

VOLUNTEERS WANTED...



FEATURE

...FOR BIGGA SUPPORT TEAM

The Open Championship, Turnberry GC, July 16-19

This is your opportunity to work at Turnberry GC to assist Golf Course Manager and Estate Manager, George Brown, and his team with the preparation of the course and be a part of the on-course team which accompanies each match ensuring bunkers are raked in a correct and professional manner.

It will be your responsibility to make your way to the team's base for the week – Auchincruive College (Scottish Agricultural College AYR) - but after that transport to and from the golf course, shared accommodation and meals will be provided for the duration of the Championship.

You will be expected to report for duty by 5pm on Wednesday, July 15,

and be available until the close of play on Sunday – a meal and bed and breakfast will be supplied for the Sunday evening and Monday morning if required.

This opportunity is open to full BIGGA members only. Younger members, relatively new to the Association, will also be actively considered.

To apply complete this application form and send to: Scott MacCallum, BIGGA HOUSE, Aldwark, Aine, York, YO61 1UF. For further information contact Scott on: 01347 833800 or email: scott@bigga.co.uk

Closing Date for applications for The Open Team February 1, 2009, and you will be notified later in the month.

		Yes	No
Name		I have been a BIGGA member for more than three years.....	<input type="checkbox"/> <input type="checkbox"/>
Golf Club		I serve, or have served in the last three years, on a Section/Region Committee	<input type="checkbox"/> <input type="checkbox"/>
Position		I am enrolled on BIGGA's CPD Scheme.....	<input type="checkbox"/> <input type="checkbox"/>
Age		I have attended three of the last five Harrogate Weeks.....	<input type="checkbox"/> <input type="checkbox"/>
I have applied for/appeared on the team at:		I am/have been a member of the PGA Championship Support Team	<input type="checkbox"/> <input type="checkbox"/>
	Applied Successful		
Royal Birkdale 2008	<input type="checkbox"/> <input type="checkbox"/>	I am willing to be a mini bus driver (You must have held a full driving license for three years and be over 25 years of age.).....	<input type="checkbox"/> <input type="checkbox"/>
Carnoustie 2007	<input type="checkbox"/> <input type="checkbox"/>		
Hoylake, 2006	<input type="checkbox"/> <input type="checkbox"/>	I am an overseas Member	<input type="checkbox"/> <input type="checkbox"/>
St Andrews, 2005	<input type="checkbox"/> <input type="checkbox"/>		
Royal Troon, 2004	<input type="checkbox"/> <input type="checkbox"/>		

Note: A place on the team is open to all full BIGGA members but priority will be given to the more active members. Also, subject to sufficient experienced applicants, no BIGGA member will be eligible to appear on more than three consecutive teams. A limited number of places will be made available to overseas members. Please ensure that you have spoken to your golf club or Course Manager prior to applying and have arranged the time off. Should you be chosen you must send a passport picture of yourself to BIGGA HQ as the R&A now have photographic ID for all Open Championship workers.

TAKE A SWING AT REDUCING YOUR CARBON FOOTPRINT

By Clive Collier



Climate change is increasingly becoming a concern not just to governments, but to businesses and individuals. For the last two years within the UK we have experienced a lack of traditional summer weather and have instead had high winds and severe rain leading to floods in numerous areas.

While the mild winters have benefited golf clubs, the unsettled summers have not, leading to reduced revenue and difficulties in course maintenance.

The extreme changes occurring throughout the world, such as the severe droughts in Australia, floods in India, and more frequent hurricanes are hard to ignore, and the scientific evidence from such bodies as the Intergovernmental Panel on Climate Change (IPCC), The Royal Society, and the United States National Academy of Sciences, has become more consistent, leading rational people to believe that our carbon emissions are at least partly responsible for climate change.

The weather has a great impact on golf club activities, so it would make good sense for clubs to try and reduce their carbon emissions, however there are many other issues facing golf

clubs today. The downturn in the global economy and looming UK recession will undoubtedly affect income over the next year and this, coupled with high energy costs, will seemingly make it difficult for clubs to address the issue of reducing their carbon footprint.

But is that actually the case?

Being more energy efficient makes sound economic sense because using less energy lowers operating costs. From an environmental perspective, it's an effective way for clubs to cut carbon emissions and, in turn, combat climate change.

Firstly, how can a club reduce its footprint? The obvious answer is to cut the amount of energy used: most clubs have irrigation systems that use pumps to distribute the water around the course and, in some cases, to extract locally available water. There are also closed loop wash down systems that are used for recycling the run off water from pressure washing the maintenance equipment, which also use pumps.

