in field construction or mistakes in management can result in poor quality, which negatively influence activities and possibly the safety of the participants.

EXPECTATIONS

The concept of ownership values must be recognized, understood, and accepted because they lock in the requirements of present and future maintenance needs. All sports field demands are basic to ownership expectations and, thus, determine the ownership values.

The owner-- a private individual, a firm, an institution, an organization, or a government agency--is the controlling unit. As ownership values connect with the demands for the site the expectations evolve. The demands and expectations determine the degree of maintenance intensity required with the associated expenditures for development of a maintenance program.

The expectations of the user and the spectator may not agree with those of the owner. Users, primarily athletes, expect a uniform surface that doesn't adversely affect the outcome of the game and provides reasonable protection from injury. Spectators expect a field that looks like a field should look.

Television has focused on major league field appearance and performance quality, which influences all expectations. The users and spectators expectations for quality are not concerned about the type or amount of use a field receives. The owner's resource commitment determines the capability of meeting each of the expectations.

PERFORMANCE

The performance of sports fields is judged against the expectations of the interested parties. The parameters of sports field performance are safety, playability, aesthetics, and durability.

SAFETY A safe sports field is defined as being in such a condition as to not be responsible for injuries to athletes and to not affect the outcome of a game. The field must provide elasticity for impact absorption, footing, and a regular, uniform surface. The field should be free from bumpiness, grass and weed clumps, mounds and slopes on the grade, wet and dry spots, bare areas, and holes or other obstructions.

Field safety is estimated by measuring hardness and traction, which are related to impact absorption (ability of the turf to take shock), shear resistance (ability of the turf to resist the tearing of the shoe cleats sliding over the turf) and footing. At field locations where cleat traffic is greatest, such as the center of the football field, turf cover is reduced, the soil becomes compacted and dries out, and the corresponding impact absorption capability decreases. Loss of turf cover at the center reduces shear resistance and footing, though soil compaction increases shear resistance. On balance,

loss of vegetation has a greater influence than soil compaction.

PLAYABILITY A smooth, uniform surface is conducive to good play. Surface characteristics such as hardness or turfgrass cutting height can affect play aspects such as ball bounce or roll and athlete performance.

Walking, running, cutting, veering, stopping, pivoting, dodging, lunging, jumping, and landing are the 10 basic movement patterns that an athlete makes in sports. The energy return of turf is the elasticity for the enhancement of performance.

Field playability is both measurable and perceptual. The speed of the turf surface related to a ball or runner can be measured. The feeling of speed relates to several factors resulting in the perception of the speed of the surface. The controllable factors are the firmness, surface uniformity, height of cut, puffiness, and thatch.

Football playability concerns uniformity, footing, speed (actual and perceived) and drainage. Drainage relates to a wet or muddy field and to sloppy areas. Baseball playability concerns ball speed, hop, deflection, player footing, speed (actual and perceived), and elasticity. Soccer field playability concerns ball hop and deflection and player footing, speed (actual and perceived), and elasticity.

AESTHETICS Turf has an important aesthetic function. It is supposed to look good. Appearance of the field, even though it is primarily a concern of the spectators in attendance and television audiences, reflects the pride of the maintenance personnel. A bad looking field, especially if the playability is poor, is a highly visible civic embarrassment. Many maintenance factors aimed at creating a uniform turf impact positively on aesthetics. In addition, mowing patterns, use of colorants, and painting of lines, logos, and end-zones enhance aesthetics. If a field looks good from the stands at kick off time, the spectators will largely be satisfied with the field condition.

DURABILITY Faced with increasing demands, sports field use limitations are pushed to the extremes of their potential. Through the selection of proper construction techniques, turf species, and management practices, the sports turf manager can maximize the durability of the turf.

The groundskeeper must be aware of the expectations of the owner, user, and observer at all levels of sports turf management, including major league. The field performance expectations are in grades of durability (games or hours), aesthetics, playability, and safety, but not necessarily in that order. The expectations must be matched with the resources including budget, personnel, equipment, right grass, and adequate installation.

Construction errors are managerial and technical. Managerial construction errors come from administrative decisions, architect/designer judgment, and contractor shortcuts based upon lack of knowledge of sports field construction, poor advice and ego. Technical construction errors are usually related to drainage, root-zone media, surface grade, and turfgrass species. The results of the construction errors are increased maintenance costs, high repair costs, and ultimately field failure. Compromises are necessary and usually decisions are based on budgetary vs. technical needs. These compromises should be approached with thought and knowledge.

SPORTS TURF QUALITY

Quality is the differentiation of grades of excellence. Turf quality is the degree to which a turf conforms to a generally accepted norm of uniformity, density, texture, growth, habit, smoothness, and color, as judged by subjective visual assessment (Beard, J.B., 1973, Turfgrass: science and culture. Prentice-Hall, Englewood Cliffs, NJ.). Sports turf quality definition adds playability, which is a subjective perceptual assessment.

Sports fields can be segregated into four levels of quality to meet performance expectations: *Premium, Choice, Standard, and Play.*

PREMIUM sports fields have high visibility and as such are expected to be of very high quality. They typically have high traffic from sports and events. Management intensity is very high to meet the expectations. These fields generally support major professional league and major college sports teams and are capable of absorbing very high traffic.

