Growing Better Turf for

Soccer Fields

Using Thermally Optimized Clay Soil Amendments by Pro's Choice

AUTHOR BIOGRAPHY

Professor Henry T. Wilkinson is a world renowned expert on designing, building and maintaining natural grass sports fields. He has worked on soccer (football) fields in Holland, France, England, Scotland and the United States. He has built numerous major and minor league baseball fields through his association with Roger Bossard of Turf Specialists, Inc. Most recently, he has been the lead turf consultant for new stadium construction for the St. Louis Cardinals, Seattle Mariners, Detroit Tigers, Chicago White Sox, and Milwaukee Brewers. Through his involvement with Arena Stadium in Holland, Safeco Field in Seattle and Miller Park in Milwaukee, he has become the leading turf expert for retractable dome stadiums.

Wilkinson has designed and built little league, softball and municipal sports fields. His knowledge of rootzone and drainage materials, turf and field designs makes him a valuable resource at the University of Illinois.

When asked how he approaches building an athletic field, he states, "First and foremost you must never forget the purpose of the field: athletics. Next, you must use common sense in designing and constructing the field: as simply as possible. Finally, you must design the field with both the construction and maintenance budgets in mind."

Wilkinson was recognized as Scientist of the Year by the Sports Turf Managers Association (STMA) for his work on the use of thermally optimized clay soil amendments to improve grass rootzones.

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SPORTS FIELD PRODUCTS

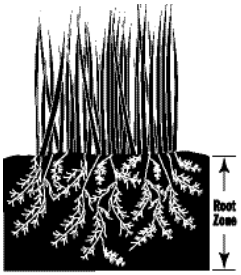
TURF FOR SOCCER FIELDS

Most soccer fields rely on natural grass as the surface for the playing field. The reasons for the popularity of natural grass compared to artificial surfaces are simple: fewer athlete injuries, cooler playing surface, and good interaction of the soccer ball with the turf. Artificial "grass" surfaces were designed to reduce the impact of weather on a playing surface. However, this comes with some compromises: a field that is hotter, has to be crested to shed water, highly resistive to shear forces from feet, and which allows less control of the soccer ball. Real grass is a living plant and, as such, can be damaged by the game of soccer, but with a proper rootzone and good management, grass will perform well.

TYPES OF GRASS FOR SOCCER FIELDS

The number of grass types used for soccer varies greatly, compared to the two types used for baseball and the five types used for football. One of the main reasons for this variation is that soccer (or "football" outside the U.S.A.) is played in most countries of the world, and this wide geographic area dictates that locally adapted grasses be used for the playing field. Further more, grass is not the only natural surface used for soccer; the game is also played on bare or skinned soil (no grass!). In baseball, the effect of the grass on the movement of the ball is very important to the nature of the game. For soccer, this is also the case. The soccer ball, being several times larger in diameter than a baseball but much less dense, interacts with turf over a much larger surface. As such, the main impact of turf on a soccer ball is on the speed at which the ball rolls and the speed at which the ball will skip. The shorter the grass - the faster the ball rolls and skips (i.e. less friction) - and the more difficult and fast-paced the game. Soccer on bare soil is also very fast. In addition to the ball, the soccer player interacts with the turf a good deal when running and making sliding tackles.

The more common types of grass used for soccer fields are: Kentucky bluegrass in the cooler climates, and bermudagrass in the warmer climates. However, zoysiagrass and different mixtures of grasses are also used in many parts of the world. The selection and management of the grass is based on the level of play, the management budget for a field, and what grass species are adapted/available in the climatic region. Ryegrass is used for soccer in grass mixtures or as an overseeded grass. In the northern climates, ryegrass is used to repair damaged areas during a season. Fields that use Bermudagrass or zoysiagrass may be overseeded with perennial ryegrass in the mid-fall, to ensure a good quality soccer field when these turfs become dormant in the cold months. Turf leaves are the surface soccer is played on. However, to achieve a good quality turf, it is very important that the



grass have a well-designed rootzone. The rootzone is the soil under the grass, which supplies grass with water, air and nutrients. If you have a good rootzone, you will have good turf for soccer.