Pumps are driven by electric motors, most of which run at maximum speed at all times whether the process requires it or not, if the speed of the motors could be adjusted inline with the required

process then savings could be made.

The solution is to fit an AC drive.

An AC Drive or Variable Speed Drive (VSD) is a device which can control the speed of an electric motor. Most conventional motors run at full speed only, but a VSD equipped unit means it can run at a variable rate. This allows the motor to drive a pump or fan at a speed appropriate to the requirements of the process.

Because energy and motor speed are exponentially related, even a relatively small reduction in speed can result in a significant energy saving. Fitting an AC Drive to a motor is an attractive cost-saving project for many businesses, as it can provide quick results and a relatively short payback period.

It is often the case when irrigation systems are installed that the pumps and motors installed are over specified for the purpose and as such waste considerable energy. When this is the case, the speed of the motor can often be reduced by 40% and thereby reduce energy consumption by 78% which relates to significant cost savings and reduction in carbon emissions.

A 20% reduction in speed provides a 50% saving in energy costs.



AC drives come in a range of sizes to suit the application

AC drives come in a range of sizes to suit the application, thereby helping to keep the cost in line with its intended purpose.

AC Drives can also dramatically reduce the energy costs of air conditioning systems; many of the larger golf clubs do have air conditioning in the club house. It is of course a requirement that we actually get a summer for a change to warrant switching on the air conditioning, but for golf clubs in the hotter climates this would substantially reduce both energy costs and carbon emissions.

Further energy savings can be made where clubs have closed loop wash down systems; these systems have air blowers fitted which run 24 hours a day, seven days a week. An air blower can be replaced with a linear air pump for a relatively low cost which will result in substantial energy savings. The air blower consumes the same amount of energy as an electric fire, whereas the linear air pump consumes only the energy used by a light bulb.

There is a capital cost involved in having an AC Drive fitted to existing systems, however this is quickly paid for by the savings in energy. Furthermore the Government, being keen to

reduce emissions, has set up schemes to help businesses fund the capital cost for such energy saving devices.

The Enhanced Capital Allowances (ECA) scheme provides for qualifying capital expenditure. The Energy Technology List (ETL) specifies the energy-saving technologies that are included in the ECA scheme... this list includes both AC Drives and linear air pumps.

The scheme allows businesses to write off the whole cost of the equipment against taxable profits in the year of purchase. This can provide a cash flow boost and an incentive to invest in energy-saving equipment which normally carries a price premium when compared to less efficient alternatives.

The Carbon Trust is a private company set up by the Government in response to the threat of climate change. It offers advice on reducing CO2 emissions and has been set up to help businesses fund energy saving projects by means of Interest Free Loans for which payment could be off-set by savings in energy costs.

Energy-Efficiency Loans, from the Carbon Trust, are a cost effective way to replace or upgrade your existing equipment with a more energy efficient

version. Small or medium-sized businesses in England and Scotland, or all businesses in Wales that have been trading for at least 12 months, could borrow from £5,000 to £100,000. It is unsecured, interest free and repayable over a period of up to four years. There are no arrangement fees and the application process is straightforward.

So, with the quick return on investment, being able to offset the costs against profits made and the availability of interest free loans, is cost a real consideration? If a golf club is using pumps and motors, then it makes sense to reduce their running costs and thus reduce their carbon footprint.

To summarise, if a golf club is serious about reducing emissions, it is possible to do so without breaking the bank and, in the process, enjoy the ongoing advantage of reduced operating costs.

About the Author

Clive Collier provides marketing expertise for Environmental Green Systems Ltd, Stoke on Trent

Tel: 01270 884689
www.environmentalgreensystems.co.uk



DEDICATION'S WHAT YOU NEED

Drax Golf Club is on the up thanks to their dedicated staff. Melissa Jones reports...

It all began back in 2004, when the club, part of the Sports & Social Club in Drax, North Yorkshire, put an application into the English Golf Union for a grant.

"I'd had previous experience of applying for a grant for a rugby pitch, so when I came on board, originally as Vice Captain, I was able to help with the paperwork. They then left it to me and Denise, our Secretary, who completed the reams of paperwork it involved," explained Paul Weaver, Club Captain.

"It was the intention for internal staff to run a budget for the club to pay for the three new holes themselves," continued Paul. After doing their sums, the club realised their budget was approximately £70,000 and the estimated price for the work was nearer £400,000.