The highest level of sports field excellence is usually considered to be Premium fields of *major league quality*. Though, there is no standard for major league quality, Aesthetics and Playability are the performance parameters that are the primary criteria of which each must fit the highest expectations of the owner, user, and spectator.

A distinguishing characteristic of major league quality sports fields is the attention to detail: high focus areas are manicured; lines are straight; arcs are cut clean; borders are trimmed; big and little holes filled; debris picked up; fertilizer and mowing patterns attractive; patches matched to surrounding turf, and the sprinklers flush with the surface.

CHOICE sports fields have high visibility in a community and quality is expected to be high. They have moderate to high traffic from sports and events. Management intensity is high. These fields generally support minor league professional, college, and high school sports teams. Local school stadiums are faced with community pressures for access to the field. Parents of junior varsity players appeal for play in the stadium since many of the student athletes will not make the varsity and will not have a chance to play in the stadium. Band directors and parents of band members appeal for practice time in the stadium. If the field is in good condition, other local schools appeal for game time. Pop Warner football league parents don't like playing on the practice fields and express a need the use of the stadium. Soccer tournaments are locally popular and feel that they need to be displayed in a stadium.

Optimum care of a Choice level sports field includes enough fertilizer applied as needed to meet the performance expectation, timely uniform irrigation, mowing, aeration, topdressing, rolling, overseeding, and repair of traffic injury. A high traffic level expectation for a game field performance would be an actual use of approximately 18 game-time hours of soccer/week or 12 game-time hours of youth football/week or 30 game-time hours of baseball/week. *It is not unusual for traffic levels on Choice fields to far exceed this.*

STANDARD sports fields may have high community visibility with moderate quality expectations. These fields typically have very high traffic. They may support community college and several high school sports teams as well as being used as practice fields at all levels, including professional, college, and high school. Resource input is restricted with moderate management intensity. Care of a Standard sports field includes enough fertilizer applications to allow the grass to grow, timely uniform irrigation, mowing, and aeration as needed. For that minimum investment the performance expectation of actual use would be approximately 10 game-time hours of soccer/week or 6 game-time hours of youth football/week or 20 game-time hours of baseball/week can be met with the minimum input on a field built on at least a loam soil and with reasonable drainage. *It is not unusual for traffic levels on Standard fields to far exceed this.*

PLAY fields are park and school fields with very high traffic. Quality is low due to restricted resource input resulting in low management intensity. Low to moderate traffic will show severe wear on the playing surface.

PRACTICE FIELDS

Practice fields are usually Standard quality. They typically receive less attention during design, construction, and care but are subjected to greater use than game fields and generally have lower maintenance budgets. The use intensity on practice fields is very

high and compaction and wear reduce the turf surface performance.

Activities that repeat traffic over a short time period, such as practices, rehearsals, and classes, are usually more damaging than most game action. Any kind of practice tends to focus the traffic. Practice fields are expected to take great abuse to prevent damage to the game field. If a field is to be a show place, practices should be limited. One band practicing 45 minutes twice per week will not be a problem on the field if the surface is dry. In contrast, football and soccer practices are particularly destructive because there is a tendency for coaches to keep the activity in a limited area for several hours. It is common for world-class soccer to only allow teams a 30-minute walk through to get a feel for the stadium, but to practice on an outside facility. Baseball practice is usually held just prior to a game on the game field. Most of the infield damage occurs during pre-game practice. The use of a game field for practices should be closely controlled.

EVENTS TRAFFIC

Not all traffic on sports turf is from sports. Sports fields are often used for other events, such as commencements, concerts, and rallies. What is good for the sports field as a sports surface may be in conflict with owner and administrative needs for fiscal return-on-investment. Major athletic facilities are expensive and are often saddled with a significant debt load, which administrators think can be overcome, in part, by hosting events that generate additional income. The immediate financial need overshadows a long-term view to preserving the playability of the turf surface and the intensity of use from increases in events traffic.

SUMMARY

The expectations of sports field quality and performance can be segmented into four grades: Premium, Choice, Standard, and Play. Each is identified by quality and achieved by management and resource input.

Sports field quality and performance expectation grades and management requirements

Grade	Quality	Mgt.
Premium	Very high	Very high
Choice	High	High
Standard	Moderate	Moderate
Play	Low	Low

Sports traffic defines the quality and performance grades. The highest grade sports field is capable of supporting the highest traffic level, but rarely receives it. The lowest grades often receive the most intense traffic and least resource and management input, which may compromise the performance for safety, playability, aesthetics, and durability.

Sports field quality and performance expectation grades and traffic support

Grade	Supportable Traffic	Normal Traffic
Premium	Very high	High
Choice	High	Mod to High
Standard	Moderate	Very high
Play	Low	Very high

(See: **Establishing and Maintaining the Natural Turf Athletic Field: Publication 21617. 2004. S.T. Cockerham, V.A. Gibeault, and D.B. Silva. University of California, ANR Communications, Oakland, CA, 94608-1239**)