



Grass Court Guidance



Whilst grass remains a very popular surface, representing approximately twenty per cent of all club courts across the country, the number of natural turf surfaces is declining, as many clubs choose to convert courts to more practical surfaces in order to maximise the amount of play possible throughout the year.

A lot of clubs are keen to retain their grass courts, and with them, a part of their tradition. But for many others, particularly smaller clubs, the relatively short playing season is too small a return for the necessary investment of the time and cost of year-round maintenance.

The large number of grass courts in Britain also represents a wide range in the quality of surfaces, as a great deal of skilled groundsmanship is required to maintain natural turf in good condition. Whilst there are many experienced and knowledgeable grounds staff, they tend to be based at larger clubs and venues, and a large number of clubs have to get by with the work being done by club members on a voluntary basis, or with the help of part-time grounds staff who have not specialised in natural turf sports surfaces.

Also, clubs often operate with insufficient budgets for maintenance equipment and materials. It is for these reasons that The All England Club, in conjunction with the LTA, set up in 1991 a seminar to provide practical advice and guidance on all aspects of grass court construction, renovation, and maintenance. The seminar, which is now held annually, is aimed at groundstaff responsible for the care of grass courts at clubs, park and tournament venues throughout the country.

What is a Grass Court?

Whilst any flat area of grass of sufficient size could, in theory, be used for playing tennis, a good quality grass court can only be produced by proper design, construction and maintenance. A grass court's playing characteristics (such as the height, speed and trueness of the ball bounce), as well as its durability depend on the quality of a court's component parts and the skill of the grounds staff in looking after it.

For example, the speed of a court depends on its hardness, which itself depends on the amount it is rolled and the level of moisture in the surface. But the precise control of moisture relies on a delicate balancing act between irrigation and the weather conditions, and requires a degree of judgement from the grounds staff only acquired with years of experience.

A grass court consists of three distinct parts; the grass plant, the soil layer and the foundations. Each element has its own vital function, but all three must work well together if the combined result is to be a good quality playing surface.

The visible part of a grass court, the grass itself, consists of a dense, closely mown turf covering the whole area of the court. The specific types of grass plants used should be carefully selected according to their characteristics; a combination is required that will be hard-wearing, quick to recover, and resilient to close mowing.

Traditionally grasses known as bents and fescues have been used predominantly, but increasingly there has been a demand for more hard-wearing grasses, such as the improved strains of rye grasses. Nowadays there is a wide range of types and varieties of grass plants from which to choose.

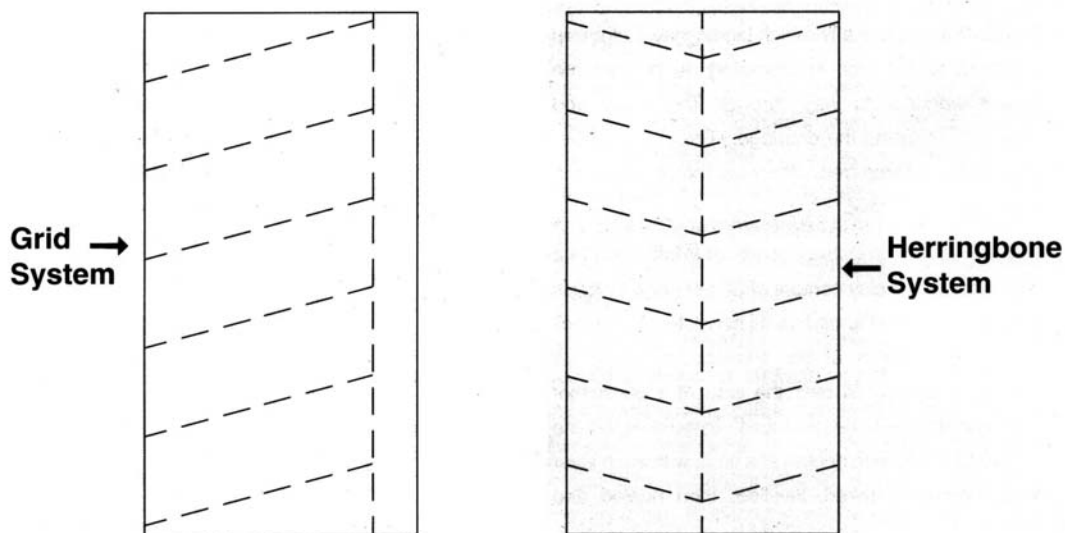
The choice of soil is equally important, as it must promote good growth of the grass and provide a suitable surface on which play can take place. The soil must allow the grass plants' roots to grow as deep as possible, so that the whole surface locks together well and so that the grass surface is more resistant to wear and tear.

Soil types are categorised according to the size of constituent particles, ranging from sand (the largest size) to clay (the smallest). As well as sandy soils, silt soils and clay soils, there are light, medium and heavy loams. The chosen soil type must provide good grass growth, for which it must have some form of organic content and micro organism in an active state. It must also contain an amount of clay, which will bind the whole surface together when rolled, thus providing a firm base and a fast and true playing surface. It is also important that the soil should not break up or become dusty when dry, and that it should be sufficiently pervious.