Soccer is more damaging to the grass plants than baseball, but less than football or rugby. Several factors contribute to the severity of soccer damage to a natural turf field. First, most soccer seasons start in the fall and extend into winter, when turf is not actively growing. This means that damage from the sport cannot be compensated for by re-growth. Secondly, most of the game is played in an oval area, centered in the field, and in front of the goals. Third, soccer is growing in popularity to the point that fields may be used all year, thus not giving the turf time to recover. Similar to football, there is a good deal of stopping, starting, twisting and sliding by soccer players, all of which results in damage to the turf. Ceramic soil conditioners can improve the performance of turf as a soccer surface.

ROOTZONES FOR SOCCER FIELDS

The rootzone should have a depth of 8-12 inches. Any less will reduce the performance of the field, and any more will add little to the growth of the grass. However, in those cases where a topsoil is being modified by the addition of a soil amendment and cultivation, then a 6-inch modified rootzone will perform well. There are four important aspects of the rootzone:

1. *Texture*
2. *Porosity*
3. *Drainage*
4. *Chemical Reaction*

These four factors dictate how well turf will grow and perform as a soccer field. In addition, they will also determine how effectively and rapidly a soccer field can be repaired. A brief explanation of how these four factors affect the rootzone will help you understand how to get the most out of your soccer turf.

ROOTZONE TEXTURE

Texture is the size, shape and proportion of soil particles in a soil. Soil particles are defined by size, and they must be able to pass through a mesh or screen having openings that measure 2 mm square. Further, there are three main classes of soil particles: sand, silt and clay. These three natural soil particles come in a wide range of sizes and shapes. Soil particle shapes range from flat to round, and smooth to rough. For example, clay particles are flat, and sand particles are round.

If you have a textural soil analysis done, a soil specialist will tell you how much sand, silt and clay you have. Further, a good analysis will tell you how big the sand particles are and what percentage of each size your soil has. This is useful information, but it does not tell you all you need to know to estimate soil porosity or drainage of your soil. Texture and the arrangement of soil particles are very important to the way a soil will drain water. However, reducing the drainage rate of a rootzone while increasing the soil cohesion can produce a soccer field that will rapidly drain, yet resist the shear forces from soccer players, which can damage the turf.

For these reasons, a rootzone composed only of sand is not the best choice for soccer or football fields. A uniform sand rootzone cannot establish strong cohesive bonds between particles: this

results in excess sand movement, thus transferring the shear forces from players directly to the turf and damaging it. A sand rootzone amended with ceramic conditioner and some natural soil, or a natural soil rootzone amended with clay soil conditioners can produce an excellent soccer field.

ROOTZONE POROSITY

Pores are the spaces in a rootzone where water and air move and most importantly, where the roots grow. Pores are generally described by their diameter because that relates to their size. Based on their size, we can estimate whether roots will get the proper air and water they need to grow. Soil pores are created by the arrangement of soil particles. Soil made up of particles that are all the same size and shape will have uniform soil pore sizes. For example, a sand soil containing only one size of particles will have one size of pores, and these will fill and empty water all at the same time. A clay soil made up of uniform clay particles will also fill and empty water at the same time, but clay is very different than sand. Pores in clay are very small, and thus can pull and hold onto water much stronger than sand.

Rule One:
The smaller the pore.
The stronger it holds water.

Clay can hold water so strongly that a grass root cannot absorb it. Sand holds water so weakly that it loses its water to gravity before a grass plant has a chance to absorb very much of it. There are very few soils that are completely uniform, but some come close. Most soils are made up of more than one particle size, and this creates soil pores of different sizes.

How do you determine the porosity of your soil?

