

CONSTRUCTION AND MAINTENANCE OF SKINNED SPORTS SURFACES

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Baseball and softball fields that are frequently unplayable are almost always deemed unplayable because the skinned area is too wet and unsafe. This condition is related to poorly designed, constructed and maintained skinned areas.

Managing surface moisture is the most important factor in maintaining skinned surfaces. A sloping surface, sandy soil, an ability to add moisture and soil conditioners are all very important. There are no scientific specifications that can be cited for individual fields. Coaches and players prefer different surfaces; native soils are very different and inconsistent, and sand and commercial soil conditioners are likewise very different. It is more ART than SCIENCE.

The following recommendations and details relate to the successful management of many fields in Kentucky but they are certainly very general and only give an example of methods utilized to establish and maintain skinned areas.

SLOPE - A surface slope of ½% is a MUST and the distance that surface water must travel should be as short as possible. On skinned surfaces, essentially no water passes through the soil profile. There is **no purpose installing underground drain lines**. All excess water must move off the surface by gravity flow.

The skinned surface can slope toward the outfield, however water moving from the skinned surface to grass will cause 'lip' formation (raised surface) at the interface of the grass and skinned surface. Not only does a lip cause erratic ball movement that may endanger a player, but it also entraps excess surface water. Never grade a surface so that water from the grassed outfield or foul lines drains toward the skinned area.

It is best to slope the field so excess water drains from the skinned base lines toward the foul lines, with the highest base line elevation near second base. Normally the highest point on the infield is the pitcher's mound, and the field slopes away from the mound almost 1/2% in all directions. But make sure the skinned surface remains at the same elevation as the grassed area so that no water can collect at the interface between the grassed area and skinned surface. Then, future maintenance MUST prevent building a lip between the skinned area and grass area.

ADDING SAND - If the surface soil is heavier than a sandy loam, you should add a mortar sand until you get nearly a 60:20:20 ratio of sand, silt and clay respectively. Make sure you do not use a sand with gravel (particles larger than 1/8 inch). For heavy clay soils, those that are sticky when wet and very hard when dry, add about 2 inches of mortar sand to the surface and till it into the surface three inches of soil with a rototiller or rotovator. (This may require 35 tons or more of mortar sand, depending upon the size of the skinned areas you are amending). Then roll or pulverize to firm the surface, soak the surface and allow to settle and dry. If the surface is still too sticky when wet, then add more sand and till again. If the soil is too sandy (the surface is unstable), then till the surface an inch or two deeper, thus diluting the sand.

You can judge the proper consistency of the surface by wetting a handful of the soil mix in a cup, making a paste or mud ball. Then attempt to squeeze the wet material between the thumb and forefinger. If the soil is too heavy (sticky), then you can squeeze out a ribbon of soil 1/4 to one inch long and a dense mud ball can be formed when you roll the material between your fingers. If it is too sandy, you will not be able to hold the material together at all. The **proper consistency** is one in which the wet mix feels very gritty, will not ribbon when squeezed, and it will form a very delicate ball when rolled between your fingers.

SKINNED CONSTRUCTION - If you plan to add, for example, several inches of sand and/or conditioner to mix within the surface, then make sure you allow for this increase in elevation. You **DO NOT** want this added material to affect the 1/2% slope, and certainly you do not want the skinned area at a higher elevation than the infield.

SURFACE PREPARATION - With a surface 2 or 3 inches of the sandy loam type soil texture at the surface, you can easily prepare the skinned area with a nail drag, i.e. the nail drag will penetrate sufficiently to soften the surface without making it excessively loose. This texture is important whether or not you add conditioners and moisture for play. If the soil is too heavy (higher silt and clay content), it will dry out very slowly after a rain, it will be sticky and slippery when wet, very dusty when dry and it will be very, very hard when dry.

MOISTURE AS A CONDITIONER - For optimum playing conditions, especially during hot and windy weather, moisture must frequently be added. Properly installed irrigation quick-couplers should be placed near or within every field. A simple rose type nozzle on the end of a hose can be very useful. Added moisture reduces dust, softens the surface, and enhances the penetration of a nail drag or similar tool.

SOIL CONDITIONERS - Soil conditioners are very important in managing moisture. Conditioners containing calcined clay, when properly mixed within the top inch or two of the surface, will help to soak up excess water after a rain, but it will also retain within the porous granule sufficient moisture to help maintain the 'right' surface moisture for a longer period of time. Unfortunately it requires a lot of conditioner to achieve this and it may be expensive. A one inch depth of calcined clay would amount to at least two or three tons of conditioner that will likely be required for regulation base paths or for softball infields. After about a 1 inch layer of the conditioner is placed evenly over the surface, it should be tilled into the top 3 inches of the sandy loam soil. This results in a three or four inch of 'cushion' over a very firm base of non-amended soil. This amended surface has the feel of a cork board when properly amended. An additional 1/4" of conditioner placed on the surface adds additional cushion and color to the surface.

SURFACE MAINTENANCE - Skinned areas requires constant attention throughout the playing season and beyond. Again, moisture must be controlled.

- A good mix of the soil/sand/conditioner should be used to fill depressions. You can use certain drying agents made from organic products or calcined clay to soak up water and prepare depressions for play, but generally such absorptive organic materials should be removed after each use. If not removed, the soil will become gummy and compacted, and the problem increases. It is usually better to use calcined clay products as drying agents, although they are not nearly so absorptive.

- If depressions affect the surface drainage, then a major amount of soil mix may have to be added after the season ends. For maximum leveling and grading, the soil may need tilling to a two inch depth, with conditioner added as described above. A bolt drag, instead of a nail drag, can often be used to more aggressively loosen and mix the surface.

LIP MAINTENANCE - Regardless of how hard you try, some lip formation may happen. However to help prevent lip formation, always keep the nail drag, bolt drag or mat drag at least 12 inches from the grass edge and work toward the center of the skinned area. Continuously change the dragging pattern in order to maintain the desired slope. You must work the skinned/grass interface area by hand. An inverted leaf rake is an excellent tool.

LIP REMOVAL - Although very time consuming, the lip may best be removed by using a mechanical sod cutter to cut a strip of sod about three feet wide along the arc of the baseline. Remove the sod or lay it back for future use; then remove the excess soil. After the sod is removed the sod cutter can also be used to cut/loosen a specified depth of the excess, compacted soil so it can be easily shoveled away. After the excess soil is removed, the sod cutter can also be used to loosen the soil surface to improve rooting of the replaced sod. A couple of months may be needed for the replaced sod to sufficiently root down.

- After every game, blow or sweep lips to remove the loose infield mix that the players have kicked or tracked into the grass area.
- The grass area will likely need edging once or twice per season, but it is difficult to do unless you have several days between games. Before edging, you can use a high-pressure water hose to force loose surface material back toward the skinned area.