Overview

Over the past several years, there has been a dramatic increase in emphasis in field sports from the point of view of both observers and players. Technical advances in nearly all aspects of field sports have tended to improve both the performance and the safety of the athlete.

With the increased emphasis on field sports has come an enhanced awareness of the problems associated with playing surfaces, since they are related to both the performance and the safety of the athlete. The initial question one must ask is, "What defines the ideal surface for a particular sport from the standpoint of both performance and safety of the athlete?" The playing surface should enhance both the performance and safety aspects of the sport.

Considerable work has been done in several different disciplines—including biomechanics, agronomy, polymer chemistry, and physics—to characterize the properties of an ideal playing surface. In addition, maintenance personnel, officials, and others have studied the subject. Each discipline has previously published results and is currently performing studies concerned with athletic fields, communicating the findings in the publications of its own specific professional field. This Special Technical Publication has been published as a result of the 1988 Symposium on the Characteristics and Safety of Playing Surfaces (Artificial and Natural) for Field Sports, held in Phoenix, Arizona. The symposium was an attempt to begin to communicate and provide information concerning playing surfaces across several disciplines. It was also organized to promote information exchange opportunities, particularly objective data, among these disciplines.

The symposium was the outgrowth of work within ASTM Subcommittee F08.52 on Playing Surfaces and Facilities, a subcommittee of ASTM Committee F-8 on Sports Equipment and Facilities.

It is well known to most individuals involved with playing fields that there are many more variables than constraints to be considered. In reviewing field performance, the player/field interaction and the ball/field interaction are two key factors. Before appropriate standards can be established, test methods must be developed and correlations of test results to actual field performance must be carried out. The test methods established should be applicable to any type of playing surface, artificial or natural. Of course, compromises will then have to be made between player performance, safety, and field maintenance. In an attempt to approach the subject from an objective point of view, the symposium included sections on the following subjects:

(*a*) playing field standards—studies and recommendations,
(*b*) surface traction,
(*c*) testing and correlation to actual field experience, and
(*d*) state-of-the-art playing surfaces (natural and artificial).

The collection of papers published in this Special Technical Publication has followed the same format. Some papers could have been placed in more than one section, and in these cases, arbitrary decisions were made.

Playing Field Standards

The papers in the section on playing field standards are written with varying levels of technical depth, which provides those relatively new to the area with a general overview of the interaction of a sport with the playing field. The approach taken by these papers would be suitable for any type of playing field or sport. The views of the designer, administrator, athlete, and sport researcher are expressed.

Surface Traction

An integral part of the player/surface interaction concerns the interaction of the player's shoes with the surface and their compatibility with the surface. The papers presented in this section deal with the problems associated with the correlation of laboratory test results and actual field experience. It is extremely important for the footwear designer to consider the movements of the athlete required by the sport in relation to the surface on which the sport is being played.

Testing and Correlation to Actual Field Experience

Various material tests are currently being used to assess the qualities of playing surfaces. In this section, the relevance of these tests to both natural and artificial surfaces is discussed. The majority of the papers presented deal with the problems associated with testing a surface and the correlation of the results to a real field situation. Several techniques for testing, data acquisition, and interpretation of results are discussed. Specifically, test results relating to shock absorption [the ASTM Test for Shock Absorbing Properties of Playing Surface Systems and Materials (F 355-86), the Clegg soil impact test apparatus, and other tests], friction [ASTM Method of Measuring Surface Frictional Properties Using the British Pendulum Tester (E 303-83)], and other tests are reviewed in this section. Several papers deal very specifically with the Clegg tester and adaptations of it. The effects various playing surface management practices have on test results is also discussed. The issue of field maintenance and liability of the operator as a key concern in relation to testing is the topic of one paper.

State-of-the-Art Natural and Artificial Surfaces

Various types of playing field surfaces are reviewed in this section in relation to aspects ranging from composition and construction to end use performance. Modified or enhanced natural surfaces such as Prescription Athletic Turf and the incorporation of randomly oriented interlocking mesh elements are discussed from the aspect of performance improvement. Artificial turf surfaces are reviewed, including their material selection and performance.

The papers briefly outlined here should provide the reader with a good review of the work completed on playing surfaces by several disciplines. A general overview of established standards, test methodologies, and state-of-the-art fields is presented. The symposium committee is grateful to the authors for presenting their work, and to ASTM personnel for their efforts, which have made this publication possible. I would also like to acknowledge and thank my cochairpersons, in particular, Dr. Chauncey Morehouse of Penn State University, who helped organize and present the symposium.

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