

Getting ahead of field design and construction

BY JIM PUHALLA

If you are a sports field manager, grounds supervisor, or administrator in charge of sports fields, you may ask "Why should I care about principles of design and construction?" That's a fair question. Hopefully, your fields have already been designed (and constructed) by people with sound knowledge of these principles who designed a facility that is easy to keep playable.

However, many of the daily challenges you face in preparing your fields for competition are profoundly affected by the decisions made by its designers sometime in the past. The more you know about how these decisions were made (and about errors which were made during the design process), the better prepared you will be to take the steps necessary to adequately support competition.

For example, field managers will be able to make better decisions about field renovation and or maintenance based on a sound knowledge of field design. If a baseball field skinned area drains toward the outfield grass, the challenge would be to keep a lip from forming in that area so water can flow freely into the grass. If the skinned area drains toward the foul lines, then the grass in that area must remain flat for water to flow off the playing surface.

Many field managers are intimately involved in the process of designing and constructing new sports facilities. Under these circumstances, you have the option of simply leaving this work to professionals hired for the purpose. However, it's worth considering that if these people make mistakes (and, sadly, sometimes they make serious ones), you will be the person responsible for cleaning up after those mistakes, sometimes for years to come.

If, on the other hand, you have taken time to familiarize yourself with the basic principles of field design and construction, you will be in a position to ask questions,

make suggestions, and warn against errors. So the time invested in learning as much as you can about the design and construction process will pay huge dividends in time, money, and headaches.

Here are some of the most common design errors and solutions.

1. Incorrect Field Contours

* Sports field contours are expressed as percentage of slope. Any slope that is less than 1% (except baseball/softball infields which should be .5%) or more than 2% is considered to be incorrect. The preferred slope for sports field grass areas is 1.25% to 1.75%. Baseball or softball field skinned areas should be between .5% and 1.75%.

* A baseball or softball infield should never be the lowest point on the field but rather the highest point to enhance surface drainage.

* If the contour is not even and consistent, it is incorrect. A field with a 1.5% slope

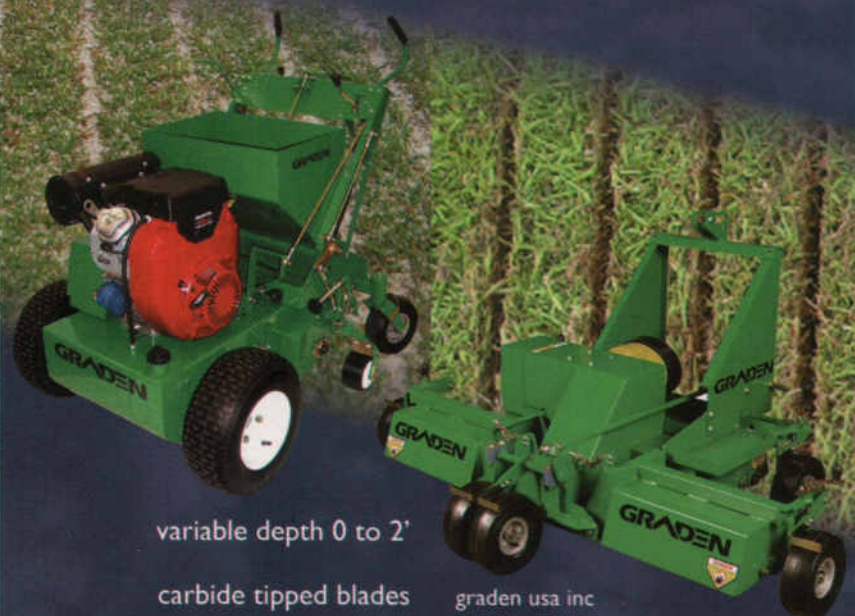


Scarify the existing soil to prepare for the addition of soil to raise the grade. Avoid placing new soil over compacted soil. This will form a layer that will inhibit internal drainage.



Topsoil and skinned area soil is brought in so the final grade can be set. Grade and scarify the soil in preparation for seed, sprigs, or sod.

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should be graded evenly with an 11/2-foot difference in grade over a span of 100 feet.

2. Failure to Isolate Fields as Drainage Units

* No field should be expected to drain away more water than what falls on it. Even if a field is built with correct contours, water running onto the field from another field or an adjacent area can seriously compromise playability in rainy conditions.

* The preferred design isolates each field as an individual drainage unit by using swales and/or catch basins around the field, or by making the field higher than its surroundings.

3. Insufficient Clearance Around Field

* Fields that are designed or constructed with insufficient clearance will have inherent problems: out-of-bounds areas may be too small for the safety of players, spectator areas may be cramped or unsafe, and surface drainage around the field may not work as intended.

* Consider space requirements in the planning stages. Make sure there is enough space around each field before construction begins to prevent it from being "locked in" by other fields, parking lots, roads, buildings, etc.

