

## Optimisation of rolling for cricket

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### Introduction:

The guidelines are based on a four-year, in depth research project at Cranfield University's Centre for Sports Surface Technology. The project was funded by the ECB and a government research council (EPSRC) to find out the answers to the above questions. The following guidelines are based on a series of detailed studies in both the laboratory and in field trials.

This document explains the science behind the recommendations and dispels myths such as:

- The more a pitch is rolled the harder and better it plays
- Rolling slowly helps compact the pitch
- Heavier rollers help get the pitch harder at depth
- Any pitch problem can be cured by just rolling it more

By knowing some key information about their roller and their pitches, most groundstaff can reduce the amount of rolling they do. This saves time and fuel, and helps save money

There is optimum *moisture content for rolling*. If the soil is too dry then it will be hard and strong and cannot be further compacted with a roller, so groundsmen will normally irrigate dry pitches to wet them up before rolling. But if the pitch is too wet then the soil will not compact. Groundsmen must bear this in mind when preparing match pitches and when pre-season rolling.

### **GUIDELINES FOR CHOOSING THE RIGHT ROLLER FOR YOUR CLUB**

1. The roller should be balanced both left and right and ideally fore and aft. This is to ensure that pitches are compacted evenly.
2. The rollers should have a **minimum** diameter of 0.5 m (1.6 ft), but ideally 0.6 m (2 ft) or more. This is to reduce horizontal forces when rolling. Larger diameter rollers reduce these forces further but it is essential to consider height restrictions in storage sheds etc.
3. Select weight according to pitch soils, covers and thatch control – but generally the heavier the better up to about 2.5 tonnes, then it becomes a case of diminishing returns. The minimum is 1 tonne un-ballasted, with the option to ballast to 1.5 tonnes.
4. Modern cricket-specific rollers tend to have curved edges on the roller to prevent mid-pitch creasing problems. They also tend to have hydrostatic transmissions which make operation and direction changing easier for the operator.

**Normal speeds are 0.7 km/h (0.45 mph)** – this is about 2 minutes to roll a full pitch so for most rollers, first gear, low revs. Make sure that you drive both the front roller and the rear roller right off the pitch (except after the pitch has been marked out) because on some rollers they weigh more at the back than the front – so you could under roll one end of the pitch.

## **Pre-season rolling - Guidelines**

### **1. Pre-season rolling is recommended for the majority of clubs.**

Over-winter wetting reduces the bulk density of the square between cricket seasons. Following *autumn renovation* and during the winter period, many pitches / squares will have been subjected to some form of mechanical aeration or decompaction which can also reduce density. If groundsmen did no pre-season rolling at all, the soil would increase in density as it dries and shrinks but early rolling can help to reduce re-wetting of the soil from spring rainfall and encourage quicker natural recovery of soil density as the pitch will dry more quickly. Pre-season rolling is a good idea – it might be possible to get away without it, if there is: minimal post-season decompaction (but not to the detriment of a healthy root system); a warm dry climate; and a good cover system – but that's not the case for most cricket clubs in the UK.

### **2. Don't start until there have been at least two continuous good drying days – warm temperature (more than 10°C), a breeze and no rain.**

There is optimum moisture content for rolling. If the soil is too wet, compaction will not take place. Don't just get the roller out because it's February, don't start too early – it could be wasting time and fuel and causing horizontal soil movement. Initial rolling can be undertaken after a minimum of 48 hours of dry weather but any increase in density will be minimal until soil drying increases later in the spring. This process does help with smoothing out surface levels on the pitch – removing any over-winter or autumn renovation irregularities. If there is a known high thatch or organic matter content then leave your pitch to dry for longer (minimum 3 good drying days) because moisture retention is increased.