It can be measured, but an expert will be needed. It is very important to know, and worth the money. Listed below are some general characteristics of soils with different textures. Note the approximate type of soil you have at your site (don't worry about the soil color) and review the general properties of the soil:

SOIL TYPE	CHARACTERISTICS
Clay	Cracks when dry/slick when wet
Silt or Loam	Commonly referred to as Topsoil
Sand	Fast drainage, little water retention
Silt/Clay	Looks like topsoil/cracks when dry
Sand/Silt	Looks like dirty sand

ROOTZONE DRAINAGE

Drainage is a descriptive term that defines how fast soil both absorbs and releases water. When it rains or you irrigate, the first thing that happens is the water is absorbed into the upper surface of the soil (vertical drainage). This starts very quickly, especially if the turf and soil are dry. But soon after it starts, the top inch of soil will be saturated and absorption will slow down.

The texture and porosity of soil determines how fast water will be absorbed by a dry soil. Soil that is saturated will absorb water only as fast as it is lost from the bottom of the rootzone. This is called horizontal drainage. Once all the soil pores in a rootzone are filled with water (saturation), the rate at which water will

drain horizontally is a function of how fast the water can be removed from the rootzone (drainage system capacity). To speed up drainage, perforated pipes are usually buried under a rootzone (the drainage system). As you can now understand, there is a lot more to the drainage of a rootzone than just these drainage pipes.

Drainage is very important for both the growth of turf and the game of soccer. The grass needs a rootzone that drains well, so it can receive fresh water and air. For soccer, water management is very important, because in certain climates the ground could be frozen during the time of play. A well-aerated field will still drain water when partially frozen. A soil that does not drain well will be either too wet (water-logged) or too dry. Either condition will produce poor grass and a poor soccer field.

When soil is too wet, it will become slippery and move under force. For the game of soccer, drainage and soil particle-to-particle stability (cohesion) are very important for a good quality field that will last. A sand rootzone that absorbs and drains water very quickly can take several inches of water in less than a few minutes, but this type of rootzone offers turf little protection from the damaging forces delivered by the game of soccer. This is also the case for football fields, but to a greater degree than soccer fields. Soccer, while damaging to turf, is less destructive than football. As such, a soccer field can be designed with a greater drainage rate than a football field, and it will still have sufficient stabilization for the game of soccer. A sand rootzone can be somewhat stabilized by the addition of water, but it will never be stable enough, with just water and roots, for the game of soccer. A rootzone can be built from many different soils: each will drain at a different rate and offer different degrees of particle stabilization and protection for the turf. The following example will help you understand the complexity of soccer rootzones and how to design one.

A rootzone made up of medium-textured sand can drain water at a rate of 30 inches or more per hour. However, this rate of drainage is very seldom attained on a soccer field for a simple reason: the grass resists or slows down the rate of vertical drainage. A dense turf growing on a sand rootzone slows the drainage rate to 2 inches per hour.

Rule Two:
The rootzone is very important for ensuring a good drainage system, but the turf is also important in determining the final rate of drainage.

The best type of rootzone is one that drains water quickly, but holds enough for the grass to grow properly. For this reason, a soccer field rootzone should be designed to balance the horizontal drainage rate and particle stability. Mineral soils containing mostly silt and sand with just a small fraction of clay are the best. Soil composed of these materials that drains 5-10 inches of water per hour works well. Adding a ceramic conditioner to these soils can improve the porosity, resulting in a better rootzone.

Are there other methods to stabilize a rootzone for a sports field?

Yes, there are several different products reported to stabilize natural turf sports

fields. A number of these are synthetic fibers, which come in various shapes and have a range of properties. Such fibers can help to stabilize rootzone materials and the turf, by creating a three-dimensional matrix for the grass roots to adhere to. As the roots adhere, the fibers will then contain or stabilize the soil particles. Such materials, while useful, cannot replace the use of structural amendments and topdressing. The fibers will not improve rootzone drainage or reduce nutrient requirements. In addition, there is concern that if these very strong fibers migrate to the top of the playing surface, they could interfere with a player's footing.

