

# Award-Winning Baseball and Softball Field Maintenance and Renovation

By Jim Puhalla

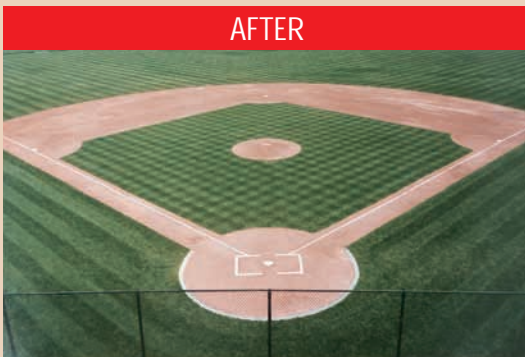
A simple, easy-to-follow, illustrated manual  
for creating and maintaining high quality infields, featuring

## PLAY BALL!®

Advanced Formula Infield Conditioner



No one even wanted to play on this neglected  
high school diamond.



The same field, after renovation, won “Diamond-of-the-Year”  
accolades and is a source of community pride.



PlayBall!™ makes infields easier to maintain. And players at all levels love the way it feels.

## “PlayBall!® Infield Conditioner gives us the best results in all types of weather.”

Jim Puhalla, Sportscape International, Boardman, Ohio

“We’ve installed hundreds of fields. This is the first conditioner I’ve seen that makes a noticeable difference.”



### Faster play following rain

“After a hard rain, PlayBall!® lets us get games started twice as fast. It supports tractor weight better, giving us quicker access for dragging. Plus, it absorbs excess water better than other conditioners we’ve tried. And we’ve tried them all.”

*PlayBall!® comes in two types: REGULAR for conditioning, FINE for puddle control.*

### Easier to work with

“It’s the only conditioner we’ve ever used that gets positive comments from everyone from the maintenance staff to players. Crews like how easily PlayBall!® incorporates with sand and clay to make the whole infield smoother and more resilient. Players love the feel of it”

### PlayBall!® is different

New PlayBall!® is more effective at reducing compaction and increasing infiltration because it’s made from calcined (kiln-fired) diatomaceous earth, DE for short. Calcined DE is one of the world’s most highly absorbent minerals. It holds up to 130% of its weight in water, yet is strong enough to resist crushing under foot.

*PlayBall!® stands up to repeated wet/dry cycles without breaking down.*



### PlayBall!® keeps on working

PlayBall!® makes a lasting improvement to infields. It stands up to repeated wet/dry cycles without breaking down and turning to dust and mud.



*PlayBall!® is surprisingly lightweight.*

Lightweight bags are easier on the back

Now you can carry less weight into the field to do the same job. PlayBall!® comes in 25 pound bags, about half the weight of traditional conditioners. This helps reduce the potential for back injury.

### Why wait?

Get ready now. Call today for a trial order. See for yourself how new PlayBall!® makes it easier to create a better infield.

# PLAY BALL!®

*Advanced Formula*

INFIELD CONDITIONER



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"After" cover photo by David Grantonic.  
Other photos by Jim Puhalla, except where noted.

# Introduction

A top quality baseball or softball diamond doesn't happen by accident. Long before the teams take the field for the first time, a group of committed planners - sometimes including many volunteers - begin working behind the scenes to provide the very best possible competitive arena for their athletes.

Of course, the hard work doesn't end when the first pitch is thrown out. Throughout the season, day by day, before games, and long into the night afterwards, there's a dedicated group of people behind every great field. It's often a thankless task, rewarded only by the satisfaction of seeing players perform on a field that lets them reach for the stars.

This book is meant to provide some helpful tips for those who are responsible for that behind-the-scenes work. We'll begin by looking at some of the things you can do to get your diamond ready for the season, then move on to tips for helping your diamond withstand the stresses of competition during the season, and then consider some post-season techniques to keep your diamond improving steadily over time.

## The Importance of Regular Field Inspections

Maintaining a first-class diamond requires regular inspections of the field. Figure 1 is an example of a chart to guide your inspections. This chart can be used in a number of ways: It can be a guide for daily maintenance practices on your diamond, or it can

be a planning tool for specific field-improvement projects.

If you use this chart (or one like it that you make up yourself), you'll be more likely to remember all the various things you're supposed to be looking for. And it's important to be thorough, because sound maintenance procedures need to be planned on the basis of inspections like these.

Inspection Report						
Baseball or Softball Field						
Field:	Proper Dragging Methods*	Cupped Base Lines	Holes at Pitchers Mound	Holes at Home Plate and Bases	Lip Build Up at Grass Edges	Other: Dugouts, Fences, Spectator Areas, Trash, etc.
<b>Skinned Area</b>						
Date:						
Date:						
Date:						
Date:						
Date:						
Date:						
Date:						
Notes: Edging: May & Sept. Foul lines: Chalk skinned areas and paint grass. * Dragging: Start 12" from the grass edge and work toward the middle of the skinned area.						
<b>Grass Area</b>	Overall Appearance	Clippings*	Height of Cut*	Sharpen Mower Blade	Soil Moisture	Other: Color, Density, Thatch, Compaction, Weeds, Catch Basins, Sprinkler Heads, etc.
Date:						
Date:						
Date:						
Date:						
Date:						
Date:						
Date:						
Notes: Use a reel mower for cutting heights less than 2". * Observe the 1/3 rule cutting off no more than 1/3 of the blade per cutting.						

**Figure 1.** *This inspection report form will help you remember to check all the factors affecting the performance of your baseball diamond. If you inspect regularly and keep them on file, you'll learn more about how your field responds to weather and seasonal changes.*

On the skinned areas of the field, which are the most critical portions from a competitive standpoint, here are some of the things you should look for in your inspections:

Check for proper dragging methods, making sure that soil is not being dragged into the turfgrass. (This is probably the most common problem area for skinned area maintenance on baseball diamonds.) Check the base paths to make sure they are not "cupped" - worn down in the middle of the path. Look for holes or heavily worn areas at the pitcher's mound, the batter's box, and where the infielders typically position themselves. Also, check the edges of the turfgrass, where the skinned areas and the grass meet. Look for the buildup of soil in the edge, where it can form a lip to block proper surface drainage.

