



# Standard Guide for Construction and Maintenance of Warning Track Areas on Athletic Fields<sup>1</sup>

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## 1. Scope

1.1 This guide covers techniques that are appropriate for the construction and maintenance of warning track areas on sports fields. This guide provides guidance for the selection of materials, such as soil and sand for use in constructing or reconditioning warning track areas and for selection of management practices that will maintain a safe and functioning warning track. Although this guide has applications to all sports where a warning track surface may be required or desired, it has specific applications to baseball/softball.

1.2 This guide does not address synthetic warning tracks such as rubberized surfaces, artificial turf, or paved surfaces.

1.3 Decisions in selecting construction and maintenance techniques are influenced by local soil types, climatic factors, level of play, budget, and training/ability of management personnel.

1.4 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

1.5 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**F1815** Test Methods for Saturated Hydraulic Conductivity, Water Retention, Porosity, and Bulk Density of Athletic Field Rootzones

**F2651** Terminology Relating to Soil and Turfgrass Charac-

teristics of Natural Playing Surfaces

## 3. Terminology

3.1 *Definitions*—Except as noted, soil- and turfgrass-related definitions are in accordance with Terminology **F2651**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *aggregate material*—a soil-like or earthy material without appreciable soil structural properties such that an aggregate material is essentially granular or single-grained in nature.

3.2.2 *warning track*—a section of a sports field area typically devoid of vegetation, that provides a change in surface texture such that an athlete can sense without looking the proximity to a hazard such as a fence, post, or wall.

## 4. Significance and Use

4.1 Warning tracks are playing surfaces located on the margins of the playing area for the purpose of providing a warning to the player that he or she is approaching a hazard (commonly a fence) or out-of-bounds area. In order to provide for an effective warning track surface, the warning track must be constructed and maintained in such a manner so that the player can sense the change in texture from the regular playing surface and the warning track without having to look. This feature is very important in that the player is often visually focused on the ball during play and would not be looking at the ground as he/she is running toward the warning track. The warning track must also be constructed and maintained in such a manner that the warning track itself, or the surface transition, does not pose a hazard to the players.

4.2 The warning track areas of sports fields should provide a uniform surface with good footing. The change in surface texture of the warning track from the surrounding playing surface must be of enough contrast such that the player can sense the change without looking. Most often, warning track surfaces are devoid of turf or other vegetation. However, turfed warning track areas may be used in instances where such purpose is to “warn” the player of an impending hazard where the primary playing surface is a skinned area. This may be the case in softball where the entire infield playing surface is a skinned area and a turfed warning track is used along the first base and third base fencelines. Undulations, rough surface,

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

hard or soft surface, weeds, stones, debris, wet spots, etc. detract from a good, safe warning track. The safety and effectiveness of the warning track is largely affected by construction and maintenance procedures and this guide addresses those procedures.

4.2.1 During construction, consideration should be given to factors such as the physical and chemical properties of materials used in the area, freedom from stones, sticks, and other debris, and surface drainage and internal drainage. Consideration should also be given to the surface elevation such that a drastic change is not produced by the transition from the playing surface to the warning track area which may create a tripping or falling hazard.

4.2.2 Maintenance practices that influence the playability of the surface include edging, dragging, rolling, watering, vegetation control, and removal of stones and debris that may adversely affect play and safety.

4.3 Those responsible for the design, construction, or maintenance, or a combination thereof, of baseball and softball fields, or play areas where the need for a warning track area has been identified, will benefit from this guide.

## 5. Design

5.1 *Composition*—Most warning track constructions will be an area devoid of vegetation as a transition from a turfed (natural or artificial) playing surface. While areas devoid of vegetation are technically “skinned” areas, for the purpose of this guide the term “warning track” is utilized to differentiate the areas of the playing surface that are not part of the skinned infield area.