ROOTZONE CHEMICAL REACTION

Roots need air, water and nutrients to grow. The soil structure provides support for roots to get air and water. The nutrients that the grass uses must be available in the water that is contained in the pores. Grass nutrients are not always in soil water, but are mostly found bound to the surface of soil particles or organic material. Soil particles, especially clay, have charged surfaces, and it is to these surfaces that plant nutrients bind.

Organic matter (dead plant material) is a nutrient source with charged surfaces to which nutrients bind. Therefore, a mixture of both clay and organic matter in a rootzone is desirable, but too much of either of these causes problems for both grass growth and drainage. Clays do not allow for good drainage if they comprise more than 10% of the rootzone material, and organic matter can clog soil pores and greatly inhibit soil drainage if it makes up more than 5% of the rootzone material. You can add or amend soils with materials that will increase the surface charge for nutrient holding and not inhibit drainage. One of these materials is a ceramic soil amendment, (like Pro's Choice Turf soil conditioner.)

Rule Three:
Thoroughly incorporate clay soil amendments into dry soil for good root growth.

CERAMIC CONDITIONERS: ENHANCING YOUR GRASS ROOTZONES

A rootzone is the soil in which grass roots grow. Generally, it should range from 8-12 inches under the turf. For a rootzone to support good root growth, it must be porous enough to allow water and oxygen to move through it. By using a clay soil amendment, you can improve your rootzone's porosity. In porous soil, the roots absorb water and oxygen, thus allowing them to grow. As the roots grow, the top of the turf (the leaves) will also grow. The better the root growth, the better the turf looks and plays. In addition, good root growth means that many roots will grow deeply into the rootzone, and this means stability and good footing for soccer players. The second important feature of clay soil amendments is its ability to hold water and nutrients. Each particle of ceramic conditioner contains thousands of micro-pores and has a huge surface area, which holds water and retains nutrients for root growth.

COMMON APPLICATION QUESTIONS

Will ceramic conditioners improve all soils?

The answer is yes, but some soils benefit

more than others. Clay soils and sand soils will probably benefit the most, because they have either too many small pores (clay) or too many large pores (sand). Clay soil conditioners can increase both large pore volume in clay and small pore volume in sand. The size of a ceramic conditioners' particles ranges from the size of sand particles to several times larger than sand particles. However, clay soil amendment particles have many small pores on the inside, which can store water and nutrients. When used properly, these particles will integrate with natural soil particles and improve any soil.

How are these soil amendments used most effectively?

It is recommended that you always incorporate or till-in ceramic conditioners when using them to improve the rootzone before you plant grass. This can be done with a roto-tiller or soil blender for big operations, or you can mix it into the soil using hand tools for small areas. It is important that the ceramic conditioner be thoroughly and uniformly mixed into the soil. This will ensure that you get the maximum benefit.

Rule Four:
Incorporate the ceramic conditioner as deep as you expect roots to grow in your soil.

How deep should these soil amendments be incorporated into the soil?

The maximum benefit will be realized in the top 3 inches of the soil: the depth at which most of the grass roots will be found. However, it is better to incorporate the ceramic conditioners to a depth of 6 inches, because it increases both the stability of the rootzone material and the adhesion of the turf to the ground. Below 6 inches, the benefits from adding any soil conditioner will be small, unless the soil below this depth is heavy clay. Incorporating clay soil amendments into this soil can improve the horizontal drainage.

3" Minimum suggested depth
6" Maximizes benefits
6"-12" Helpful in sand soils

What clay particle size works best for your rootzone?

There are three standard sizes of ceramic conditioners in the industry 24/48, 8/16 and 5/30. The 24/48 particle size of ceramic conditioner is recommended for sand rootzones, such as those found on golf greens and tees, baseball fields, and some soccer fields. There are also fine-textured products, but these are generally recommended for rapid surface water (puddle) control. Pro's Choice offers two standard sizes that would be appropriate for mineral soils containing silt, sand and some clay: Pro's Choice Select (8/16) and Pro's Choice Turf (5/30). The following is a general recommendation for using these Pro's Choice products:

Natural Soil *(high clay content)*
5/30 Pro's Choice® Red Infield Conditioner

Natural Topsoil
8/16 Pro's Choice® Select Topdressing

Sand Soil
24/48 Pro's Choice® Ceramic Clay Granules

Why are various sizes of thermally optimized clay recommended for different soil types?

In natural soils, there is a wide range of soil particle sizes. The best way to determine the exact particle size analysis is to have your field soil evaluated, thus ensuring you can blend the best size and amount of conditioner into your soccer rootzone.

As a general guide, soils can be divided into those that contain a large amount of clay (commonly called topsoil) and those that are sand. Research has shown that for soils with more than 25% clay, a conditioner with a 5/30 particle size is the best choice. Its larger particles will both create large pores for root growth and stay "suspended" in the so that layers are not formed.

A topsoil, which has less clay but more silt and sand than most poor soils, will benefit from the stable pores that a ceramic conditioner will add. A topsoil is generally a heterogeneous soil, having a lot of different soil particle sizes. For this reason, a conditioner with an 8/16 size particle is recommended. The Pro's Choice Select conditioner will stay blended and add permanent pores to your topsoil more effectively than the 8/16 material. Soils with greater than 80% sand are not recommended for soccer fields unless they are blended with about 20% mineral soil.

As alluded to above, sand particles create large pores which do not retain sufficient water, and they will not readily stabilize the rootzone. Further more, sand is somewhat fluid, moving under force of soccer players. However, using a combination of mineral soil and ceramic conditioner, you can obtain a rootzone that will both drain well and stabilize the turf. For this type of application, you want to match the clay soil amendment with the sand particle sizes (Pro's Choice Ceramic).

Rule Five:
Add no more soil conditioner than is recommended!

How much Pro's Choice ceramic conditioner should be blended into the soil?

To achieve the maximum benefits it is critical to add the proper amount of soil conditioner. Remember, each natural soil will be different, so being exact is not possible. The recommendations given below are based on extensive studies at the University of Illinois and feedback from turf managers. They are given as a range. It is extremely important that you do not add too much. Adding too much soil conditioner can result in poor turf performance and even dead grass! Work with your Pro's Choice professional to determine the most effective amount of conditioner to use.

RECOMMENDED AMENDMENT INCLUSION FOR DIFFERENT TYPES OF SOILS

Natural Soils (Clay & Topsoil)

Incorporation Depth	No. of Bags/1000 sq. ft.*
3 inches	30-50
6 inches	60-100

Sand Soils

Incorporation Depth	No. of Bags/1000 sq. ft.*
3 inches	40-60
6 inches**	80-120

** Calculation based on 50 lb. Bags*

*** For soccer field construction, it is recommended that you use a minimum of 6-inch depth of incorporation.*

What is the best method for adding soil conditioner to the soil?

The best method to incorporate any soil amendment is to blend the material off-site. Scoop up the soil from your field, use a blender to combine the two materials, and then move the amended soil back to the field. This is very expensive and not very practical for most soccer fields.

An alternative is to gradually blend the soil conditioner into your field. This will require that the field be stripped of grass (bare soil). The dryer the soil the better. Uniformly distribute the recommended amount of thermally optimized clay conditioner onto the soil surface. This can be done with shovels and rakes, but a machine will distribute the material faster and more uniformly. Once the soil conditioner is spread out, till the soil to half of the total incorporation depth. Then till the soil to the final incorporation depth. For example, if you are incorporating Pro's Choice Turf to a final depth of 6 inches, run the tiller to a depth of 3 inches, then go over the field a second time with the tiller depth set at 6 inches. This helps blend the soil conditioner into the soil gradually and will improve distribution.

Can I add less than the recommended amount of soil conditioner?

Yes, you can add as little as you want or can afford, but the benefits will also be reduced. It is important to realize that incorporating the soil conditioner before you establish your turf is the best and cheapest method. Adding soil conditioner after the turf is established (topdressing) is more difficult and the benefits for root growth will be slow to develop. The recommended depths of incorporation are listed at 3 and 6 inches, but you can also modify this to whatever works best for you.

Is it better to incorporate soil conditioners to a depth of 6 inches, as opposed to 3 inches, even if you can't apply the maximum recommended amount?

Yes, always try to establish a good 6 inch rootzone. In natural soils, add as much as you can up to the maximum amount to a depth of 6 inches. In sand, you can reduce the amount (for any depth), but it is recommended that you add at least 1/3 of the maximum amount suggested.

FOUR STEPS TO BUILDING BETTER ROOTZONE FOR YOUR SOCCER FIELD

To achieve the maximum benefits from clay soil conditioners when building a soccer field, follow these steps:

1. Have the rootzone soil on your soccer field analyzed for texture, drainage and chemistry.
2. Review your soil analysis with a Pro's Choice soil expert.
3. Have a Pro's Choice soil expert calculate how to improve your soil using Pro's Choice Red, Pro's Choice Select or Pro's Choice Ceramic.
4. Blend in the Pro's Choice product using these guidelines and you are ready to establish your field.

CERAMIC CONDITIONERS: TOPDRESSING YOUR SOCCER FIELD

What is topdressing?

Topdressing is a general term used in the turf industry to describe the application of a structural material to the top layer of turf. A structural material is one that does not break down rapidly in water. Examples of structural materials are soil conditioners, sand and soil. Examples of non-structural materials that are also

applied to the top of turf are fertilizers and pesticides.

TOPDRESSINGS BENEFIT YOUR FIELD SEVERAL WAYS:

I. Improve the quality of the turf surface.

Topdressing fills the voids or uneven spots in a field, thus making it more uniform. Soccer players change direction a lot during the course of a game, and proper foot stabilization and release from the turf surface are very important.

II. Protect the turf crowns.

The crown of a turf plant is the most important part of the plant. During a soccer game, cleated shoes tear and stomp turf crowns, which can weaken or kill the crowns. When the crown is damaged, the turf will thin and then die. This is obvious when you look at the center of a soccer field after several games. Topdressing will surround the crowns and give them some protection from damage. It can also protect any young ryegrass seedlings.

III. Improve the porosity of the soil and reduce the organic thatch.

Turf requires lots of soil pores for growth. These pores should also be big enough to allow roots, water and air movement.

As turf grows, it forms a lot of organic matter that supports the crowns and the upper part of the roots. The dead organic matter, i.e., thatch, is beneficial for sports fields if it is about 5/8 inch thick: Thinner than that and the turf will be hard for the athlete's feet; much thicker than that and it will start to impede water and fertilizer movement through the turf rootzone, resulting in wet, shallow roots. The rate at which thatch forms depends on both the variety of grass used and the turf growing speed. Topdressing the turf will incorporate structural materials into the thatch. This will improve the rate of thatch degradation and maintain better soil porosity.

Do I need to use topdressing?

All soccer fields can be improved by topdressing. In particular, the goal area and the center oval area, where most of the action takes place on a soccer field, will benefit. These areas will benefit in two ways: the turf will be protected and last longer, and renovation (overseeding or sodding) will be more effective.

Are ceramic conditioners the best material to use when topdressing?

Ceramic conditioners are natural soil materials and, as such, will integrate with other soils very well. While clay soil amendments are very good, they should only be used when diluted with other natural soil. There are a number of other soil amendments in the marketplace, and some of them also can be effective, but few of them will equal the performance of soil conditioners. For example, diatomaceous earths are extruded calcium-based materials produced from sea animals. They are fragile and tend to crumble over time. There are also some artificial materials that are marketed as

Rule Six:
Always dilute ceramic conditioners, or any other absorbent, with a natural material when using it as topdressing.

soil amendments, but caution should be used when considering their use. One such material is ground-up rubber known as crumb rubber. This material is resilient and could add some cushioning to the athlete's feet, but it will not integrate well with natural soil materials, and it absorbs and radiates a lot of heat, but not water.

TOPDRESSING APPLICATION RATE

Topdressing a soccer field will benefit your turf and produce a great playing surface. Topdressing with ceramic conditioners or any other highly absorbing structural material can lead to problems if you use them improperly.

When you topdress with a material containing more than 40% ceramic soil conditioner, you risk stressing your turf. However, if you follow the recommended rate, you will safely achieve an excellent turf surface. The maximum limit is 40% Pro's Choice Turf, but the generally recommended rate is 30%. The rest of the material in the topdressing should be the same material that the turf is growing in or a coarser material like sand. For example, if your field was built on the existing soil, then add 30% or less ceramic conditioner to the same soil. The reason for this is to maintain a good transition between your rootzone soil and the topdressing material. Over time, as you add more and more topdressing material, your rootzone will conduct water and air better, thus promoting root growth and allowing thatch to degrade rapidly. There are many sports fields and golf greens with natural soil rootzones that have been successfully topdressed with sand or sand amended with a good ceramic soil conditioner.

Rule Seven:
Never topdress a turf area with structural material containing more than 40% ceramic clay soil conditioner

Rule Eight:
Never add more than a 1/8 inch layer of any structural topdressing per single application.

How much topdressing should be applied?
For a single application of topdressing, add enough to achieve a layer 1/8th inch thick or less. For example, for a typical soccer field (160 ft x 300 ft), you would apply 8-10 tons of topdressing amended with a good conditioner. You can always use less topdressing, so remember: topdressing works best if it is applied multiple times over a period of years.

How often should a field be topdressed?
This cannot be answered exactly because it depends on many factors, including how much play the field gets, how fast the grass is growing, what type of grass you have, the thickness of the thatch layer, and other factors. In general, an aggressive topdressing program would include applications once per month while the grass is growing. Further more, a topdressing program will achieve the greatest benefits when done for the life of the field. However, even one application per season is going to give you some benefit.

Rule Nine:
Topdressing benefits will be realized when you add small amounts over several years.

REPAIRING SOCCER FIELDS DURING THE SEASON

Soccer is more destructive on grass than baseball. During a typical season, your turf can be worn thin or even killed. Renovation or repair of soccer fields during the season is a challenge for most turf managers. Remember that an aggressive, dense turf that has been topdressed is the best way to start the season. After that, you should continue your topdressing program, but you will still have to consider repairs. Ceramic soil conditioners can help you achieve a better level of success in your repair program. If you use ryegrass to fill in thin areas in the center of the field and in front of the goals, be sure to topdress after you seed. This will give the seeds and the new seedlings a better chance of germination and survival. If your turf is beyond repair and you need to use sod, then make sure you have your rootzone amended with ceramic soil conditioner (see above) before you install the sod. This will improve the rate and extent of sod rooting. Also, a soil conditioner in your rootzone allows you to "stick" the new sod to the soil without damaging the crowns. As always, when installing sod, wet your soil first. This will both solidify the soil and allow excellent sod contact with the rootzone material.

RENOVATING A FIELD

Can a soil conditioner improve sod installation?

A soil amended with ceramic conditioners will have a better rootzone and, as such, will allow sod to quickly establish new roots. In addition, a natural soil amended with ceramic conditioners will effectively adhere or "stick" to new sod, securing the grass for immediate play. Using big roll sod, the goal areas of a soccer field can be re-sodded and played on instantly, if the rootzone is properly constructed. It is strongly recommended that the rootzone of the goal areas be amended with clay soil amendments, as they are the most important and most damaged areas of soccer fields. If you have a good rootzone in front of the goals, then you can quickly cut out damaged sod and replace it with new sod, no matter how wet the soil is. A soil amended with ceramic conditioner will also improve overseeding at any time of the year, including during the season. The amended soil can be readily cultivated or core-aerified to allow the new seed to make good soil contact. Water and nutrients can be applied to clay-amended soil for the seed, without interfering with play.

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