### **3. Start with light rollers but build up roller size and ballast as soon as soil conditions allow without creating a bow wave or deep creasing between pitches.**

Whilst soil moisture remains high, the moisture/density combination within the soil rather than the roller weight is likely to be the limit to increasing density. A gradual increase in roller weight will result in the same final density as using the heaviest weight of roller throughout. Be cautious with roller weight to avoid surface damage from horizontal movement, **but the roller with the final desired compactive potential should be used at the earliest opportunity to minimise the number of roller passes.**

### **4. Limit rolling sessions to 4-5 passes of a 2-drum roller over each area then stop and allow a couple of drying days.**

Then build up roller weight and get out for another session of 4-5 passes. Finish with a session of 4-5 passes with the heaviest roller when the pitch has dried in-between. Guidelines for spring roller passes have to be a broad recommendation as circumstances are different from club to club in terms of density and soil moisture. **No more than five roller passes would be beneficial at any one moisture content/roller weight combination.**

### **5. If possible, cover the pitches/square to help with drying but don't limit grass growth as healthy grass is a very effective pitch drying system.**

Playing seasons that start early, before vigorous grass growth, will need the use of covers to aid in the reduction of soil moisture, although the drying process will be slow due to low early season temperatures and high humidity under the covers.

### **6. The practice of cross rolling in a 'Union-Jack pattern' over the square can help to ensure even compaction across the square.**

## **Match-pitch preparation - Guidelines**

### **1. The fundamental rolling principles remain the same as for pre-season rolling – wait for the right moisture content and limit passes.**

Summer pitch preparation follows the same rolling principles as spring rolling but drying rates are quicker and therefore **timing is more crucial**. All the principles discussed above for general rolling guidelines and spring guidelines are important for pre-match summer rolling.

### **2. Match rolling practice to your pitch performance aspirations but also your roller and whether or not you have covers**

When preparing match pitches, be realistic about the quality of your pitches. Understanding the limitations of both your match preparation equipment and the quality of your pitches is essential. There is no point in trying to achieve a 'First Class' standard pitch in Table 3 unless you have higher clay content soils, with small amounts of thatch, the right roller and covers with a full time staff to take them off and put them back on again. This will just result in rolling at the wrong moisture content with the wrong roller.

### **3. To achieve optimum moisture contents for rolling during the summer it will probably be necessary to irrigate the pitch.**

Table 4 shows approximately how the pitch will dry (although this varies with weather patterns). Don't roll when in the blue zone (See Table 4). Also if you there is a known high organic matter content or thatch, then during preparation time you might need to add a day or two to account for the extra moisture retention.

### **4. A total of 10 passes (with a two drum roller) should do it. (A – B is 1 pass)**

Summer pre-match rolling requires a maximum of 10 roller passes (two drum roller) to achieve the roller compactive potential.

With **low clay** soil this should be done in the period **36 to 56 hours after** saturation in one or two sessions and with the maximum roller weight for at least six of these passes. After this time the full compactive potential of the roller will not be achieved. For the **high clay** soil, the drying to optimum moisture content time is more likely to be influenced by the ambient weather conditions. However the following regime with a two drum roller is suggested:

- An initial rolling of two passes within **48 to 72 hours**, preferably with the maximum roller weight but make sure that it is not too wet as there is a risk of horizontal soil movement (this depends on the initial pitch density).
- A further four roller passes per day for the next two days should be sufficient to achieve maximum potential.
- A total of 10 roller passes with at least the last six roller passes with the maximum roller weight.
- The timings of these will change according to the weather conditions however it is important not to leave rolling until the soil has dried below the optimum.

**Further rolling beyond the recommended 10 roller passes is unlikely to increase pitch density and for reasons discussed previously should be only undertaken for other playability reasons. For this purpose it would be prudent to consider using a lighter roller to prevent excessive horizontal soil stress.**

**REMEMBER THE ROLLER DOESN'T GET GROUNDSTAFF ALL THE WAY TO HARD PITCHES – THEY MUST BE ABLE TO ALLOW THE PITCH TO DRY.**

For full details of the guidelines download 'Guidelines for Rolling in Cricket' from [www.cranfield.ac.uk/sas/sst/rolling](http://www.cranfield.ac.uk/sas/sst/rolling) and the ECB ([www.ecb.co.uk](http://www.ecb.co.uk)) and iog ([www.iog.org](http://www.iog.org)) websites.