"I got on board with the sports council and persuaded them to increase the grant from £60,000 to £280,000 then £300,000. We were the first golf club, that I know of, to get a 100% grant," continued Paul.

HOW THE GRANT WORKS

If you want to apply for a grant for your golf club, you need to fill in an application form (www.englishgolfunion.org) and send it to the English

Golf Union (EGU). The EGU will then consider the application and decide if it's a worthwhile cause. If it's considered to be a worthy application, it is then forwarded to the Sports Council who allocate a percentage of money to golf.

Once the EGU and Sports Council have approved the application, it's then the golf club's job to chat with various designers to make sure the laid down criteria, such as making sure the course is suitable for the disabled and women etc, is fulfilled within the plans - It took about two years before Drax Golf Club finally got to the point where they had everything approved and met all the criteria.

The next step is informing the council and obtaining planning permission. You have to meet the council's stipulations and give residents the opportunity to object - which in Drax's case wasn't too time-consuming and didn't rouse too many problems.

CARRYING OUT THE JOB

"We were due to start work on the three new holes last year but we are about seven months behind our original programme because of the weather," said Paul.

The new holes came about when the club recognised that as a 9 hole golf course, the club was stagnant. "Membership and turnover had

started to drift off," explained Paul, last year we had 350 golf members which only allowed us to break even. The new holes will provide a new concept."

Cue Craig, Craig Lalley did his basic greenkeeper training at Drax GC, earning £40 a week. Since then he has worked at Heworth GC and most recently Rudding Park. Paul asked Craig to return to his roots at Drax GC earlier this year to implement his new found skills by taking on the role of Course Manager. Craig now manages three permanent staff and one seasonal worker at the club.

"I identified a gap in our staff. We didn't have anyone with the knowledge to bring on the new land. I realised that if we didn't complete it to EGU standards the risk would be that the quarter of a million pounds we were given could be drawn back, which would bankrupt the club. We needed someone with the experience, someone professional," explained Paul, "and Craig's enthusiasm for what could be was in line with that of the committee."

"I know the potential of Drax and I know the vast majority of membership. I feel if I can come in and slowly change the standard of the course. It will not only benefit the Sports & Social Club but the area in general," enthused Craig.

"I can really stamp my mark on Drax and raise the profile - Selby's best kept secret. With

350 members paying 250 the budget is not massive. I've got to manage the course with the little budget I've got."

TIMESCALES

Craig hopes to have the 3 new holes ready for play by Spring 2009. Since he took on the role at Drax back in September, Craig has spent 75% of his time playing catch up: "I've put a fertiliser programme in place, started tree planting, drainage and digging of the paths, but am conscious that I still have a 9 hole course to look after," said Craig.

Over the past six weeks, Craig has been doing as much physical work as he can to get the new holes to a certain standard.

"I have now got the height of cut on the greens down to a good level. With regular hand dressing and overseeding, the greens have come on a great deal in a short time, and the sward has become very dense.

"The greens are in good shape coming into the winter months, so let's hope the weather is kind and that we have a good start to the season so I can get the new holes open and make Drax some much needed income."

MEMBERSHIP

The average age of members at Drax Golf Club is quite high and Paul believes this is because people hold the preconception that a 9 hole golf course doesn't provide enough of a challenge, as the yardage isn't as long as that of an 18.

"The course does provide a challenge for members. We need to ensure we keep all ages happy with the additional three holes - a challenge for the youths but at the same time not too hard for elderly members to play, so it doesn't affect their handicap," said Paul.

"I think we will be in a stronger position once the development is finished, as we are one of the cheaper clubs to join. You don't have to fight for a tee time here and you will be able to play 13 holes of golf to a good standard. We've got the facilities here too: snooker tables, a gym, bowling, football, cricket, tennis etc," explained Craig.

"It's a transitional period and I'm going to have to work hard to get it to the standard I want. I feel I can make Drax a really good golf club which people will want to come back to year on year."

USEFUL NUMBERS:

English Golf Union –
01526 354500
info@englishgolfunion.org
www.englishgolfunion.org

Sports Council –
020 7273 1551
info@sportengland.org
www.sportengland.org



The greenstaff have planted trees on the new land.



View from the new land looking across to the existing 9 hole course.



Paul Weaver Club Captain & Craig Lalley Course Manager.



IS RELIEF GRINDING ESSENTIAL TO ACHIEVING THE PERFECT CUT?

By Charmian Robinson

How do you ensure that you maintain your mowing equipment in a way that ensures the best possible performance?

