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“Give Your Infield A Passing Grade” by Jim Hermann

If the first task of the morning is to pull the cover off your Infield, don't read this article. If your crew does a routine to the tune of YMCA as they drag the infield in the fifth inning, don't read this article.

This article is directed to the maintenance personnel who maintain fields with limited budgets.

It is increasingly upsetting to hear people say “if you want your infield playable after a rain you have to buy this product. If you have standing water you need this product.” Buy this product! Buy that product! Buy another product!

Most soil conditioners are recommended to condition the playing surface of an already well-maintained field. If you depend on internal drainage or soil conditioners to eliminate ponding on your infield, you can also depend on rainouts and upset coaches. An infield mix with adequate clay (or particle size distribution) for stability will not allow for adequate internal drainage under normal environmental conditions.

The most economical step you can take toward maintaining your infield in a safe playable condition is to prevent water from ponding. There is no product available that will prevent water from ponding on your infield. You have to depend on surface drainage to prevent standing water. Probably the only rule in athletic field maintenance that has no exceptions is this; **WATER**

RUNS DOWN HILL. If you maintain adequate slope to the perimeters of your infield skin, excess water will run off.

When you resolve yourself to ridding your field of chronic water problems you have to accept the fact that it won't happen over night. There is no quick fix. There is no magical product. Every field is different. Every field has its own individual problems. It may take a number of attempts to finally get a passing grade (get it, grade?)

The very first task you should accomplish when beginning the work on any infield is to document the elevations of different areas of the infield, using a transit level or some other means. Try to get a picture of where the water is or is not currently moving and where it can move to if adjustments are made.

A transit is nothing more than a fancy level that provides the relative height of different locations within a given area. Individually these elevations mean absolutely nothing, but when they are plotted on a drawing they can give you an invaluable picture of the high and low areas (topography) of your infield.

Once the transit is properly positioned and leveled, readings are taken by sighting a leveling rod, which is positioned at different locations on the field. The leveling rod is a long measuring stick marked off in feet and inches. The higher the reading on the leveling rod, the lower the ground level is. Example: If you take a reading of 4' 4" at

pitchers mound and a reading of 5' at home plate, the pitchers mound is 8" higher than home plate.

The first reading you should take is a benchmark. This is a reading, typically taken off the field that won't change over time and can be used later as a reference point. You have to remember that each time you reposition your transit the readings you take will be different. The benchmark allows you to relate current readings to your prerecorded readings. Example: Today your benchmark reads 4'. You take all the readings on your infield. A week from now you come back to the field to continue your project and with the transit set in another location, that **same** benchmark reads 4' 6". All you have to do is add 6" to all your existing readings rather than reshooting the entire site.

Take readings at each of the base inserts, home plate, and the pitchers mound. Next take readings every 10 or 15 ft around the outside perimeters of the infield on the turf just beyond any obvious lip that will be removed during the renovation process. In addition to the readings you take just beyond the lip, take another row of readings 20 feet or so into the turf area on all sides.

These readings, when compared to the readings taken just beyond the lip will allow you to determine if water has the potential to run onto the infield or if it has some means of avoiding the infield. When the outside lip is removed you don't want problems you didn't have prior to your renovation. This can be extremely embarrassing. (Not that I would know.)

If it is a turf infield, also take readings on the inside turf perimeters of the baseline. If you have a skinned infield, take readings 20' or so off of the pitchers mound. Take these readings directly across from your outer turf readings so that slope can be determined from inside to outside. In addition, take readings of any obvious depressions on the infield that are holding or could potentially hold water.

In order to keep water from ponding on your infield skin you should have a minimum of 1% slope to the turf perimeter of the infield skin area. A 1.25% slope is equivalent to 1/8" drop or rise per foot. For ease of calculations use 1/8" (.125") per foot when figuring slope.

If you have a distance of 50' from the pitchers mound to the outfield radius, a 1.25% slope would make the outfield radius 6.25" lower than the ground level at the mound area prior to construction of your pitchers mound. ($50 \times .125 (1/8") = 6.25.$) If your transit reading is 5' at the pitchers mound, your reading at the outfield radius would be 5' 6 1/4"

When grading a turf infield, if you don't have adequate slope from the infield to the outfield, it may become necessary to slightly crown the skinned area to allow for water movement in two directions.

Care should always be taken to position base inserts at the proper elevation. If your infield has adequate slope toward the outfield, base inserts should be positioned lower than the infield turf. On a little league field with a 9' radius from the base to the infield turf, the base would be positioned approximately an inch lower than the infield turf ($1/8" \text{ per foot} \times 9' = 1 1/8"$) in order to maintain adequate slope.