5.1.1 Warning tracks can be constructed of various materials and still meet the objectives of an effective warning track surface. Various soil components and amendments may be specified. The concept of a warning track surface with firm footing is that the particle sizes of the materials used or blended for the construction are of a wide enough range so as to provide a substrate that binds together or has good interlock of the components. Clay soil materials may be used in such constructions in that they will bind together. However the plastic nature of clay materials when wet could preclude high-clay warning tracks in that they would not provide safe and effective footing under conditions of high moisture.

5.1.2 The most effective warning tracks should be composed largely of granular or aggregate materials (fine gravel and sand) of a wide enough particle size range such that the particles interlock. Angular grains of aggregate (as opposed to rounded grains) provide more interlock due to the increased internal friction they provide within the soil profile. Small additions of clay or clayey material may be appropriate to provide some characteristics of cohesiveness and color. It is often desired for the color of the warning track to match as closely as possible the color of the skinned areas of the field. In these instances, the clay material used in the skinned infield constructions may be included in smaller proportions in the material mixed for the warning track areas.

5.2 *Dimensions*—Typically, warning track dimensions are not included in rule books and the recommended widths are typically based upon such factors as the age, size, and ability of

the players. For warning track areas adjacent to the backstop fence and extensions, the distance used for a warning track is typically  $\frac{1}{3}$  of the distance from home plate to the back stop. For example, where the rule book specifies a home plate to back stop distance of 7.6 m (25 ft), the appropriate dimension for the warning track in this instance would be 2.5 m (8.2 ft). The warning track dimension therefore would tell the catcher and infielders that they have covered two thirds of the distance to the backstop/fence. Other criteria for warning track dimensions include the rule of thumb for a distance equivalent to three full strides of a running player. The concept here is that the player has a distance equivalent to three strides in order to adjust his position/speed to protect himself from the impending obstruction. A distance of three full strides of a running player can vary from about 2.5 m (8 ft) for youth players up to 5.5 m (18 ft) for collegiate or professional-level athletes. It should be noted that warning track dimensions that are too great may lose their effectiveness in that a dimension that is too vast (too much playing area contained within the warning track area) will fail to provide effective “warning” of the impending obstruction.

5.2.1 A warning track construction should be designed to allow for surface drainage. A surface slope between 1 and 1.75 % should be incorporated as a design element in the warning track.

5.3 *Performance*—A warning track could be constructed by blending an aggregate amendment into the on-site or existing soil or could be constructed of entirely imported materials.

5.3.1 *Aggregate*—The aggregate material used for a warning track blended material (whether blended with on-site materials or imported materials) should meet the following criteria:

5.3.1.1 *Particle Size Criteria for Aggregate Component of Warning Track Material:*

(1) Less than 5 % material greater than 6.35 mm (0.25 in.).  
 (2) Relatively uniform or homogeneous in size fractions between 6.35 and 0.3 mm. Sieve sizes used for characterizing the aggregate material shall include: 6.35 mm, 4.75 mm, 2.36 mm, 1.18 mm, 0.6 mm, 0.3 mm, and 0.05 mm.

(3) Less than 20 % of the particles in the <0.3 mm fractions combined.

(4) Less than 5 % silt and clay size particles (<0.05 mm).

5.3.2 *Soil*—If on-site soil materials are used in a warning track blend, the final mixture should contain no more than 15 % of the soil material in the final blend. Lesser amounts of soil material additions may be required for the resulting blend to meet the recommended physical criteria in 5.3.3. If a finer-textured import soil material is blended with an aggregate material, the soil material should meet the following criteria:

5.3.2.1 Soil shall consist of a clayey soil material (>30 % clay size particles).

5.3.2.2 Soil material shall have <2 % organic matter by mass.

5.3.2.3 Soil material shall have a silt to clay ratio of <2.

5.3.2.4 Soil material shall have <5 % particles greater than 2.36 mm.

5.3.3 *Resulting Blend*—It is anticipated that a resulting blend of warning track materials shall have <15 % soil materials in a blend with the specified aggregate material. The