4. Failure to Provide Sufficient Access

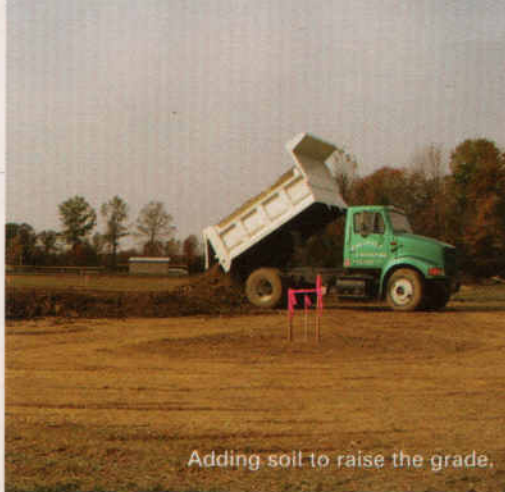
* A well-designed sports field includes access roadways for players, spectators, maintenance equipment, and heavier renovation equipment including large trucks.

* Parking lots should be centrally located to provide easy access, especially for elderly and handicapped fans.

Surveying and designing

In designing a field for reconstruction, the first step is to perform a topographic survey including spot elevations, dimensions of the field, and other structures in and around the field like fences, catch basins, swales, etc. (Surveying an existing field can be done by anyone who has experience using a level.) In planning for the reconstruction of an existing field, it's helpful to shoot the elevations of the key points on the field; simply shooting on a grid pattern will miss the most important points that are critical to good playability.

For an existing baseball infield, be sure to take measurements to the backstop, dugouts, fences, and other structures. Shoot elevations at critical points, like home plate, pitcher's plate, the bases, and the fence line. Make sure to survey the outfield on a



Adding soil to raise the grade.

grid pattern even if you're planning on reconstructing the infield only. The outfield grade dictates what can be done to fix problems in the infield. Include the fence line and foul territory in your survey.

If you're surveying an existing football field, shoot elevations every 10 yards down the center of the field and 40 feet increments toward the sidelines. Include at least 20



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feet outside the field to make sure the grade will carry water off the playing area. In my experience, a crowned field may need the addition of 4 inches of soil from the center of the field to the hash marks to reestablish the crown. Follow the same procedure for all rectangular fields establishing a grid starting at the center line.

Many people assume football fields are crowned down the center when in fact many fields are built with a side-to-side slope. This design works well as long as someone doesn't try to recrown the field. Adding soil along the center line of a side-

to-side sloped field will cause the upper half of the field to become muddy in rainy conditions because the additional soil leaves the upper half of the field level or with very little slope.

When designing a new field it is wise to hire a professional surveyor to do the topographic survey. Property lines, utilities, structures, and other limits of construction must be shown on the plan. Simple grid patterns used by the amateur surveyor will not locate these items accurately like the total station instrument that professional surveyors use.

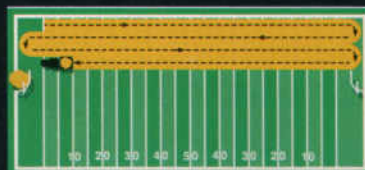
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Reconstruction

Let's look at an example of a baseball infield that needs reconstructed. The outfield drains toward the infield causing standing water and unusual wet conditions in the infield. After surveying and designing the project, the infield is raised at the base of the pitcher's mound 18 inches so the infield drains only the water that falls on it and not all the water from the outfield. The first step is to scarify the existing soil in preparation for additional soil to raise the grade.

Then add soil to raise the grade to within 6 inches of final grade. Before adding soil, scarify the soil to eliminate the layering effect that stops drainage. By using equipment with tracks, compaction is minimized.

There are many different pieces of equipment you can use to reconstruct a field. Beware of using heavy-duty wheeled vehicles, because they will cause extreme compaction causing problems for turfgrass roots and internal drainage. Examples are road graders, earthmovers, heavy dump trucks, and even skid steer loaders. Bulldozers and skid steer track loaders are best for moving soil and final grading sports fields because they cause the least amount of compaction. The secret to good sports field construction is scarify, scarify, and scarify. Scarify before applying subsoil, before applying topsoil, and before planting.

Bad designs lead to bad construction, and fields that requires a lot of time and attention to remain playable. On the other hand, good designs and specifications lead to sound construction techniques and fewer mistakes. The result is fields that can be used in all kinds of weather conditions and fields that will support competition for years to come with minimal yearly renovation. **ST**

Jim Puhalla is president of Sportscape International, Inc., Boardman, OH and also co-author of two books, "Sports Fields-a Manual for Design, Construction and Maintenance," and "Baseball and Softball Fields-Design, Construction, Renovation, and Maintenance."