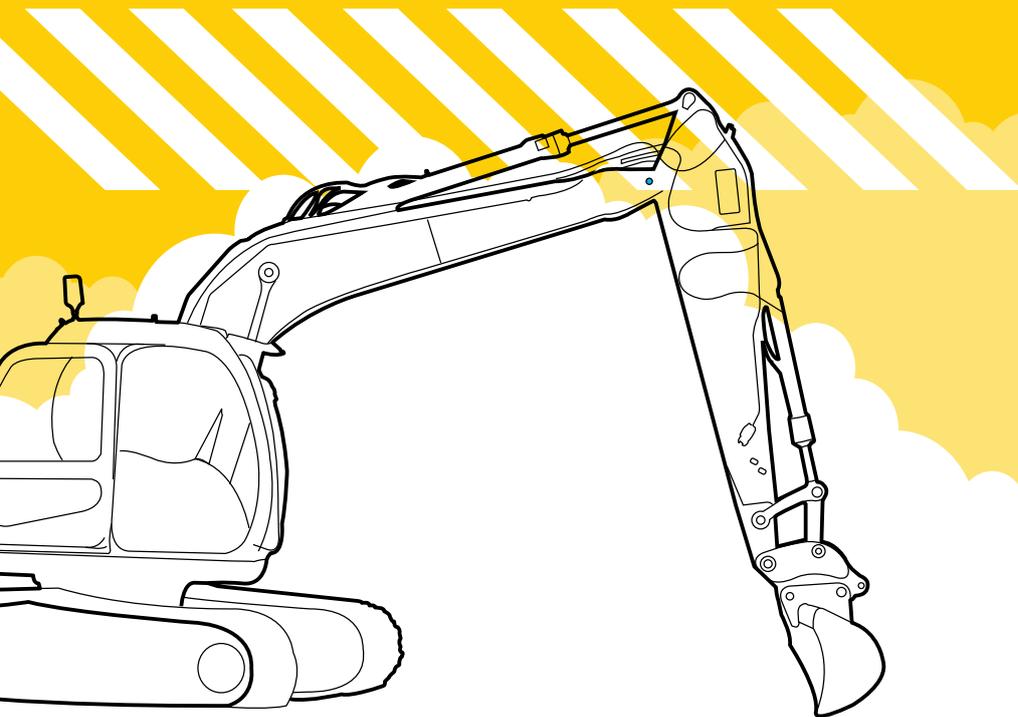


A guide to: horse arena construction



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Introduction

This manual offers guidelines on how to create an arena with a riding surface appropriate to your own intended type of use. Presented in step-by-step format, it outlines key considerations for outdoor arena construction.

We recommend that you also seek the advice of a professional installer prior to commencing construction, as each project will have its own individual requirements which will need to be addressed.

Most would agree that the ideal riding surface is good quality turf. Turf exhibits good drainage qualities (otherwise the grass would not grow on it), it is resilient, it gives a good firm footing, it has a fibrous root structure which binds it together, and it is self regenerating. The average horse already knows all of this, having evolved over millennia on grasslands across the globe, and if an arena surface is poorly constructed, with an inconsistent riding surface, then the horse will automatically

try to aim for the best bits, to the frustration of the rider.

Since turf regeneration is relatively slow, the aim is to emulate its properties, but with more durable materials. Many artificial riding surface materials exist, and this manual attempts to define the fundamental criteria not only for arena construction and maintenance, but also to give some guidance and understanding towards making an informed choice of the riding surface materials available.

The following topics are addressed:

- Site Selection and Preparation
- Base Layer Construction and Membrane
- Riding Surface Materials
- Finishing
- Maintenance
- Costs





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Site Selection
and Preparation





Drainage Channel



Preparing for the drainage layer



Delivery of the drainage layer

Site selection and preparation are of fundamental importance, and the following factors should be considered:

- The site should be as level as possible, and preferably level with, or above adjacent land, in order to facilitate drainage.
- The size of your planned arena will depend on the intended style of use, for example, 40x20m for novice dressage, 60x20m for advanced dressage and a minimum of 25m wide for show jumping.
- Opt for the largest arena that the budget permits, without compromising on raw material or construction quality; this will avoid constantly riding the boards and will utilise the overall surface less intensively.
- Take into account any extra area required around the perimeter of the arena for posts and rails, and for access.

- Adequate provision for rainwater drainage should be considered, and if there is any doubt regarding the drainage properties of the proposed site, then seek advice from a reputable land drainage company or arena constructor. Most commonly, drainage channels are cut, and then filled with the same material as used in the arena base layer.
- Ideally, the arena should be near the stables for ease of access, otherwise mud carried in on hooves could eventually clog the membrane.
- Consider construction machinery and raw material delivery vehicle access, and the condition of the ground they must travel over for this. Also consider the season, as poor weather may hinder construction.