If you don't have adequate slope to the outfield turf at 2nd base or adequate slope to the foul territory turf at 1st and 3rd base, raising the base insert may give you enough elevation to allow for water movement. Base inserts should never be positioned level with the infield turf. This will inevitably cause standing water problems in front of the base.

On a turf infield, if your base paths don't slope to the foul side, it may be necessary to slightly crown the base paths to minimize the potential for standing water. On a skinned infield you may have to add material to the inner areas of the infield to create a crown to the entire infield.

Home plate should have a minimum of 1/8" per foot slope to the turf.

It is sometimes possible to adjust the elevations of the turf perimeters by leaving a portion of the lip to add elevation to a given area. Leaving a portion of the lip can aid in preventing water from running onto the infield in certain situations. This should only be done if the end product results in a safe playing situation. An abrupt change in elevation caused by a lip is one of the most potentially dangerous conditions of a poorly maintained infield.

Once your field is graded properly, make a drawing of the infield and include all the elevations you have taken along with the location and elevation of your benchmark. This drawing is known as an "as built" design and should be filed away for future reference.

Tilling or Solid Tine Aerification


In the early spring it can be noticed that the top inch or two of mix is almost entirely sand. The winter freeze and thaw along with the rainfall and wind throughout the previous season have caused much of the silt and clay in the upper portion of your mix to wash or blow away. I believe a portion of it translocates deeper into the soil profile. This theory has however met with some resistance.

Compaction of the Infield skin is another problem that creates a large impact (literally) on baseball infields. The cause of compaction is obvious. The results of compaction are many. *Cont.*

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Did You Know? Nightcrawlers were brought to the United States from Europe by settlers. They perform an important function in mixing organic matter with mineral matter. In a sense they are soil Factories. (Soil Science Simplified, 4th ed, 2001)

A beneficial practice is to till the infield mix a couple of times during the season to relieve compaction and reincorporate existing silt and clay into the upper portions of the soil profile. This procedure alone, when done in conjunction with proper grooming technique, can provide many benefits.

Compaction relief is a major benefit of tilling or aerating the mix. A second benefit gained by compaction relief is an increase in moisture holding capacity. A hard infield does not allow moisture to permeate the mix and be held in the pore space between the infield particles. Since the moisture holding capacity of unmodified infield mix is largely controlled by the amount of sand, silt and clay, (particle size distribution) tilling and reblending the mix aids in this area.

Much of the initial benefit derived from the incorporation of soil conditioners is partially the result of the tilling process and not solely the result of the amendment itself as is generally thought.

Care should be taken during the tilling process so as not to bring up rocks or native soil from below the infield mix. A soil probe can be used to determine the depth of the infield mix in various locations to help insure this doesn't happen.

A solid tine aerifier with vibrating tines sometimes referred to, as an aeravator would be considered an option to tilling the infield mix. This piece of equipment is already a part of many equipment arsenals due to its dual-purpose usage potential. (Turf and Infields)

It should be mentioned that the moisture holding capacity of an infield mix can be a double-edged sword. The benefits of moisture holding capacity are derived from very specific amounts of water strategically applied over time to maintain moisture and compensate for evaporation. The flip side is a waterlogged mix that takes time to become playable after a rain. Covering the entire infield between games greatly increases the benefits of modifying an infield soil. Desired moisture does not evaporate as readily and excess moisture caused by rain is minimized.

After tilling or aerifying the infield mix, it should be regraded, smoothed, rolled with a roller and then groomed to return it to the proper grade and consistency. A small one-ton roller is suggested. If the roller is equipped with vibration, care should be taken not to run the vibration. This creates too much compaction. If this type roller is not available, a small water filled roller is generally adequate to firm the infield mix.

After the infield mix is rolled, the top quarter inch can be worked up with a nail drag or other means to provide a firm yet cushioned playing surface. If this procedure is completed in the spring there is generally ample moisture available. If you decide to till your infield in the summer between seasons you should wait until there has been adequate rain fall, or water the infield prior to tilling.

Once you have drawn an "as built design" for water management, removed any lip, reset the base inserts as needed, tilled, graded and groomed the infield to eliminate the potential for ponding water, you are ready to play ball.

The subject of infield grading along with grooming, lip removal and base installation will be

addressed at our April 3rd Spring Field Day at Plainsboro Twp. Bring your field specific questions with you, as there will be time allocated for questions and answers.

Maintenance; Extra Credit for a Passing Grade

In an attempt to prioritize different procedures and products available to the field manager, maintenance is divided into three levels of intensity.

Level I:

You have recently acquired the responsibility for the maintenance of your field.

Rule 1: Take the rakes away from the volunteers unless they are interested in learning proper maintenance technique.

Rule 2: Put any soil amendments or drying agents under lock and key. These products are abused more than any other products in the industry.

