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High Traffic Area Pads for Horses

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Suburban and rural horse farms can suffer from problems created by mud in areas of concentrated horse traffic. Because of the frequent trampling of wet ground, mud usually occurs at key locations on the farm—gates, loafing and feeding areas, and watering areas. Once mud appears, it is difficult to remediate, and the problem recurs with each rain. Depending on the enterprise, cost-share programs may be available that can offset the expense of installing high traffic pads.

Excessively muddy conditions impact the health and well being of horses by creating a soft surface that makes walking and standing difficult. Extremely muddy areas may increase shoe loss for shod horses. Mud can harbor pests such as flies and mosquitoes as well as pathogens that may cause infection.

Muddy areas can be dangerous and expensive for the horse owner as well. Such areas can become slippery and increase chances of falls and injuries. When the mud dries, the soil becomes compacted, prohibiting vegetation growth and creating an area with reduced infiltration and increased surface water runoff. Air spaces in the soil are removed, which reduces the insulation value of the soil and can cause water lines near livestock waterers to freeze.

Exposed soil has a negative effect on water quality. The lack of vegetation allows nutrients, sediment, and possibly pathogens to be carried in runoff and discharged to surface water. Concentrations of pollutants may exceed local and national water quality standards.

A solution to the problem of mud is the construction of pads in high traffic areas where horses congregate. A properly constructed pad can provide a sturdy surface for the horses to stand on and can significantly reduce mud in these areas.

Construction

Horse owners should follow the construction guidelines below and illustrated in Figures 1 and 2 to construct a pad that will aid in reducing mud in high traffic areas. The materials suggested below have been found to work best for pad construction and can be obtained from a number of manufacturers and suppliers. Ideally, the pad will be built on a summit rather than a sloping area. If the pad must be constructed on a slope, the area should be leveled to allow runoff to move across as sheet flow to reduce channeling and erosion of the rock pad.

The size of high traffic area pads depends on the activity level and usage. In areas around gates the pad should easily accommodate the horses in the pasture or paddock; a pad used for a feeding area must accommodate the feeder and provide adequate space for all horses to stand entirely on the pad while eating. When making a decision on the size of the pad, remember that nearly everyone who has constructed a pad says they wish they had built it larger.

Excavation

The first step in the construction process is the removal of soil from the affected area. The area should be excavated through the topsoil layer until stiff, stable soils are encountered. Extremely muddy areas may require overexcavation to reach a solid layer. A county soil survey book and web soil survey (http://websoilsurvey.nres.usda.gov/app) are useful for determin-

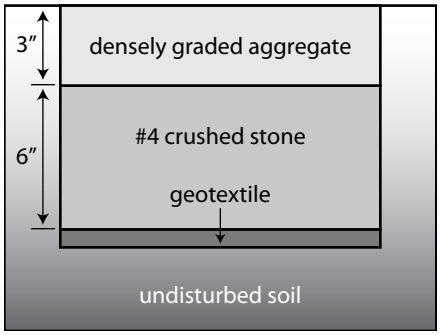

Figure 1. Construction details.

Figure 2. Excavation through the topsoil to stable soil beneath.

ing the depth of top soil and the distance to a subsoil. Before removing the topsoil, excavate a few test holes in the area to determine how deep you will need to go. Typically, about 9 inches of soil must be removed from the area to reach a solid subbase for pad construction. Knowing beforehand how much topsoil will be removed will allow you to determine how much rock will be needed. The excavated soil may be used to landscape other areas on the farm to aid in water flow control. Be aware that excavated soil expands to a greater volume than does compacted soil. Also remember to cut away soil directly under fences to give clean, distinct lines for placing the fabric and rock.

Geotextile Fabrics

Geotextile fabrics are commonly used in construction projects such as roads and highways for subgrade stabilization. The geotextile, which is used to separate the soil from the rock layers, is a key element for successful long-term performance of the traffic pad (Figure 3). If the geotextile is not used, the rock material will sink into the ground over time and mud will seep up through the voids, eventually creating the same problem the pad was built to remedy.

Geotextiles come in two varieties—woven and nonwoven. Many categories and variations of each type exist, and they vary in thickness and strength. Woven geotextile is generally lower in cost and more widely used than nonwoven and is typically more widely available. However, certain geotextiles are better suited for specific applications and soil types. Check with your local or state Natural Resources Conservation Service (NRCS) office for a current list of providers that can supply small quantities of geotextile fabric.