Spreading the drainage layer



Tips:

- Ensure there is adequate access for a 21 tonne 8-wheeler or 29 tonne articulated lorry - remember to consider the large turning circles they will require.
- Drainage is paramount to the longevity of your arena - if in doubt about any aspect of drainage we advise you consult an expert.
- Locate the arena near the stables for ease of access, otherwise mud carried in on hooves could eventually clog the membrane.

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Base Layer Construction & Membrane





The base layer must be level, with the stones firmly packed together for stability, separated from the riding surface by a suitable porous membrane, and sound enough to withstand heavy impact.

Materials used are coarse aggregates, such as 40mm single size limestone or similar. Drainage channels may be filled with this, and then the overall base surface covered to a depth of 6"-8".

The porous membrane between the layers prevents the finer riding layer material from washing down through the lower drainage layer.

The riding surface does need to retain a certain amount of moisture in order to be effective, and the importance of the membrane as the interface which allows both the drainage of excess water and the retention of useful moisture in the riding surface cannot therefore be over emphasized. It should be laid evenly over the prepared drainage layer, and construction vehicles should not be allowed to ride over or turn, on the unprotected surface.

Surround boards should be installed such that they do not restrict drainage channel outlets.



Ensure no gaps between membrane sheets



Sand is evenly spread over membrane



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Riding Surface Materials

The most commonly used riding surface is washed and processed silica sand, laid to a depth of 4"-5", well compacted, and augmented with other materials according to the intended style of use. The sand properties are crucial to the performance and longevity of the arena.

Important attributes to consider when selecting your sand are:
Particle size - 94-99% passing through the 250 micron sieve is highly suitable for equestrian use, with a preferred average grain size (AGS) in the region of 150-170 microns, and a fineness index of 75 -100 AFS. Fine sands work well, because the smaller the grain size, the greater the useful inter-particle friction, due to the

increased total external surface area of inter-particle contact.

Particle shape - Excessively angular sand grains do not compact as well as more rounded sand grains, and can fracture under impact. Excessively rounded sand grains can displace under pressure, again compromising compaction. Sands with a particle shape classification of "sub angular to rounded" compact well under pressure, and do not easily fracture under impact.

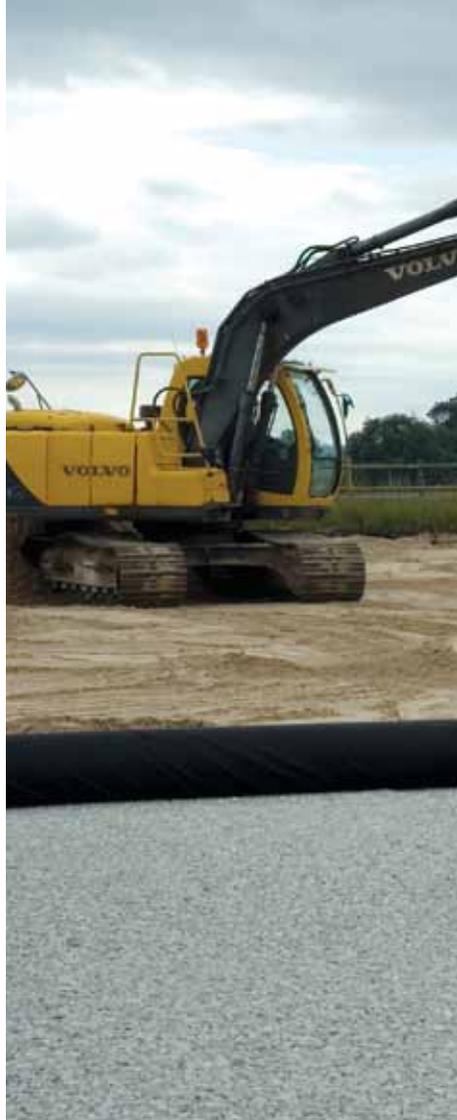
Particle size distribution - Smaller sand grains can pack into the voids between the larger grains, allowing the surface to become densely compacted and resilient,

important in preventing the horses from riding too deep.

Chemical composition - High purity (90% SiO₂ or above) silica sands are very durable, and it is important that the sand is virtually clay free. Agglomerated clay particles could eventually clog the membrane, and impair drainage. Finer sands have a greater moisture retention property, which further aids compaction, somewhat in the way that sea sand is left compacted when a wave retreats.

The single most important, but counter intuitive, fact about pure silica sand is that it needs to be thoroughly compacted in order to drain, until it becomes rather





like the surface of blotting paper. If left un-compacted and wetted, it becomes a quagmire, retaining huge amounts (more than 12%) of water. Good compaction is critical to the performance of the arena.

There are a great variety of materials available with which to augment the sand properties in order to make it suitable for your purpose, hence it is a good idea to try a few local arenas in different weather conditions which have been constructed for a similar intended use to your own. It is then far easier to make an informed choice.

Examples of commonly used materials are:

- Chopped Rubber: Relatively large slices of chopped rubber on the arena surface spread the impact of the hooves and also help retain moisture in the sand. The source of the rubber should be considered as some suppliers shred steel reinforced tyres and remove the steel, but rubber from textile reinforced tyres is preferable as the textile fibres from the rubber work their way into the sand and behave a bit like grass roots, helping to bind the surface. Chopped car tyre

rubber is also of consistent quality. Fresh chopped rubber does tend to smell a bit for a while, but this disperses eventually.

- Fibre: This may be power harrowed into the sand surface, or purchased as a sand/fibre mix, from various sources. Again, the fibres mimic the effect of grass roots in turf and give a firm, free draining surface. Various blends of sand/fibre/rubber are on the market, and it is important to check carefully which is suitable for your purpose. Fibres from man-made materials are more durable and do not degrade as quickly as organic fibres, which can break down and possibly restrict drainage.

- Petroleum Jelly: Binds the sand surface into a fine, compact, cohesive layer by virtue of it's wax like property, without compromising drainage properties.

It may be seen that three distinct principles prevail for arena sand additives; spreading the impact: binding with fibres: adhesion by viscosity. Other additives are available, such as chopped wire insulation, shredded car fabrics, shredded door seals, but they each use one or a combination of these principles, and can therefore be evaluated accordingly.

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Finishing, Costs & Maintenance

Once the riding surface sand has been laid, it should be thoroughly and evenly compacted.

This can be achieved by either intensive, repeated longitudinal and transverse rolling with a tracked or heavy wheeled vehicle, or rolling with a Bomag powered roller or similar over boards, until no further compaction is possible. After which, ideally, it should then be left unused for a period of about two weeks to settle further, and preferably until it has also been rained on. After this, the other materials of choice can either be laid over or power harrowed into the surface, as appropriate.

Chopped rubber needs to be laid to a depth of 2" over the sand, and most other materials have producer's

recommendations for laying. Ready mixed blends of sand/fibre/rubber should also be laid according to the suppliers recommendations.

It is now possible to ride on the arena. The intensive action of the horses' hooves impacting on the surface will gradually break the initial compaction, and after a few days work, the surface will need to be rolled. For a period of time, the surface will need to be alternately ridden and rolled. It will gradually settle and compact from the ground upwards, eventually resulting in the desired riding surface.

Occasional levelling of the surface will also be necessary, and this is often best achieved by letting the horses drag a five bar gate or similar round the arena. If tines are added to harrow the surface, ensure

they are not long enough to risk damage to the membrane.

Costs

The cost of constructing the arena will be determined by size, location and method of construction and these criteria will in turn largely be dictated by the intended use to which it is to be put; it is important to do the calculations in advance. At least half the cost will be absorbed by the base construction. To minimise haulage costs, try to source materials of suitable quality locally.

Finally, choose your contractor, if you intend to use one. Discuss the intended use, ongoing costs and maintenance implications when agreeing the type of arena with him; he will have a wealth of experience, sound advice and valuable





knowledge to draw from. Then, the total capital outlay may be established, and any contractual clauses agreed.

Maintenance

- Horse droppings should always be removed.
- Surface displacement will occur in the most heavily used areas; regular levelling by grading with a gate or similar is recommended.



- Keep the surface damp, water it during dry spells - this is essential to the performance of the arena (otherwise it could ride deep)
 - Avoid letting muddy hooves or machinery onto the surface when possible.
- Longevity depends upon both quality of maintenance and intensity of use, but a properly constructed and well maintained arena should be good for many years of service.



Tips:

- At least half the cost will be absorbed by the base construction. To minimise haulage costs, try to source materials of suitable quality locally.
- Occasional levelling of the surface will be necessary, and this is often best achieved by letting the horses drag a five bar gate or similar round the arena.
- After compacting the surface it is advisable to leave unused for a period of about two weeks to settle further, and preferably until it has also been rained on. After this, the other materials of choice can be added.

There are a number of reputable manufacturers, suppliers and contractors and we recommend you undertake the necessary research prior to commencing the project.

We would like to acknowledge and thank Arclid Hall Stud for the use of their site for the photography contained within this guide. www.arclidhallstud.com



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