Rule 3: Give one person ownership of the field. Give one person the responsibility to cancel games if conditions warrant. Give one person responsibility for implementing the maintenance strategy.

- When raking baselines and perimeters always rake parallel to the grass line. Raking the baselines back and forth perpendicular to the turf creates a belly in the baseline. This belly is a potential for ponding water and the improper raking technique is a portion of the cause for an inside and outside lip at the turf perimeter. When raking stay a minimum of 6" away from all turf perimeters. This will further minimize the potential for lip buildup at the turf perimeter. *Cont.*

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- Always rake the first and third baselines and the base areas by hand, taking care to fill any depressions and lower any high spots created during play. Be careful to maintain the proper base elevations. Infield mix tends to accumulate under certain types of bases. This accumulation can cause the base to lift and interfere with surface drainage.
- A specific area of concern is the area around each base. Without exception, daily play creates a depression at each base. These depressions should be filled and smoothed by hand raking on a daily basis. If left unchecked, these depressions become deeper and more difficult to eliminate. They are a candidate for ponding water after each rain. The ability to effectively maintain these areas is critical in a successful program.
- When raking or dragging the infield, vary your start and stop point along with altering your drag pattern so as not to repeatedly add or take mix away from the same areas.
- **Never** pull an infield drag into the turf.
- **Always** remove any infield mix that has accumulated on the drag, carry the drag off the field.
- Maintain the pitchers mound and home plate areas by hand raking the entire areas. Fill any depressions and cut any high spots that have accumulated.
- Tamp the batter and catcher's boxes. Do the same to the wear area and landing zone in front of the pitcher's rubber to provide a smooth surface.
- If you have access to water, dampening the pitchers mound and home plate area along with covering them between games will improve playing conditions. Covering alone does create condensation under the covers and can provide much needed moisture to the infield mix and minimize evaporation.
- Applying water and covering base areas is another step in improving playability and quality. In most maintenance situations applying water has much more benefit if the area can be covered and the water is allowed to evenly penetrate the infield mix so as to allow for proper moisture during the game.
- Under normal playing schedules the turf perimeters should be broomed, washed or blown off two to three times a week to minimize the buildup of infield mix in the turf and the creation of a lip. This is one of the most important procedures in infield management for both low and high maintenance fields.
- A specific area to be concerned with when maintaining the turf perimeters is the turf adjacent to third base. Infield mix is typically blown out into the turf by base runners rounding third.
- If you line the base lines and batters boxes using a pulverized lining material repeatedly throughout the season you will inevitably acquire a buildup of lining material on the infield. This material should be removed periodically to minimize buildup. Under wet conditions this material turns to gne and can compromise otherwise playable conditions. An accumulation of this material also has a negative effect on the quality of your infield skin.
- After rain, nail drag your infield to decrease the drying time. When the mix is dry to the touch, drag with a mat or hand rake to prepare the surface for play.



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Level II:

Once you have a strict maintenance schedule and are taking good care of the pitchers mound and home plate area, some level of relief in labor intensity along with a marked improvement in quality and playability can be accomplished by modifying these two areas with clay. Modification is generally limited to the wear area and landing zone in front of the pitchers rubber along with the batter and catcher's boxes at home plate. It should be stressed at this time that this procedure is designed to minimize existing maintenance, not eliminate potential maintenance.

Level III:

At this level you have modified the pitcher's mound and home plate areas with clay. You cover the bases, home plate area and pitchers mound between games and apply water to the entire infield prior to games. You have no standing water and are looking to go to the next level of

quality and playability. At this time soil amendments may be indicated. These amendments are very beneficial in moisture management and infield conditioning. If you are watering your infield these soil amendments will minimize the time spent watering and increase the effectiveness of the water you do put down. These benefits are maximized at higher levels of management and severely compromised at lower levels. ;)

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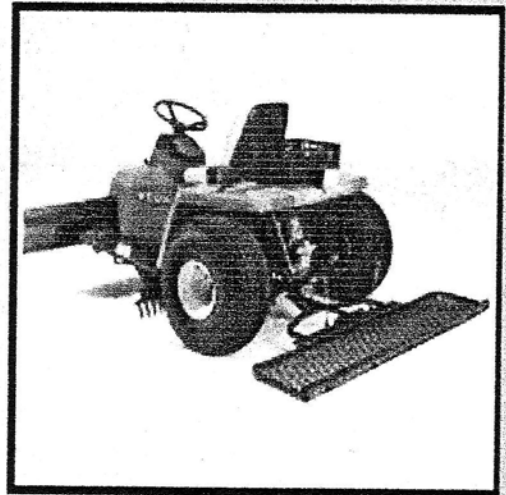
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