If you want to learn as much as possible about the condition of your turfgrass areas, you'll need to go look beneath the surface - literally. Take along a soil probe and push it into the soil at various spots around the field to check for moisture, compaction and thatch buildup. Pull up a few plugs and take a hard look at the root system, thatch and grass blades. Look for things like root growth and incorrect mowing practices. For instance, tearing and shredding at the ends of the blades is usually caused by mowing with dull mower blades.



*Shredding is characteristic of mowing with dull mower blades. Shredded blades are more susceptible to pests.*

Make sure the mowing is correctly taking off about 1/3 of the plant. If there are excessive clippings on the turf, it probably means too much of the blade is being cut at one mowing.

It's a good practice to inspect the field occasionally during or just after a heavy rain. Look for places where water is standing on the field, and especially where there are puddles on the skinned areas. Inspect the field once a month or so in the off-season.

Over time, you'll find that these inspections are your best source of information on the overall condition of the diamond, and they'll help you make better maintenance decisions.

Another important process is to develop a short-term and long-term plan for your diamond. Make a list of things that need to be done right away, and another list of projects that can wait (or that you can't afford to do right now). That way, you can be setting aside the funds you'll need for real field improvements, or getting groups like boosters started on raising the money.

## The Concept of "Integrated Cultural Management"

Before we launch into our subject, let's take a moment to consider our overall philosophy of sports turf management. We call it "Integrated Cultural Management," or ICM.

Anyone who's been involved in sports fields over the past 25 years knows that our industry is coming to recognize that over-dependence on pesticides and other chemical agents is a shortsighted approach to managing sports turf. We've seen the emergence of a good deal of evidence that over-use leads to accelerated resistance in pests of all kinds. And we've all come to recognize that, under some circumstances, careless use can lead to allergic or chemical reactions among some players.

Several years ago, the idea of "Integrated Pest Management" (IPM) became popular as a response. IPM was meant to be a more cautious discipline for using chemical agents to manage pests - which include disease and weeds, as well as insects.

But Integrated *Cultural* Management shifts our focus away from "managing pests," and concentrates instead on managing the *culture* of the turfgrass. ICM is based on one simple fact: healthy turf naturally resists pests. If we manage our cultural practices properly, our mowing and aerating and irrigating and drainage, we won't have to "manage pests." The turf itself will do that.

The basic difference between IPM and ICM is this: IPM focuses only on pests, but ICM considers all of the stresses that affect the turf. Turfgrass stresses can be divided into three types: environmental (temperature, water, light, air, etc.), mechanical (foot traffic, cleats, mowing, vehicles), and pests (weeds, insects, disease, nematodes).

For sports field managers, considering all the stresses is particularly important, because of the mechanical stresses placed on the turf by players.

The greatest dangers to turf happen when more than one type of stress is present. For instance, the onset of insect infestation during a summer dormancy period. If you can keep your turf actively growing by seeing that it gets at least one inch of water a week, it will resist the infestation much better. By managing the turfgrass culture, you've reduced the need for chemical agents.

So, as you can see, ICM is really just a fancy way of suggesting that an ounce of prevention is better than a pound of cure.

## Before the Season Begins

**Lip Removal:** One important process that can and should be done before each season is "lip removal." With the passage of time, some of the dirt from the skinned areas gets pushed into the edge of the turfgrass. Bad dragging technique slings most of the soil that ends up there. Players' spikes throw some of it. Even weather conditions like wind and rain can push dirt into the grass.

Eventually, all that stray dirt forms a lip at the edge of the grass. That lip keeps rain from draining away into the grass the way it's supposed to. It also becomes a hazard to players because the uneven surface causes the ball to bounce erratically, and can even make players trip. So getting rid of that lip is very important.

One good way to keep these lips from building up is to blast the grass edge with a high-pressure water hose, washing dirt and sand back out of the grass edge and onto the skinned area. This should be done at least once a year; twice is better. Just focus the stream of water on the two to four inches of grass at the edge of the skinned area.



If a small lip (1" to 3") has already built up, you can usually remove it fairly easily with a standard sidewalk edger. It's best to edge all the base lines, at home plate and the pitcher's mound, and along the outfield arc, even if the lip is not visible everywhere.

*A high-pressure water hose is an effective tool for washing skinned area soil out of the grass edge and promoting skinned-area drainage. This process should be performed at least once a year.*

*(Photo by David Grantonic)*

For a lip that is 4" - 12" or more wide, you'll need to use a sod cutter. On some fields, the lip has already grown into a grass hill that's visible to the naked eye and may be three to five feet wide. If you encounter that condition, it's best to go ahead and sod-cut away those hills and lower the grade now, so the surface drainage will work during the season. You can maintain the sod-cut space as part of the skinned area, then seed or sod after the season. Your infield will be a little larger than usual, but the improved drainage will be well worth it.



*Mounded ridges along the arc of the outfield grass restrict runoff. Sod-cut the affected area, re-grade, and then replace the grass after the season.*

**Skinned Area Surface Leveling:** The first step in getting a skinned area ready for the season is to use a pulverizer to break up the compaction that forms over the winter. You'll find that pulverized infield soil is also easier to work with in making minor grade changes.

Once the compaction has been treated, it's time to level the skinned area surface. You can perform minor grade adjustments with hand tools, but it's much faster and easier if you use a tractor and level bar, and you'll get a much smoother skinned area surface. (If you don't have a level bar, consider investing in one, or even making one in your shop.)

There are those who rototill to loosen skinned area soil, instead of using a pulverizer. We recommend steering clear of tilling unless you're adding conditioners. Even then, any pre-season tilling should be shallow to reduce the time it takes the soil to re-settle. Here's a useful rule of thumb is: for each inch deep that you till, it takes one week for the soil to fully settle after a heavy rain (e.g., after tilling two inches deep, the soil takes two weeks to settle.) So, if you need to use the field in two weeks, till only two inches deep.

**Applying PLAYBALL!® to Skinned Area:** If your skinned area tends to be too wet or too dry during the season, a pre-season application of an infield conditioner may be the answer. Our favorite conditioner is EP Minerals' *PLAYBALL!*®, a diatomaceous earth product that soaks up water when it rains and releases it when the soil is dry. *PLAYBALL!*® can be added to the skinned area soil before the season, but, to repeat, don't till it in too deeply if you need to use the field right away. The ideal time to condition your skinned area with *PLAYBALL!*® is after the season, so we'll cover the installation sequence more thoroughly in the post-season part of this book.

**Rolling and Dragging the Skinned Area:** After you've leveled the skinned area surface and made any pre-season applications of conditioner, rolling the skinned areas with a standard garden roller helps to firm up the soil. Then, go over the skinned area with a nail drag and, finally, with a mat drag.

It might not be easy, but try to keep the team off the field after the first heavy rain until the entire skinned area has dried out completely. That cycle seals the soil into a good, consistent surface.



*One of the secrets to correct dragging is to lift the drag before you leave the skinned area. Never drag skinned area soil into the grass, where it can affect drainage.*

Once you've had one complete soaking/drying cycle, you can continue regular dragging with a nail drag and mat drag, a routine you'll use through the end of the season. Remember that poor dragging practices (especially going too fast along the grass edge and failing to pick up the drag before you leave the skinned area) get soil into the grass and lead to lips. Start dragging six to twelve inches from the grass edge, keep your dragging speed low, and lift the drag before you move off the skinned area onto the turf.

**Turfgrass Tune-ups:** Since most of the baseball diamond is turf, it's important to give some pre-season attention to the health and condition of the turfgrass culture. If you haven't had a soil test done recently, take soil samples from your field and submit them for testing. Once you have the results in hand, you can begin to plan your fertilization program for the year.

Fertilization can begin whenever you see a 20% to 30% green-up in the spring. At that time, the turf is ready to begin taking advantage of the nutrients you'll be putting down.

When it's time to begin mowing, take time to decide how high you want the turf when the season begins, and set up a schedule to reach that height gradually, cutting off no more than 1/3 of the plant at each mowing. Even if weather makes mowing difficult, resist the temptation to cut off more than a third, because the health of the turfgrass may be diminished just when it's expected to begin dealing with the stresses of competition.

Before the season starts, there's an opportunity to improve the quality of your turf by applying *AXIS*® turf conditioner, which is the turfgrass equivalent of *PLAYBALL!*® conditioner for skinned areas. The best way to get the full benefit of *AXIS*® is to mix it into the soil before seeding or laying sod, or apply it in combination with aeration. *AXIS*® can also help to dry up problem wet spots on the turf; spread the product liberally over the soggy areas, either by itself or in a 50/50 mixture with sand.

## Procedures to Perform During the Season

**Proper Dragging Methods:** Once the season begins, keeping a baseball diamond in top condition is even more challenging. In addition to all the environmental stresses the field has to face in the off-season, there are now a variety of mechanical stresses that can wreak havoc on the condition of the surface.

Unfortunately, sometimes the way routine maintenance processes are performed actually makes the problem worse.

One good example is dragging. We've already looked at how improper dragging can lead to the build-up of a disruptive lip at the edge of the turfgrass. Of course, it doesn't have to be that way. The next time you go to a Major League baseball game, watch how the "big league" groundskeepers perform dragging. They go slowly, leaving a foot or so of clearance from the edge of the grass, and they take care not to make high-speed turns that sling soil into the turf. Try to match your own dragging practices to the big-leaguers'.

Skinned areas sometimes develop muddy spots as the season goes on, and that's especially true on fields where surface drainage is questionable. Weather conditions, the movement of players and even maintenance practices themselves can all gang up on a field to leave muddy puddles.

Under some circumstances, steps that are taken to correct these puddles can actually cause problems that are harder to solve than the original puddles. For instance, sometimes players and coaches will use a broom to sweep water out of puddles. That can spread the standing water around enough to allow play to go on, but there's a cost. This practice creates a larger depression in the skinned area, and that makes the puddle deeper the next time. Now you have to sweep even more, and the problem gets progressively worse.



*Poor skinned area drainage can leave a diamond in a muddy, unusable state. Most drainage problems result from poor design or bad maintenance practices.*

**Leveling to Prevent Puddling:** There are better solutions to puddling problems. One of those better solutions is to level the entire skinned area with a leveling bar several times during the season. That practice restores the field to its original contours to allow it to drain as efficiently as possible. Generally, a longer leveling bar is better - nine feet is ideal. Remember to keep the bar a foot from the edge of the skinned area to avoid getting skinned area soil into the adjacent turfgrass.

**Application of *PLAYBALL!*<sup>®</sup>:** *PLAYBALL!*<sup>®</sup> conditioner can also be a lifesaver when wet weather turns the field into a quagmire the day of a game. Spread the product over muddy spots to absorb standing water and provide solid footing.

**Pitcher's Mound Maintenance:** One of the most troublesome areas of any baseball diamond is the pitcher's mound. The torque generated by the pitcher's body on each pitch is transmitted directly into the ground. The back foot gouges at the dirt as it pushes off the plate, and the front foot creates a compacted depression each time it comes down. On top of that, most pitchers scrape at the mound with their cleats in front of the pitcher's plate to get just the right feel.

Maintaining the pitcher's mound requires re-filling the holes the pitchers carve out for themselves, and smoothing the downward slope at the front of the mound. In the section on "Building the Pitcher's Mound" (page 16), you'll find a drawing for an easily-made tool that will help you keep your mound contours correct. Using a tool like this three or four times during the season will make a big difference in the quality of the mound by the end of the year.

**Batter's Box Maintenance:** A similar situation develops at the batter's box, which is the other most troublesome spot on a baseball diamond. As the batters dig in and have their swings, they gradually create low spots. On most fields, someone rakes dirt back into the resulting crater after every game, and it gets kicked back out again the next time the field is used. If it rains while the crater is un-filled, there's a mud puddle right where the batter is supposed to stand.

After the season, you can really improve the condition of the batter's box and the pitcher's mound by installing a special type of soil that's been developed for that purpose. That product and its use are described in the section on post-season projects, page 16.

## Turfgrass maintenance

**Aeration:** Aerating frequently, and varying the equipment you use, helps to make the turf stronger. Aeration allows oxygen to reach the roots of the turfgrass, where it can be used by the plants. When you aerate, you can also add an amendment such as *AXIS*<sup>®</sup> that can help you manage air and water in the soil. During the season, it's a good idea to use solid tine aeration unless you can invest the time to drag or remove the cores left by core aeration. Leaving cores on the field during the season causes erratic ball response.

**Mowing:** In the North, where many fields are a mixture of bluegrass and ryegrass, the ryegrass starts growing first in the spring. To strengthen the bluegrass component of the

turf, keep the mowing height at about 2" to let sunlight reach the bluegrass base. When the bluegrass starts growing in May, try to maintain the mowing height at 2". Then, raise the height 1/4" in June to help the turf prepare for the summer's heat. In July, you can consider raising the height another 1/2" - the grass should be higher in mid-summer than at any other time of year.

In the South, the cycle is reversed. Once the growing season begins, mow at a height of about 1 1/2". As the average temperatures go up, gradually reduce the mowing height until, during the hottest part of the summer, you're cutting at around 1".

**Irrigation:** As a general rule, sports fields need about 1" of water per week. If you get an inch of rain, you don't need to apply more. If you get 1/2" of rain, add 1/2" of irrigation, and so on.

Some soils, like those with a good deal of sand, may require substantially more watering. In these cases, the turf itself will usually tell you it needs water. You'll see rolled, shriveled leaves, poor turf color and brittle texture. If the normal allocation of water seems to run through the soil, you may need to water all summer with frequent and light irrigation.

Contrary to popular belief, the best time to water is in the early morning hours just before or just after sunrise. Early morning irrigation usually doesn't interfere with practice of games, and the rising sun helps to dry off the leaves and minimize the period of leaf surface wetness. Wet leaves can be a gateway to turf disease, so reducing the time the turf leaves stay wet is an effective way to reduce disease incidence. If you water early in the morning, the field will usually be dry and solid by the time the team shows up for practice or a game.

**Weed Control:** For most northern baseball and softball diamonds, one spot application of a post-emergent product should be all that's needed to control weeds during the season. In the South, it may be necessary to make a blanket application of a pre-emergent where crabgrass or other weeds are a particular problem.

**Spot Drainage Problems:** Probably the most common and troublesome baseball diamond management challenge is wet spots on the field. We've already looked at how *PLAYBALL!*® conditioner can be used to treat wet spots on the skinned area. But what can you do about wet areas on the turf?

In turfgrass areas, spot drainage problems are more difficult to correct during the season. Spreading *AXIS*® turf conditioner over the affected area will absorb much of the water out of the turf, and allow the game to go on. Persistent problems will probably require post-season solutions like the installation of strip or sand drains to dry up the affected area. If you add 10% to 20% *AXIS*® by volume to the sand when you install strip drains, it will help to reduce the brown stripes over the drains during drought conditions.

**Inspection:** A critical element in effectively maintaining a baseball diamond is to inspect the field regularly during the season - and probably at least weekly. It's a mistake to assume that players and coaches will tell you about any problems they see. They may just "fix" the problems using practices like sweeping out puddles, and you may not hear about the problem until it has become so serious that drastic measures are required.

## Post-Season Procedures (Renovation)

Once the season has ended, there's a chance to perform some steps that will really upgrade the quality of the diamond for the next year's play - and save you some time, money and headaches along the way. One of the most effective upgrades is to condition the entire skinned area with a comprehensive installation of *PLAYBALL!*<sup>®</sup> conditioner on the whole skinned area.



**Step 1.** *The installation process for PLAYBALL!<sup>®</sup> conditioner begins with placing the bags on the skinned area 6 1/2' apart.*



**Step 2.** *The bags of PLAYBALL!<sup>®</sup> conditioner are poured out onto the field, and the material is spread using wide aluminum rakes.*



**Step 3.** *Once the conditioner is spread evenly on the surface of the skinned area, a hand tiller is used to till in the product along the base paths and the grass edges to a depth of 3."*



**Step 4.** *A tractor tiller is used to work PLAYBALL!<sup>®</sup> into the rest of the skinned areas.*



**Step 5.** *After the PLAYBALL!<sup>®</sup> conditioner is tilled into the soil, a pulverizer helps to firm up the soil.*



**Step 6.** *Using a tractor with a level bar attachment helps to fill in any low spots and assure a uniform surface of the skinned area.*



**Step 7.** A standard roller helps to settle the conditioned skinned area soil, and prepares it to be used almost at once.



**Step 8.** Dragging the skinned area provides a finishing touch for the installation of *PLAYBALL!*® conditioner. After dragging, the field is ready to use.

**Installing *PLAYBALL!*®:** Begin by placing the 25 pound bags on the skinned area at 6 1/2' on center. Then break the bags and spread the material evenly to a depth of about 3/8" with standard aluminum rakes. Till it into the soil to a depth of three inches. Then go over the skinned area with a pulverizer, level bar and a roller. The whole installation process takes about forty man-hours for a full-size field.

**Characteristics of *PLAYBALL!*®:** *PLAYBALL!*® is a skinned area conditioner made from calcined (kiln-fired) diatomaceous earth (DE). Calcined DE is one of the world's most absorbent minerals; it can hold up to 130% of its weight in water. In fact, a 25 pound bag of *PLAYBALL!*® can absorb as much water as 50 pounds of calcined clay conditioners. Because of the calcining process, *PLAYBALL!*® is strong enough to resist compaction and crushing, and can continue to work for decades without breaking down.

Just about all of the conditioning products on the market today are promoted as allowing play to resume shortly after the rain stops, and all of them will soak up enough water to get the game going. Unlike some conditioners, *PLAYBALL!*® does not lead to compaction of the soil when the water evaporates. (Conditioners made of corn cobs or other organic materials can soak up water for one game but should be removed before the next rain to prevent a more serious problem later.)

*PLAYBALL!*® also absorbs more water by volume than calcined clay products. That means it supports solid footing longer than other conditioners, and promotes player safety better. During the dry months of summer, *PLAYBALL!*® also helps to control dust by holding water in the soil longer.

The recommended rate for conditioning a skinned area with *PLAYBALL!*® is 10% by volume. Figure 2 shows the comparison of recommended rates of application for various types of skinned area conditioners.

Unlike competing products, *PLAYBALL!*® allows loose soil to be raked out of the grass edge and back onto the skinned area. That means less loss of soil, and better surface drainage since natural runoff is not obstructed by a dam of grass and soil. If other types of conditioner are used, the ridges must be removed by sod-cutting the edge of the turf.

**Conditioning a regulation size  
skinned area (w/grass infield) to 4" depth**

Product	Type of Conditioner	Percent Recommended	Tons Needed to Condition Skinned Area
Terra Green™	Calcined Clay	20%	12 Tons
Diamond Pro®	Calcined Clay	25%	24 Tons
Surface®	Calcined Clay	25%	16 Tons
PlayBall!®	Diatomaceous Earth	10%	5.2 Tons

**Figure 2.**  
*This chart shows the comparative volumes of PLAYBALL!® and other conditioners required to condition one baseball diamond skinned area.*

Figure 2 shows the amount of *PLAYBALL!®* needed to condition various types of fields at 10% by volume (of skinned area soil), to a depth of 2" minimum and 4" for fields with moderate annual rainfall. In areas that typically get more rain, many fields managers recommend tilling *PLAYBALL!®* more deeply into the soil - as much as 6" deep. In dry climates, use 2" minimum and 4" for dry soil conditions to reduce compaction and improve infiltration rates. Extremely dry compacted soils should receive a 6" deep treatment.

Once the material has been installed, you can use the field right away. But after the first heavy rain, keep players off the skinned area until it has dried out completely. That cycle will re-settle the soil so it will support traffic without damage.

**Adding Skinned Area Soil:** If you're planning to add soil to the skinned area of your diamond, remember that one of the most important factors in determining the playability of any baseball diamond is the quality of the skinned area material. The ideal mixture is made up of 60% sand, 20% silt, and 20% clay.

All of the material should pass through a 3/8 inch sieve screen. A minimum of 97% should pass through a number 8 sieve, and at least 60% should pass through a number 140 sieve.

**PlayBall® Conditioning Recommendations**

Place 25 lb. bags evenly spaced over the entire skinned area and rototill raked product to the depth desired.

Total Sq. Ft. of Tons Required for each Number of 25 lb. bags

Type of Field	Skinned Area	2" in depth treated	each 2" in depth treated
<b>Baseball:</b>			
90' Bases - 95' Arc			
w/Grass Infield	10,550	2.6	208
w/Skinned infield	18,300	4.1	328
80' Bases - 80' Arc			
w/Grass Infield	8,400	1.9	152
w/Skinned infield	13,650	3.1	248
70' Bases - 70' Arc			
w/Grass Infield	6,800	1.5	120
w/Skinned infield	10,700	2.4	192
60' Bases - 50' Arc			
w/Grass Infield	3,850	0.9	72
w/Skinned infield	6,700	1.5	120
<b>Softball: (Skinned Infield)</b>			
60' Bases - 60' Arc	8,350	1.9	152
65' Bases - 65' Arc	9,300	2.1	168

Note: Apply additional bags if 1st & 3rd base lines are not outlined with grass.  
One Ton of Play Ball contains 80 25lb. bags.

Although sending out soil samples for particle size analysis is a good idea before you install any skinned area soil, that analysis will not tell you everything you need to know. It's a good idea to compare two or more different soils with similar particle sizes by doing some testing of your own.

One simple test is to punch four or five eighth-inch holes in the bottom of eight-ounce plastic cups,

**Figure 3.**  
*This chart shows the amount of PLAYBALL!® conditioner required for baseball and softball fields of various types.*

and then fill the cups 3/4 full with samples of the soil being compared. Pour in water until it reaches the top of the cup. Allow the water to drain away, and see how long it takes the various samples to become firm enough to offer some resistance when you try to push a finger into the soil. The soil that firms up quickest will return to a playable condition faster.

Before you accept skinned area soil, it's also a good idea to visit the stock yard, to look at undisturbed piles of the material to see the size of the gravel that is present in the material. You'll want to choose the soil with the smallest gravel. This works best if you can visit the stock yard shortly after a rain, which exposes the gravel.

You can have the mixing plant add your **PLAYBALL!**® conditioner to the mix before you install it. **PLAYBALL!**® should be added at a rate of one part conditioner to nine parts soil, so the product becomes ten percent of the installed soil.

**Lip Removal:** After the season is a good time to remove any existing lip or ridge along the edge of the grass so you will not have to perform this step in the spring, before the season starts. You'll be able to cut out the sod, remove some of the soil underneath to restore the correct grade, and then put the new sod down. In order to completely remove the lip or mounded ridge, you may need to re-grade as much as three to five feet into the grass.

Before replacing the sod, don't forget to loosen the soil underneath to let the roots of the plants re-establish themselves.

**Seeding and Sodding:** And that brings up our next subject. Another post-season project for your baseball or softball diamond is to conduct any seeding or sodding operations needed to get complete turfgrass coverage. A very important step is soil preparation, and the same preparation techniques should be used before sodding as before seeding.



*This simple test helps compare the ability of various soil types to rebound from heavy rain. Holes in the bottom let water run out, and the samples are checked to see which one firms up most quickly.*



*After the season, take time to cut away any lip that has formed at the edge of the grass. A standard sod cutter makes short work of the job.*



*Once the sod has been removed, lower the grade to allow for positive surface drainage.*



*When the correct grade has been established, replace the turf by seeding or sodding.*

Of course, this is an ideal time to improve the soil structure by adding *AXIS*® conditioner before seeding or sodding. *AXIS*® provides the same support for your turf areas that *PLAYBALL!*® provides for your skinned areas: increased permeability and reduced compaction. *AXIS* also helps to soak up extra water in wet weather, and it helps to preserve water in the soil during dry weather.

You need to loosen the soil about six inches deep to let the roots of the plants develop. The most common way to loosen the soil is by tilling, but tilling displaces the soil particles, and causes them to re-settle in a denser mass, leaving the soil harder. A preferred way to loosen soil is to use an agricultural cultivator, (also called a "scarifier," or an "earthcavator" in some parts of the country.)

When the soil has been adequately prepared, including the addition of nutrients and *AXIS*®, it's time to begin installing the turfgrass. If you're seeding, use a drop spreader to apply the seed on the infield and around the edges of the skinned area and warning track. A rotary (or centrifugal) spreader can be used for the outfield if there's not much wind blowing.

Rake the seed into the soil using a leaf rake, then lightly roll to improve seed-to-soil contact. Mulching allows faster germination.

When installing sod, be careful to lay the sod with the seams tight. But don't position the sod by pulling on it. That will stretch the sod, and it will eventually shrink back to its original size, causing gaps between pieces. Water new sod liberally for the first two weeks.

It's a good idea to choose a sod that has been grown on a soil that is similar to that of the field. If your sod was grown on one type of soil and then installed on another, you'll have constant maintenance headaches, due to the layering effect of the different soils. The layering results in reduced water infiltration and percolation.

**Core Aeration and Topdressing:** Core aeration should take place when the grass is actively growing - so if the season ends after growth has slowed dramatically (as in summer dormancy in the North), wait until fall to aerate.

Along with aeration, consider topdressing after the games are over for the year. Topdressing helps to level the surface, and can also be used to help improve the quality of the soil. First core aerate the field. Then topdress by evenly spreading matching soil or sand over the entire surface. We like to add about 3/8" of material over the field, and that normally takes about 135 cubic yards of soil or sand to topdress a full-size field. Once the material has been spread, use a level bar to get the surface as smooth as possible.

You can also improve your turf by adding *AXIS*® to your topdressing material before you spread it. If you core aerate and topdress with sand enhanced with *AXIS*®, the result can be a dramatic improvement in the quality of your turfgrass.

**Drainage Improvements:** After the season ends, there are opportunities to remedy spot drainage problems. Of course, you could install a complete drain system on turf areas, and that's a good idea if you can afford it.

Most of the time, of course, you won't want to get into a project quite that drastic. One effective but less complicated technique is to install "strip drains," which are fiber-wrapped structures designed to be laid in problem areas. The strip drains are about six inches high and one inch thick. You install them by digging a trench 12" deep from the problem area to a nearby catch basin. Don't forget to check the trench to make sure it runs downhill toward a collector drain. Place the strip drains in the trench and fill to the surface with sand or, even better, sand mixed 50/50 with *AXIS*®.

## Why Internal Drainage Doesn't Work on Skinned Areas

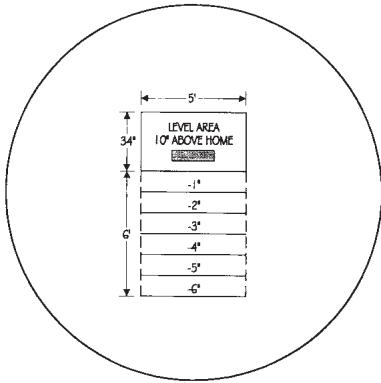
Although internal drainage systems can be used successfully in some areas of the baseball diamond, these systems typically work poorly in the sand/clay soil of the skinned area. Under normal circumstances, water percolates through skinned area soils at a rate of only about 1/100" per hour. That means water does not pass through the soil and into the drain structures quickly enough to make a difference in surface quality. Proper positive surface drainage is the only way to prevent standing water on the skinned part of the infield.

## Building (or Rebuilding) the Pitcher's Mound

The regulation pitcher's mound is actually a fairly complicated structure. The top is meant to have a flat area 60" wide and 34" front-to-back; the front of the flat area is to be 6" in front of the pitcher's plate. From that point, the mound is supposed to slope 1" for each foot toward home plate. In order to get the correct slope, you can easily make a measuring gauge using a piece of 2"X4"X10' lumber. Lay the board across the pitcher's plate so that it extends 22" behind the plate and about 8' toward home plate. When it's in the proper position, stake the home plate end level.

Mark the board at the front edge of the pitcher's plate. Measure out 18" and make another mark, then make five more marks one foot apart. The last mark will be 6 1/2' from the front of the pitcher's plate.

Level the top of the mound so there's a flat area all the way to the back end of the board. Then slope the mound toward home plate so that the mark 18" in front of the plate is 1" above the ground, the second mark is 2" above, and so on. The sixth mark should be 6" above the slope. Then slope the rest of the mound evenly to the bottom.



*This drawing shows the correct dimensions and contours for a regulation pitcher's mound.*



*This simple tool can be made in a few minutes, and can help to set the correct slope toward home plate from the pitcher's plate.*

When you're building a new mound, or renovating one after the season, consider installing one of the new materials designed for pitcher's mounds and batter's boxes. These materials have a clay base with special additives, and they resist the damage that comes from cleats digging in. They are installed by excavating the batter's boxes and the part of the mound where pitting and excessive compaction occurs to a depth of about three inches, then refilling the excavated spot with the batters box and mound material. This is a fairly new material on the market, but initial field trials are yielding good reports.

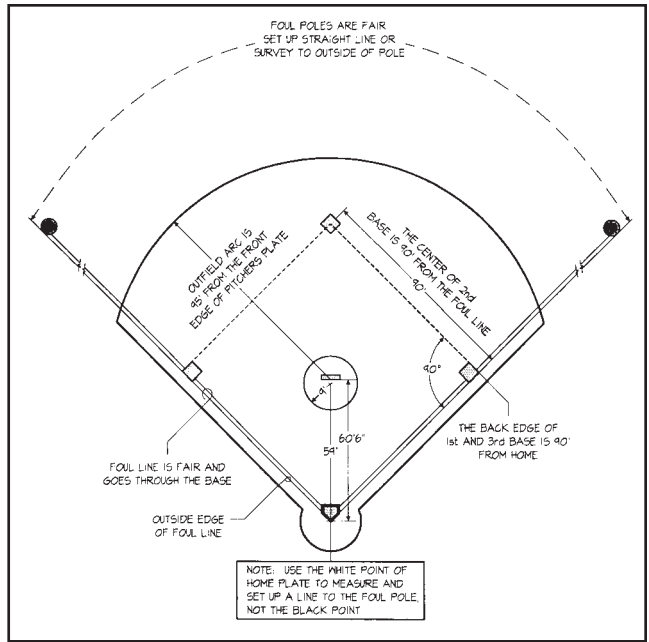
## Common Points of Confusion on Lines and Boundaries

Figure 4 shows some details of baseball field that are sometimes constructed incorrectly, either because the rule book is misinterpreted, or because the rules are observed by tradition but remain unwritten.

For instance, any time you take measurements from home plate, it is the **white** point on the plate, not the black one, that is used. Foul lines pass through the **outside** edge of first and third base and continue to the outside of the foul poles, which are themselves in fair territory.

On a regulation field, the **back** edge of first and third base are 90 feet from home plate, but the **center** of second base is 90 feet from the foul lines. The front of the pitcher's plate is 60 feet, 6 inches from the white point on home plate, and the center of second base is 127 feet 3 3/8 inches from the white point of home. The circled edge of the skinned area is 95 feet from the front edge of the pitcher's plate.

In laying out a softball field, the arc of the infield does not always have its center at the pitcher's plate. On some fields it is centered on a point several feet behind the pitcher's plate. (When you design a baseball or softball diamond, it's a good idea to consult the rule book for the appropriate governing or sanctioning body to check the exact dimensions for the field.)



**Figure 4.**  
*The correct way to lay out a regulation baseball field.*

## Procedures That Must Be Performed Year 'Round.

**Skinned Area Dragging:** One often-overlooked part of the management of a baseball or softball field is giving the skinned area some care in the off season. Once a month or so, see that the skinned area is dragged with a nail drag and a mat drag. That will discourage the growth of weeds, and also cut down on the compaction that normally occurs from one season to the next.

**Off-season Turfgrass Maintenance:** It's not uncommon to find fields that are carefully maintained during the season, then pretty much ignored until practices begin the next spring. This is a big mistake. If you carefully mow according to the 1/3 rule, perform aeration and fertilize in the off season, each year should show an improvement in the quality of your diamond. On the other hand, if you let the grass get too high then cut off half of it (or more), you'll weaken the plants, leave too much clippings on the turf, and generally degrade the facility.



*A heavy layer of clippings like this indicates poor mowing practices - too much of the blades are being cut off. Heavy clippings can cause the turfgrass to die.*

Think of it this way: the turf is a living system involved in a sports activity - just like a race horse. No trainer would stop feeding and caring for a race horse just because the racing season is over. Why treat your baseball diamond that way?

As long as the turf is growing, keep mowing according to the 1/3 rule. You can gradually increase the height so you won't have to mow as frequently, but it's probably a mistake to let the grass get over 3" high in the North between cuttings, 2" high in the South.

## The Post-Game Wrap-Up

One of the things that makes a baseball diamond more of a challenge than other types of sports fields is that it is really made up of two separate systems - a turfgrass system and a skinned area system. The turfgrass system can be maintained like any other sports facility, except that special attention must be given to the borders between turf and skinned area, because if these borders become clogged with soil, the skinned area will not drain properly.

The skinned area can be a special headache all by itself. It has to be kept clean, smooth and free of stones. It needs to be contoured correctly to promote positive surface runoff. And the soil needs to be formulated with just the right combination of sand, silt, clay and **PLAYBALL!**® conditioner to deal effectively with changes in temperature, moisture and competition.

The tips in this book are meant to provide a guideline for managers of baseball and softball diamonds, but your experience with local soil and climate conditions is an indispensable part of the process. Successful management programs can vary widely, but they are just about always programs - carefully developed disciplines to keep the diamond in top condition, and not just day-by-day reactions to changes in weather or other factors.

And when the players run out onto a diamond that provides a competitive environment where they can bring out the very best in themselves, the field manager can enjoy a sense of satisfaction just like the one a hitter gets when the ball sails over the fence.



*Here's a field that was poorly designed. In time, it was all but abandoned by the high school that built it.*



*The same field, after being completely rebuilt, including the installation of **PLAYBALL!**® conditioner on the skinned areas.*

*(Photo by David Grantonic)*



## About the Author

Jim Puhalla is the president of Sportscape® International, Inc., a firm specializing in the design, construction, renovation and maintenance of sports fields and related facilities.

Jim studied landscape architecture at Ohio State University and accounting at Youngstown State University.

He has worked in the sports field industry since 1978, designing, building or renovating hundreds of fields from Pittsburgh to Columbus, and as far north as Cleveland. In 1990, Jim was one of the founders of Sportscape® International, Inc., and he has served as the firm's president ever since. The company's reconstruction of the Boardman High School field won them a 1995 "Baseball Diamond of the Year" Award sponsored jointly by the Sports Turf Managers Association, *SportsTurf* magazine, and Beam Clay®.

Jim is a frequent contributor to *SportsTurf* and is currently collaborating with Dr. Jeff Krans and Dr. Michael Goatley of the Mississippi State University Department of Plant and Soil Sciences on a book on the design, construction and maintenance of sports fields. The book will be published by Ann Arbor Press of Chelsea, Michigan.

Sportscape® International has locations in Dallas and in Boardman (Youngstown), Ohio. The company can be reached toll-free at 1-888-784-5586.

## PLAYBALL!® REGULAR

PlayBall!® is a calcined diatomaceous earth infield conditioner

### TECHNICAL DATA

Bulk Density (tapped).....	26 lbs./cu. ft.
Water absorption.....	90.0%
Loss of Ignition.....	1.5%

### SCREEN ANALYSIS

+6 mesh.....	2.0%
+10 mesh.....	60.0%
+20 mesh.....	92.0%
+80 mesh.....	99.5%
-80 mesh.....	0.5%

### COMPOSITION (approximate)

Calcined Diatomaceous Earth	
Silica (SiO <sub>2</sub> ).....	89.0%
Alumina (Al <sub>2</sub> O <sub>3</sub> ).....	4.8%
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> ).....	1.4%
(CaO).....	1.0%
(MgO).....	0.3%
(Na <sub>2</sub> O).....	1.6%

## PLAYBALL!® FINE

PlayBall!® is a calcined diatomaceous earth infield conditioner

### TECHNICAL DATA

Bulk Density (tapped).....	27 lbs./cu. ft.
Water absorption.....	130.0%
Loss of Ignition.....	1.5%

### SCREEN ANALYSIS

+20 mesh.....	0.2%
+28 mesh.....	20.0%
+48 mesh.....	85.0%
+65 mesh.....	98.5%
-65 mesh.....	1.5%

### COMPOSITION (approximate)

Calcined Diatomaceous Earth	
Silica (SiO <sub>2</sub> ).....	89.0%
Alumina (Al <sub>2</sub> O <sub>3</sub> ).....	4.8%
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> ).....	1.4%
(CaO).....	1.0%
(MgO).....	0.3%
(Na <sub>2</sub> O).....	1.6%

## AXIS® REGULAR

AXIS® is a calcined diatomaceous earth product

### TECHNICAL DATA

Bulk Weight .....	675 lbs./cubic yard
Bulk Density .....	25 lbs./cu. ft.
Spec. Gravity .....	2.20 g/cc
CEC .....	27 meq/100 g
Water Absorption (ASTM F-726) .....	114%
Sulphate Soundness (ASTM C-86) .....	3% loss
Pore Size .....	0.1 - 1 micron
Total porosity.....	82%
pH .....	7

### SCREEN ANALYSIS

On 6 mesh .....	5.0%
On 10 mesh .....	54.0%
On 20 mesh .....	87.0%
On 80 mesh .....	98.8%
Minus 80 mesh .....	0.2%

### COMPOSITION

Calcined Diatomaceous Earth	
Silica (SiO <sub>2</sub> ) .....	90.0%
Alumina (Al <sub>2</sub> O <sub>3</sub> ) .....	6.5%

Unless otherwise noted, all information shown is "typical". Data may vary from your laboratory results according to test methods used. Product use may vary in actual practice because of processing conditions. Read Material Safety Data Sheets before using.



Poor soil structure results in recurrent drainage and disease problems, excessive irrigation and syringing needs, and unnecessary maintenance expense.



University and field tests show AXIS<sup>®</sup> improves infiltration, increases available water, reduces compaction, and improves soil structure to promote healthy root growth.

## You can keep treating symptoms. Or improve your soil structure once and for all with AXIS<sup>®</sup>.

AXIS amends soil for turf that's more resistant to recurring problems.

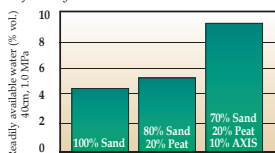
It's basic. Healthier turf handles stress and fights off disease better. And it all starts in the root zone. AXIS<sup>®</sup> is a superior all-natural inorganic soil amendment that makes a permanent structural improvement in virtually any soil profile to make it easier for you to grow healthier turf.



Proven effective in USGA greens.

Ohio State University testing showed AXIS<sup>®</sup> increases both readily available water and water retention in USGA root zone mixture, while increasing permeability in most cases.

% of Readily Available Water In USGA Fine Sand Mix



Effective for NFL Teams

Vince Patterozzi, Head Groundskeeper of the Baltimore Ravens, formerly the Cleveland Browns, uses AXIS<sup>®</sup> to keep his turf in peak condition. "AXIS<sup>®</sup> makes good agronomic sense," he says. "It worked so well for upgrading the field in Cleveland that we're using it in our new stadium field and practice fields here in Baltimore. AXIS<sup>®</sup> encourages deep, thick root growth. It helps resist compaction problems in the middle of the fields where traffic is heaviest. Plus it gives us more latitude in managing the



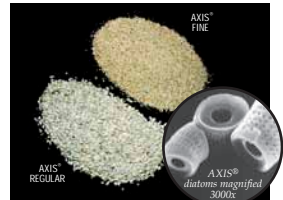
air / water balance in the soil." AXIS<sup>®</sup> makes a permanent improvement in soil structure for every sports turf application, from football to soccer to baseball fields.

AXIS is easy to use.

Modify soil structure by filling aeration holes with a 50% AXIS<sup>®</sup>, 50% sand mix. For renovation and new construction, till 10% AXIS into the top 6" of the soil.

AXIS is a unique diatomaceous earth product.

AXIS<sup>®</sup> is naturally porous with low bulk density, is chemically inert, and will not compact or break down over time even under the most extreme conditions.



AXIS<sup>®</sup> has internal pores designed by nature to absorb and release water.

Improve your soil structure once and for all with AXIS<sup>®</sup>. It's the surest, safest, most basic way to grow better athletic sports turf.

Call today for your free AXIS<sup>®</sup> Fact Kit, sample, and the name of the dealer nearest you.

# AXIS<sup>®</sup>

Irrigating Soil Amendment

AXIS<sup>®</sup> is manufactured by EP Minerals, LLC, Reno, Nevada

**Ep Minerals**<sup>™</sup>  
AN EAGLE-PIEKER COMPANY

# PLAY BALL!®

Advanced Formula Infield Conditioner

# AXIS®

Irrigating Soil Amendment

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