

James de Havilland takes a closer look at the intricacies of current machinery

The anatomy of... Cylinder grinders

Hunter Grinders Jupiter ATI. Note the gantry to facilitate raising cutting units onto the machine.

A well managed in-house grinding station will not occupy much workshop space.

Some points to consider when choosing a grinder.

Enough settings to suit the job. A key requirement is to ensure the grinder under consideration will return both cylinders and bottom blades to the original manufacturer's specification.

Accuracy and durability.

The grinder should perform accurately for at least a decade. When costing a unit, find out the machine's maintenance demands and its projected service life. Compare machine specifications and ensure the unit will work to the tolerances you demand and that these are easily achieved.

Coping with coning.

Some modern cutting units have the cylinder and rear roller fixed in the frame during manufacture. During use, the cylinder can be subject to 'coning' that cannot be corrected other than through correct grinding. Check the machine you purchase will be able to remove such coning.

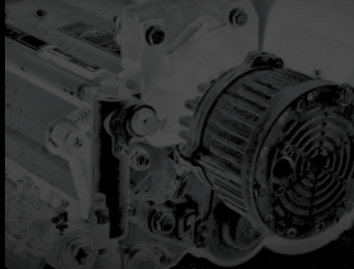
With thanks to Hunter Grinders – a division of Lloyds & Co of Letchworth Ltd.



Despite the simplicity of methods employed in cylinder grinding, there remains a degree of confusion regarding spin and relief methods. What is the difference and do they matter? James de Havilland offers his thoughts on the issue

Step-by-step Analysis...

Cylinder grinders



Technical terms

The relief on the back of a blade is cut to a specific 'relief angle'. The relief angle will typically be set by the mower manufacturer and will range between 20 to 45 degrees.

The cutting area of a given blade is often referred to as the land; so a blade with a relief that reduces the blade thickness to 1mm has a 1mm land.

Spin grinding

As the name suggests, spin grinding will typically sharpen the cutting edge and, assuming the grinder has been set up correctly, restore the edge profile to its original angle to the manufacturer's specification. The time it takes to do the job is influenced more by how long it takes to get the cutting unit into the grinder and correctly setting it up than that actual grinding process itself.

There are those that suggest a simple spin grind is always inferior to a relief/relief spin grind. This is a misleading argument because, as previously outlined, a relief may still be present following a spin grind.

Relief/Relief spin grinding

Terminology can be confusing, so it is best to consider relief grinding as a separate process; its job is to grind a relief into the back of the blade.

If the blade cutting edge can be reground at the same time, then it follows that the job will be carried out faster and hence the somewhat confusing description of spin relief grinding; the grinding stones spin but the cylinder blades are ground in turn - the cylinder is not powered and spun as it is when spin grinding.

Is a relief essential?

No, but it is accepted that relief ground units will stay on cut longer than those that are spun ground only. Cylinders can be exclusively treated to a spin grind and still deliver decent performance.

Manufacturer advice, however, tends to favour a relief grind for fine turf mowers, noting that with or without contact the technique reduces friction which in turn cuts heat generation which can help preserve the cutting edge for longer. Reduced friction also reduces overall wear and power consumption. The latter can help save fuel.

Of equal importance, a reduced land on the blade can ensure the



The cutting edge has been relief ground, leaving a slim 1mm thick 'land' on the blade.



A grinder that allows a complete pedestrian mower to be worked upon will make the whole grinding task simpler.



Spin grinding in action, with the cylinder in-situ in the cutting unit.



Modern controls make it easier to replicate grinding tasks, ensuring accuracy across multiple cutting units.

It could be argued that those responsible for the sale of cylinder grinding equipment have made outlining what specific tools do far more complex than it needs to be.

In very simple terms, modern golf course mowers are designed to produce a high quality of cut.

This quality can only be maintained if the cylinders – or reels – are kept not only sharp but also maintained with the correct relief on the blade or with an air gap.

The relief is essentially a section of metal ground out behind the blade to reduce the actual width of the cylinder cutting edge. The relief helps reduce friction between the cylinder and bottom blade – or bedknife – where a cylinder is set to light contact.

The relief also provides a degree of extra clearance behind the blade that in turn can help with the dispersal of clippings; this applies to cylinders set to both contact and air gap settings.

The relief cut into the blade essentially reduces the cutting edge width to around 1mm; this can vary according to manufacturer specifications and type of mower.

Rough mowers, for example, may have a thicker cutting edge with a reduced relief.

This is to ensure the cylinder cutting edge retains enough strength to cope with thicker, heavy mowing.

With a spin grind, there is no relief cut into the back of the blade. So the cutting edge presented to the grinder is simply reground.

If the cylinder is relatively new, the existing relief on the back cylinder blade is likely to have sufficient 'depth' not to be ground off. So although the spin grind will not have cut a relief, the existing relief may well remain and the cutting blade will still benefit from the relief.

Conversely, the relief is obviously eroded each time the cylinder is reground.

So it follows that once the relief is removed it will need to be re-ground if the cylinder is to be returned to the manufacturer's original specification.

Although this is a simplification, it follows that the relief essentially describes the edge of the cylinder blade where metal has been removed to reduce the width of the cutting edge.



Should you buy your own grinder? The view from one manufacturer, Hunter Grinders. Accepting a manufacturer will always argue in favour of buying its products, the following may help those considering grinding 'in-house'.

Cost.

The expenses related to sending cutting units out to be sharpened will range between £100 to £150. Some units may need to be ground more than once a year due to ever increasing frequencies of top dressing applications hastening cylinder wear.

Quality of cut.

In-house grinding can help ensure units are kept in premium condition throughout the whole of the cutting season – around 80% of grinding work with third parties is carried out over winter. Owning your own machine enables grinding schedules to be timed around top dressing programs, weather patterns and competitions.

Quality of grind.

Golf courses operating their own grinding equipment will not face the same pressure to grind large numbers of units, this in turn allowing – it is hoped – for more time to be dedicated to the grinding process. Automatic grinders are offered. These make it easier to maintain repeatedly high levels of grinding performance. With your own grinder, you are in charge of your own quality control.

cylinder blade to bottom blade angles are more tightly controlled for a cleaner and more consistent cut.

A spin grind will typically need to be carried out more often as the cutting edge tends to dull sooner.

As with backlapping, spin grinding delivers best results if carried out little and often.

Regardless of technique adopted, the most important issue is to keep cylinders sharp. So spin grinding will always be preferred to running dull cylinders.

So relief is best?

Simple answer is yes. Manufacturers put a relief on the back or trailing edge of a blade for a reason.

When this relief is worn away, it needs to be reinstated.

So spin grinding is can only work well as long as the original relief remains post sharpening.

It may be the case on some commercial mowers that no relief is present but not always.

Conversely, if you want to retain the relief as per the manufacturer's specification you need to regrind it as it is eroded by blade wear.

Contact or air gap?

With regard to air gap versus light

contact 'reel to bedknife' settings, it depends upon who you talk to; Toro is in the light contact group, John Deere and Ransomes Jacobsen setting most of their cutting units for golf with an air gap.

As a rule, it is best practice to follow the advice offered by your equipment supplier.

What about backlapping?

Not everyone thinks backlapping is a good idea.

The process re-hones the cylinder cutting edge from the rear and also possibly takes the cylinder 'out of true' as it relies upon the action of a grinding paste between it and the bottom blade.

Backlapping can actually further dull cutting units that are blunt to start with too.

The counter argument is that backlapping is not intended to re-sharpen a dull blade. Its job is to help retain an existing cutting edge, helping to restore it as it just starts to dull. Judicious 'little and often' backlapping can help lengthen the periods between regrinding the cylinder.

The problem with backlapping is that not everyone understands that it is only effective if the units have been relief ground because the relief is necessary to force the paste to the cutting edge.

It is not just a case of slapping on some backlapping compound, winding on a little extra pressure on the bottom blade and then running the cylinder up to speed in reverse.

The job needs to be carried out according to the mower manufacturer's instructions and performed long before the blades on the cylinder are really dull.

There are those who actually advocate a modest backlap post grinding; the argument is that grinding leaves a burr on the cylinder blades and backlapping removes them.

The more widely accepted consensus is that any burrs quickly dislodge during initial mowing, making a backlap unnecessary.

What about the bottom blade?

The correct bottom blade 'shear' angle is absolutely critical to the performance of the cutting unit.

The sharpest cylinders will not deliver if they are acting on a dull or incorrectly profiled bottom blade.

So it follows that grinding the bottom blade is as important as honing the cylinders.

Bottom blades also have a finite life, with a wear limit mark cast into many OEM designs.