The foundation, or drainage layer, typically consists of a bed of stone covering a network of pipes in which water is collected and channelled to a drainage outlet. Whilst some sites may drain well naturally, others, such as those on clay, will always require a drainage system. Good drainage of the court is essential as it provides the right conditions for the growth of the grass – the correct amounts of moisture and air – and allows routine maintenance to be carried out more quickly and easily.

Alternative Drainage Systems

Alternative Drainage Systems



Construction

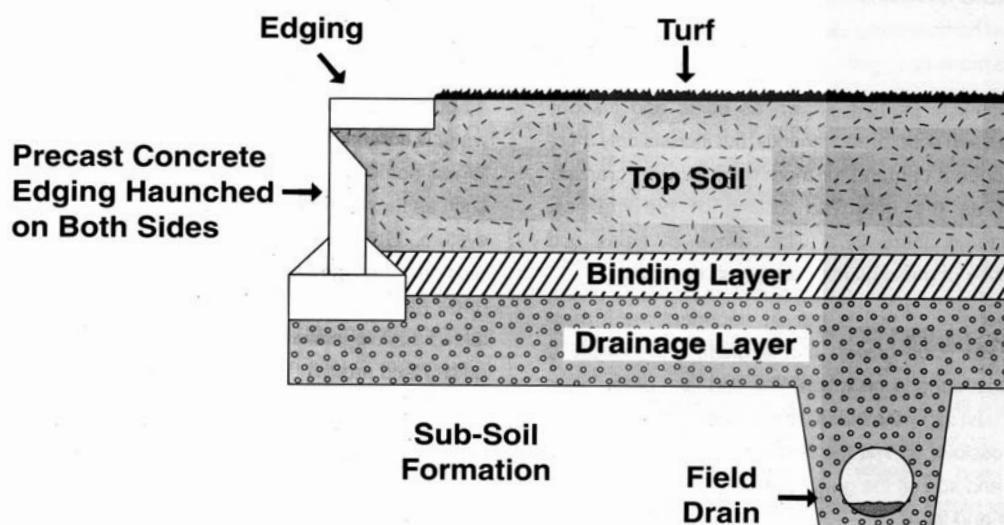
The precise construction methods used and maintenance routines followed will vary significantly from venue to venue; the following description is based on the methods used at The All England Club, Wimbledon. The construction process for a grass court begins with the excavation of the ground to 450mm (18 inches), plus an additional depth for the drainage pipework. As shown in the diagram, a grid system of drains is laid, consisting of a four inch main drain running along the length of the court to one side, plus a series of three inch lateral drains, approximately 10.5m (35 feet), extending across the court. The lateral pipes join the main drain at less than 12.0m (40 feet), otherwise turbulence can be caused which may impede the flow of water. A silt trap is also used, just outside the court, to prevent silt accumulating in the main drain. The drainage system provides significant capacity, so that the court can deal easily with the heaviest rainfall.

The drainage layer is made up of some six inches of dust-free, hard stone, usually 5/16 to 3/8 inches in size. A slightly angular aggregate should be used as it will lock together well, to produce a firm base, whilst still remaining pervious.

On top of this is a 50mm (2 inch) binding layer of sharp grit, to prevent the topsoil working its way through the court and eventually reducing the drainage. This binding layer should also be lime-free, otherwise the pH of the top soil could be affected.

The soil used to construct courts at Wimbledon is a loamy soil with a clay content of 20 per cent, which is specially produced to ensure its consistency. The soil is laid to a depth of ten inches, and must be compacted evenly all over the court if a consistent playing surface is to be produced. To achieve this the soil is laid in 50mm

Typical Cross-section of a Court



(2 inches) depths at a time, with each layer being heeled-in, raked, levelled, then heeled and raked again. Such a process is clearly very slow and labour-intensive, but this careful attention to detail is important to ensure a firm surface and to avoid any future unevenness through sinkage.

When the base construction has been completed, the grass surface is produced, either by turfing or seeding. Turfing has the advantage of being quicker, but can produce problems if the soil used to grow the grass is not totally compatible with that used in the construction of the court. Incompatible soils will not bind together properly, even though the grass roots will grow through – different soils will inevitably dry out at different rates, and the surface will therefore be prone to movement and break-up.

The seeding method ensures complete control of the mixture of grass species used, although it usually takes one year to produce a playing surface. Seed would typically be sown in the spring, and be prepared for play twelve months later.

How do I look after it?

Spring/Summer Work

Rolling is required in the early spring to re-firm the topsoil after the upheavals caused by the winter weather and to firm up the surface for play in the season ahead. An implement weighing 250-500kg (5-10cwt) can be employed for this operation, but care must be taken not to over-roll, or roll under the wrong ground conditions, which could lead to excessive compaction and future drainage problems. Occasional rolling may be required before more important matches or tournaments but should not be carried out as a matter of routine. A large 760-914mm (30-36in) motor mower with the cutting reel disengaged, is usually sufficient to keep the court firm.