First you have to understand what it is your aiming to accomplish and what you are looking to prevent. The aim of every Professional Greenkeeper is to achieve a clean quality cut and in doing so prevent the grass becoming diseased. How this is achieved is a constant source of debate, but can at least be rationalised by looking at current common practise and recommendations from the leading manufacturers of professional mowing equipment.

The recommended specification for all of the major manufacturers and a number of the smaller companies includes the stipulation that cylinders (reels) and bottom blades (bedknives) are relief ground. And there are very good reasons for this as explained by Ivan Miller, Division Service Manager, of John Deere Limited.

The cylinder back relief angle on John Deere equipment is ground to remove the cross section of the blade leaving approximately 1 mm (.040"). This angle is set at 20 degrees although the industry ranges from 20-45 degrees.

"John Deere recommends relief grinding the cylinders for the following reasons," explains Ivan.

1. Relief grinding removes metal from the trailing edge of the blade forming an angle (relief angle) to reduce the contact area of the cutting edges. This reduces blade contact area resulting in less friction.
2. Ensures longer wear life.
3. Less time is required to back lap.

4. Reduces squeezing and tearing of the grass as the unit gets dull by use.

5. Provides an area for backlapping compound to be trapped to more effectively back lap cylinders.

6. Because of the relief grind it is possible, with backlapping, to true a cylinder (make it round) if a blade is .001" to .002" too high.

7. Requires less horsepower to drive the cylinder."

John Deere recommends backlapping after spin grinding to remove burrs and rough edges left from the spin grinding procedure. John Deere machines also have "on board backlapping".

"This allows the technician to regularly back lap the cutting units to 'maintain' the cutting edges. But to maintain cylinders with backlapping the blade must have relief. Backlapping does NOT replace grinding and should never be used to sharpen extremely dull or out of shape cylinders," said Ivan.

"Another advantage of applying relief to the blades is a direct saving on fuel and repair costs. These will go up when cylinders get dull or when there is no relief grind because it does take more engine horsepower to spin the cylinders and that power will wear out components sooner. With Relief ground blades less horsepower is required to drive the cylinder."

Mike Stephenson, from the Turf Division of Lely UK Ltd, also has strong arguments for their Toro professional mowers having relief ground blades, although they advocate different angles on the bottom blades in keeping with their policy of light contact rather than non-contact mowing.

"Our reasons for relief grinding are well documented," said Mike.

"We have found very strong evidence to support our belief that relief grinding is responsible for:

A reduction in wear - due to less metal to metal contact

A reduction in power requirement - due to less metal to metal contact and pinch of the cut turf between the cutting edges

Improvement in the quality of cut - due to a better, cleaner cutting action

A better after cut appearance - due to improved quality of cut

Increased recovery rate of turf - due to clean cut of the grass leaf

Reduced back lapping time - due to less contact

Improved land area resulting from backlapping - smaller contact area to lap

Permits light contact adjustment - better adjustment of contact area

Improved machine life - reduced stress on the component parts

The reason we encourage different angles on the bed knives is because the bed knife (bottom blade) front face angle aids the presentation of the leaf for cutting and changes (depending on application), according to the distance the front face is behind the cylinder centre.

Bed knife Top face angle keeps the land area to a minimum reducing power and assisting cutting edge maintenance."

Although many Head Greenkeepers now accept the value of relief grinding as the desired method for achieving the ultimate in quality of



cut and acknowledge the benefits outlined by the mower manufacturers, he also has other elements to consider such as the time taken to relief grind his units.

The perceived amount of time needed to prepare and apply a relief angle when viewed in isolation can be a deterrent to many Head Greenkeepers looking to allocate their maintenance engineers work schedule to maximise efficiency.

Ian Robson, Managing Director of Hunter Grinders Ltd, examines the variables that effect the time required to sharpen a unit and explains how relief grinding not only gives you all the elements to achieve quality of cut, but also saves time in the workshop.

Calculating the time required to keep a cutting unit sharp

A simple basic formula has been devised to allow you to calculate this for yourself, which is described as Value A + Value B + Value C = Total Time to sharpen each unit

Value A

- Time required removing the cutting unit from the mower and preparing it for grinding.

Value B

- Time required mounting the cutting unit in the grinder, sharpening it and removing it from the grinder.

Value C

- Time required reassembling, setting up and refitting the cutting unit to the mower.

When you add up the variables and compare spin grinding to relief grinding, spin grinding a unit takes less time to set up and complete. So it could be argued that there are small time advantages to be gained from spin grinding only!

However, there is another extremely important Value to be added to the equation which is invariably over-looked and yet has a dramatic effect on the calculation; It is the fact that a spin and relief ground unit will stay sharp at least three times longer than a spin ground only unit and indeed some operators claim their units will stay sharp

five or six times longer when the unit has a full relief grind only. On average a spin & relief ground unit will stay sharp for approximately 12 weeks compared to a spin ground unit which will only stay sharp for approximately four weeks.

If we revisit our earlier equation we can now add the missing value which radically alters the time scale required to sharpen the units. During a typical growing season a spin ground unit will need to be sharpened on average at least six times whereas the spin and relief ground units need only be sharpened twice. Incorporating this value as the number of times the unit is sharpened per season gives the following results:

Spin Grind only all season: If for example the Total time per unit is 50mins x 6 grinds = 300mins

Spin & Relief Grind all season: If for example the Total time per unit is 60mins x 2 grinds = 120mins

Now the true picture as to how much time is required to keep your cutting units sharp is beginning to emerge.

And of course the time frame has to be multiplied by the number of cutting units you might have!

On the basis that an average working day is eight hrs, if you owned 24 cutting units and chose to spin and relief you would only spend six working days (48hrs) sharpening your units compared to 15 working days (120hrs) if you chose to spin grind only. A saving of nine days!

And of-course the figures increase proportionally for any club owning more than 24 units.

Further benefits of relief and spin grinding

There are occasions when a cutting unit has been damaged from contact with debris for example, or heavily coned, when it would take considerably less time to grind if it was first relief ground and then spun ground! This is because you can remove far more metal when relief grinding using coolant than you can dry spin grinding. This has a direct bearing on how heavy a cut you can take. Relief grinding without the benefit of coolant creates a build up of heat which will cause the metal to lose its hardness making it

impossible to retain a sharp edge. Also when you relief grind there is not the impacting effect on the grinding wheel which you experience when spin grinding which again reflects on how heavy a cut you can take.

Setting Up Your Units

On the recommendation of some manufacturers such as John Deere and Jacobson, units should be set up to have no contact between the cylinder and the bed knife. Other manufacturers including Toro suggest that set up should ideally in their opinion, have very light contact between the cylinder and bed knife. Unfortunately if you only spin grind this very light contact is almost impossible to achieve. This is because the cutting land is the full width of the blade, unlike the small land which is achieved when you relief grind. This has a very undesirable effect on the bed knife because contact generates heat which in turn produces even greater contact. In other words the bed knife loses its sharpness far quicker and therefore needs to be ground more often and replaced far more frequently.

Mike Stephenson sums up by saying, "It is vital when servicing to keep the machine operating as the manufacturer intended. Therefore important consideration should be given not only to the method of grinding but also to using genuine original manufacturers parts so that the equipment is kept to the original manufacturer's specification.

And finally on whether relief grinding is really a necessary option," said Mike.

"We certainly wouldn't put an extra expensive process in the manufacturing if it wasn't a fundamental requirement."

For further information please contact:

Ivan Miller, Division Service Manager,
John Deere Ltd
Harby Road, Langar, Nottingham. NG13 9HT
Phone *44(1949)863244
Fax *44(1949)860490
e-mail: Millerivan@JohnDeere.com

Mike Stephenson,
Turf Division, Lely (UK) Limited
1 Station Road, St Neots, PE19 1QH, UK
Tel: +44 (0) 1480 226813
Mob: +44 (0) 7775511279
Fax: +44 (0) 1480 226861
E-mail: mstephenson@lely.com
www.toro.com

Ian Robson, Managing Director,
Hunter Grinders Ltd
Tel: 01207 270316
Email: admin@huntergrinders.com
www.huntergrinders.com

About the Author
Charmian Robinson, ABR Publicity
Tel: 01206 230831
Email: abr.publicity@virgin.net

ROTARY BLADE SHARPENING NEED NOT BE A GRIND

By James de Havilland

Rotary blades can be sharpened using a bench or angle grinder. Getting the job right, however, takes skill. Hurry the task and you can overheat the blade, making it more liable to damage. Get the sharpening angle wrong and you will compromise the quality of cut and almost certainly cause the mower to use more fuel.

Among the blade sharpening systems that will avoid this is the now well proven Bernhard Rotamaster 4000. Here we take a look at how it operates.

Developed from the Bernhard Rotamaster 3000 rotary blade sharpener, the 4000 model is much easier to set up for different types of blade. It also does a good job, the company fitting a 'SuperBlue' ceramic sharpening stone as standard. This is designed not only last longer than a traditional grinding stone but to also work at a lower temperature. This should ensure blade 'blueing' is eliminated.

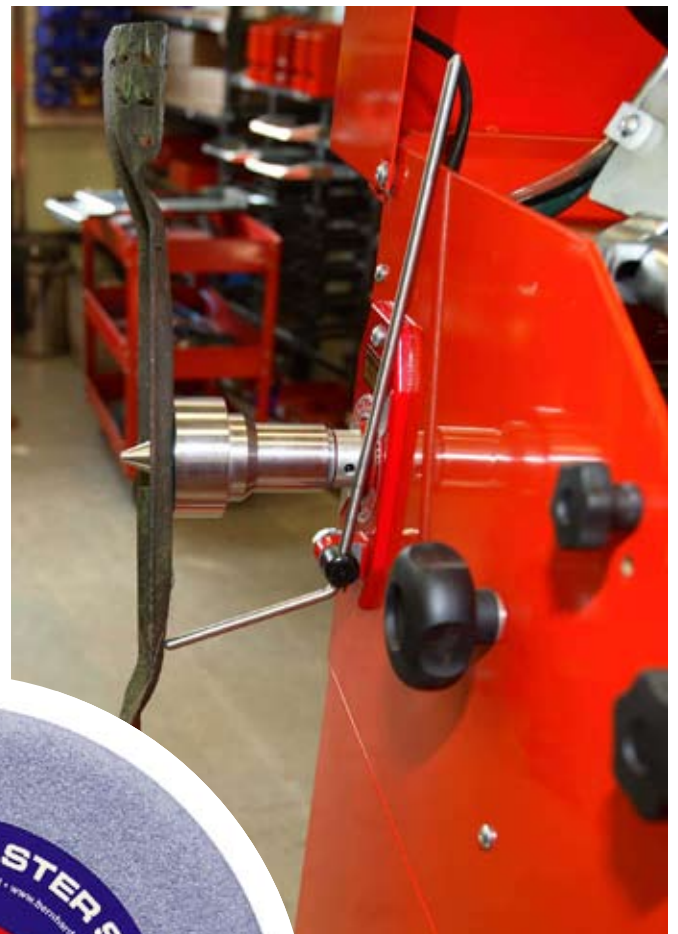
Once the Rotamaster 4000 has been set up, it will take up to 10 minutes for a really blunt and damaged blade to be properly sharpened. This will perhaps reduce to a couple of minutes if the blade has been regularly maintained.

Setting the machine to sharpen the 'light' end of the blade first enables the stop setting to be adjusted so that the heavy end has less metal removed by the time the process stops. This simple system evens up wear between the blades tips and so restores the balance.

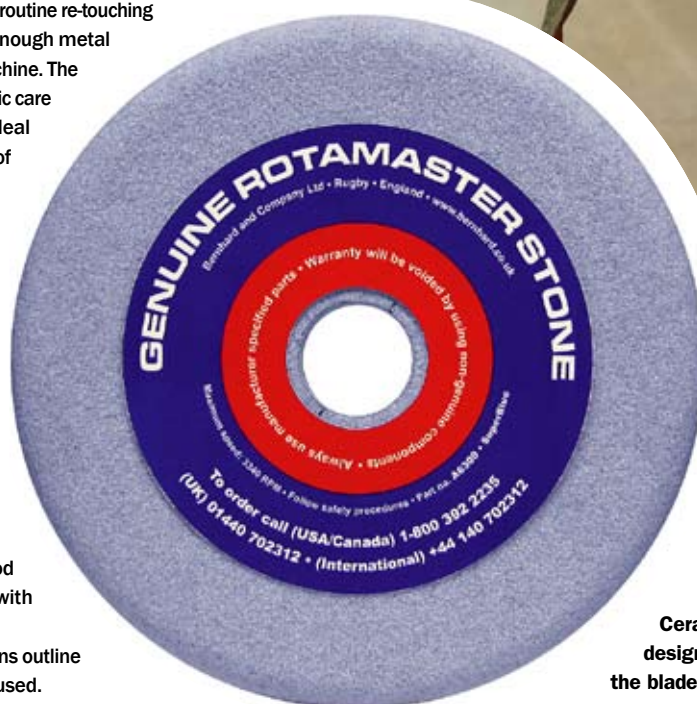
In trials, