Diamond Drainage

by Tom Burns

This article is the second of three articles on soil compaction and drainage issues. In the first part, Mike DePew discussed and defined terms to provide a better understanding of soil science principles relating to soil mechanics and soil strength principles. In this second part, Tom Burns discusses the multiple issues involved in drainage of baseball and softball fields.

A n understanding of the soil science principles relating to issues of compaction and drainage is essential in athletic field construction and maintenance. On baseball and softball fields, the relationship between the physical properties of the various soil profiles during the wide range of climatic conditions and field-use situations affecting that field must be considered to properly manage field playability.

Drainage issues on athletic fields involve surface drainage—the movement of water across and away from the soil surface—and internal drainage, the movement of water into and through the soil. Infiltration describes water movement into the soil. Percolation describes water movement through the soil profile.

Field construction should provide for adequate surface drainage of the entire field and adequate internal drainage for the non-skinned portions of the field. The clay content of the skinned area combined with the degree of compaction required to provide firmness for play create a percolation rate too slow to move water into standard internal drainage systems.

Surface Drainage
The main drainage issue on a baseball field...
or softball field is the movement of water away from the primary areas of play, the skinned and infield surfaces, and then away from the entire field surface. This is achieved through creating a degree of slope sufficient to move the water without producing a negative impact on field playability.

The general rule of thumb for this slope is one-half percent throughout the infield, one percent throughout the outfield, and one-quarter to one-half percent across the "dirt." This degree of slope could be increased or decreased slightly based on the average amount of rainfall the untarped field would receive. The higher the rainfall received, the greater the degree of slope.

The mound should be the high spot on the field with all water flowing away from it. Water hitting the center of the mound should flow in a cone away from the mound, moving equally in all directions. The infield slope should begin at the mound and continue equally and consistently in all directions past the basepath.

This common drainage design features a consistent slope extending from the infield lip to the warning track.
There are two common options for outfield drainage. The first continues the principle above, with an equal and consistent degree of slope extending outward in all directions to the warning track. The second option calls for a crown in center field, with the slope extending from the crown outward to the warning track. This option drains the outfield as two halves.

Field design and construction also must provide a method of removing the water accumulated at the perimeter of the field through surface drainage. This usually is handled through a channel drain at the edge of the field that connects to a central outside drain line that leads to a catch basin or sewer system.

If adequate surface drainage is not achieved, no internal drainage system can function well enough to compensate for the deficiencies and provide optimum field playability.

**Design and Construction**
Typically new construction will include an internal drainage system incorporating a network of drainage tiles leading to the external

---

**stn sports**

*Proven Field Success*

Depend on 45+ years of experience in sports field design, planning, construction and renovation for a wide variety of sports fields. To meet your time frame and budget guidelines, our premium turfgrasses are available in palletized or ‘Big Roll’ sod, sprigs and row planting. Find out more about our C.A.T. and PDAT drainage systems to complete your sports field project.

*stn sports* is a division of

**southern turf nurseries**
Brookfield, Georgia 31727

(Farm locations in: AL, FL, GA, NC, VA; Chile)

(800) 841-6413 • Fax (912) 382-5301

www.southernturf.com

Proud partner of the

STN2000 “Natural Grass Rug” System

---

**Diamond-Dry**

*New Granular Size - Less Dusty*

*Faster Drying - 20% More Water Absorption*

*New reddish/beige color*

---

Call 1 (800) 817-1889 use Fast Fax #1360300 and/or Circle 136 on Inquiry Card
drainage site. With higher-level sand-based fields, the drainage tiles are at the base, generally enclosed in filter fabric, and are covered with a layer of pea gravel. This layer is topped with the sand profile material. A layer of filter fabric will be placed between the pea gravel and the skinned area mix to prevent infiltration by the clay. The depth of each layer varies with construction design.

The drain lines often are placed on 15-foot centers throughout the field, though some field designs use 15-foot centers for the infield and sidelines and 30-foot centers in the outfield. If the budget allows, it's better to include the additional drains. It's far easier to add water to a field than to take water away. Typically the drains run under the skinned area, though little if any internal drainage will occur there, simply to tie drainage of the infield turf area into another pipeline. The drain lines do need to be sloped properly with some degree of downward fall leading to the collection point.

**Warning Track**

Surface and internal drainage of the warning track depend on the types of natural or synthetic materials used and the construction design. Natural material warning tracks typically have a slight slope though traffic and frequent maintenance make it difficult to maintain the integrity of the slope. Artificial warning tracks generally have an internal drainage line installed. Many field designs include drainage lines in the turf bordering the warning track or incorporate a slit or sand drain around the field. A channel drain around the perimeter of the field also helps collect water run-off from the stands. If possible, drains and a drainage system within the stands can be used to reduce run-off onto the field. Rubber skirting at the bottom of the gates used for field access from the stands also help hold back the water and reduce washout areas. Some older fields featured a catch basin system with grates that could be covered with an artificial turf mat that could be removed to allow water to funnel through.

An effective surface drainage system helps remove water from the tarp when the field is covered. Some fields are designed with internal drainage on tighter centers in the fadequate surface drainage is not achieved, no internal drainage system can function well enough to compensate for the deficiencies and provide optimum field playability.
area where the tarp water is dumped. This may include vertical drainpipes with caps that can be removed prior to dumping the tarp.

Problem Solving
Use imagination in solving drainage problems. Installation of a drainpipe, French drain or slit drain may eliminate a wet area, but will have limited holding capacity, so do tie it to an outside outlet.

Now you can afford to improve your sports turf
Give your grounds crews the right tools for basic sports turf maintenance without spending a fortune. Millcreek turf equipment works great and is priced for schools and park and rec dept's with limited budgets.

Aerate turf often
Millcreek core plug aerators give turf roots the air and water they need, especially in high traffic areas such as soccer goals. Players and coaches will be delighted with the results. The exclusive Protector Shield™ safety cage encloses tines during operation and storage. Millcreek aerators work with equipment you already have. Choose from more than 12 professional aerator models, starting around $1100.*

Topdress to improve soil
The Millcreek Topdresser is more versatile and about 1/3 the price of large area topdressers. Topdressing in conjunction with aeration improves drainage and reduces thatch. The Millcreek Topdresser will help you create a more level playing surface, and is ideal for applying compost as well as sand/peat mixtures. It topdresses a football field in 2 to 3 hours. A single operator can apply infiel mix. Starting under $6000,* you can't beat the versatility and economy.

Rugged, affordable turf equipment
Have a turf professional set up your maintenance program. Then, with Millcreek equipment, your crews can do the job themselves. It's the easiest, most cost-effective way to improve your sports turf.

Call today for complete details.

An effective surface drainage system helps remove water from the tarp when the field is covered.

Tom Burns is director of grounds for the Texas Rangers and STMA board member representing Category I, those in charge of professional sports facilities. He is a frequent contributor to sports turf-related publications and a frequent speaker at turf-related conferences.