Soil analyses of representative samples will determine the nutrient status of the soil and any major deficiencies to attend to. Based on the results of the soil analyses a Nitrogen (N), Phosphate (p), Potassium(k), N.P.K fertiliser would be 14N.OP.7k+fe(Iron) this would be applied at 35grams per sq. metre (1 oz per sq. yard). Usually nitrogenous dressings are the main requirement with perhaps occasional small amounts of phosphate and potash included in the spring dressing, depending on circumstances. A suitable nitrogenous fertiliser can be mixed as follows:

	<i>per 100 sq.m</i>	<i>or per 100 sq.yd</i>
Sulphate of ammonia	1.5kg	3lb
Dried blood	0.5kg	1lb
Suitable screened loam topsoil	4.0kg	28lb

One or possibly two further applications of fertiliser may be required during the season depending on the vigour of the grasses and the amount of wear imposed on the turf. The final application should not be applied later than the end of August to avoid unwanted late, lush growth which only serves to encourage disease.

Regular light scarification should be carried out with a mechanical unit set to just flick the surface and raise any flat or procumbent growth. Scarification reduces the amount of thatch deposition, promoting a fine, upright growing sward. Excessive thatch at the base of the turf will produce a slow playing surface, invariably exhibiting inconsistent bounce and must therefore be avoided. Scarification should only be carried out during periods of good growth.

With a predominantly rye-grass sward, the mower should be set at between 6-8mm (¼-5/16 in) but where the finer bents and fescue species are in abundance, the lower limit should be adopted. Standard of play and amount of wear and tear would ultimately determine the height of cut, which during periods of good growth is carried out two or three times per week. A comb or brush attachment fitted regularly would encourage a more upright sward.

During long dry spells it may be necessary to irrigate. The amount of water applied should be carefully regulated to give just sufficient to keep the grasses unstressed and alive; excessive applications will lead to a deterioration in turf quality. The operation is best carried out in the late evening to reduce losses through evapotranspiration and ensure the disappearance of surface moisture before the courts are brought back into play. It is important to avoid using courts when they are still soft and tender following irrigation when the surface is slippery and prone to marking.

Where there are a number of courts available, it is often good policy to introduce a system of rotating the temporary closure of one or two courts to allow several days rest. This encourages the recovery of worn areas and allows time for remedial and restorative work to be carried out. With only a limited number of courts available, this system may not be possible.

Autumn/Winter Work

Following the closure of the courts at the end of August/early September, the first task is to scarify the courts thoroughly. Intensity of treatment will depend mainly on the depth of thatch accumulation and it may be necessary to make more than five or six passes in different directions providing growth is still good. The blades of the scarifier should be adjusted to penetrate up to 5mm into the ground although in some situations this may be detrimental to the playing surface if it is uneven. The amount of debris removed can be substantial. Late, severe scarification must be avoided as it is vital for the turf to fully recover before the onset of winter.

The turf will then require intensive aeration to improve air and water movement through the compacted topsoil. Solid or slit tines fitted on to a mechanical spiker can be used, but hollow tines should not be discounted, especially where excessive thatch or compaction is evident. A regular programme of solid or slit aeration during the winter months is also recommended to encourage deep rooting and assist drainage of surface moisture. Aeration should not continue after late February or early March as this might lead to cracking of the court surface during the dry summer period.

Worn areas are likely to develop due to concentrated play, particularly around the baseline areas. Bare patches should be hand-cultivated to relieve any compaction and a firm, level seed/turf bed produced by alternate raking and heeling – levels can be corrected at this stage of the renovation programme. Seeding should be completed by the second week in September if a dense sward is to be produced for the next spring. A suitable seed mixture could comprise 70% perennial rye grass 30% slender creeping red fescue. All grass cultivars have various different qualities when selecting a seed mixture it would be advisable to select the mixtures from the Sports Turf Research Institute (STRI) handbook. If seeding has resulted in poor or partial germination a spring over-seeding in April can be carried out to strengthen the sward in any weak or bare areas. The sowing rate would be between 18-35g/sq.m (½ - 1oz per sq.yd)

If seeding is not completed in time, worn areas should be repaired with a good quality, mature turf and it is essential that the soil imported with the turf is compatible with that already on the court. Turf must be laid on a firm, fine turf bed, flush with the surrounding ground and not laid proud in anticipation of settlement, which invariably does not take place. If the old turf does sink, levels can be made good with top dressing.

The final major operation would be to give the courts a good top dressing with a suitable screened loam topsoil with adequate binding qualities (20-25% clay). This material is normally applied at 1.5 – 2.0 kg/sq.m (3-4lb per sq.yd) following end of season solid/slit tine aeration and up to 3kg/sq.m (6lb per sq.yd) after hollow tining. The material is applied dry and evenly worked into the surface with a lute and finally a drag brush. Top dressing is essential to preserve levels and to maintain a good quality turf surface.

Appropriate measures should be employed if weed infestation, disease attack or worm casting constitute a significant turf problem.

Recommended Reading

Perris J. (2000). *Grass Tennis Courts How to Construct & Maintain Them*. STRI (The Sports Turf Research Institute) In Partnership with the All England Lawn Tennis Club, Wimbledon, 2000).

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