The geotextile should be placed according to the manufacturer's recommendations. Installation typically includes using large nails or stakes to secure the fabric in place during the remainder of the construction. For large areas where multiple pieces of geotextile are used, the fabric is typically overlapped approximately 6 inches.

In areas where there will be significant truck and/or tractor traffic, consider a type of geotextile known as geogrid (Figure 4). Geogrid is a grid made of a cord material coated in plastic polymer. Unlike the fabric materials, the geogrid has a structural component that will create a more stable traffic pad in areas where concentrated heavy loads would damage a pad constructed with geotextile fabric.

Figure 3. Geotextile fabric in place after excavation.

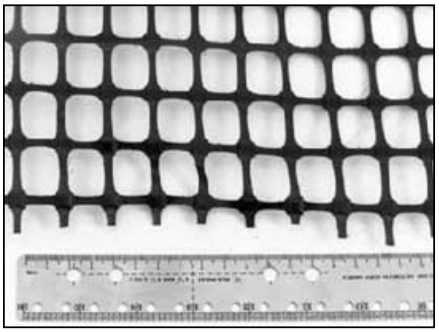

Figure 4. Geogrid for heavy traffic areas.

Crushed Stone Base Layer

The base layer of crushed stone creates space for the storage and drainage of water (Figure 5). The rocks must be large enough to provide adequate pore space for the water but small enough for easy handling and placement. No. 4 or No. 2 crushed limestone rock (Figure 6) can be obtained from local quarries and serves this purpose well. Other crushed stone sizes and combinations can be used, but individual rocks with a size of 1–1½ inches have been found to be optimal for this application. Take special care to avoid damage to the geotextile during placement of the base layer of crushed stone. Typically the base layer is approximately 6 inches thick but can be thicker if the construction area was overexcavated because of extremely soft soils.

Figure 5. Base layer of crushed stone.

Figure 6. No. 4 crushed limestone.

Crushed Stone Surface Layer

A layer of densely graded aggregate (DGA) (Figures 7 and 8) is used as the final surface material on the pad. Crushed stone mixes consisting of smaller gravel mixed with fine or some 57s in DGA can also be used. Sand has been used for the surface layer, but it tends to shift easily and does not provide firm footing for the animals. Once compacted, the DGA creates a roadlike surface that is easier to walk on than loose gravel but has some flexibility, which reduces the risk of hoof injuries. The compacted DGA also allows for easier cleaning of the surface. The surface layer is typically 2–3 inches deep and should be spread evenly and graded with a slight slope to allow the water to flow away from the pad.

Figure 7. Surface layer of crushed stone.

Figure 8. Densely graded aggregate for the surface layer.

Compaction

The final important step of construction is compaction of the surface layer. A small, smooth-drum roller such as those used for small asphalt projects is used to compact the DGA to the desired level and create a durable surface (Figures 9 and 10). Wetting the DGA before rolling will aid in compaction. **Small, walk-behind, vibratory "plate" compactors typically compact only a thin portion of the DGA layer and should not be used.** Remember that the pad is made of compacted rock and not of concrete. Occasional use of a broad spectrum herbicide will be needed to kill unwanted weeds and grasses. Follow manufacturer recommendations regarding herbicide use around livestock, in particular the proper re-entry period.

Figure 9. Compaction with drum roller.

Figure 10. Compacted surface layer.

Costs

Overall, the cost of a high traffic area pad is approximately $0.80/sq ft, opposed to a concrete pad, which would cost about $4.00/sq ft. The cost of the high traffic area pad is broken down in Table 1. Costs can be reduced several ways, most notably by use of a geotextile layer. Using the geotextile reduces by half the depth of rocks needed for stability.

Table 1. Costs for high traffic area pads.

Item	Cost/sq ft
Materials	
Geotextile filter fabric	$0.06
Rock base *(no. 4 crushed limestone)*	$0.25
Densely graded aggregate	$0.14
Total Materials	*$0.45*
Labor/Grading Work	$0.35
TOTAL COST	**$0.80**

References

Turner, L.W. 1996. "Reducing Mud Using Highway-Type Filter Materials," AEU-68, Department of Biosystems and Agricultural Engineer, Cooperative Extension Service, College of Agriculture, University of Kentucky, Lexington.

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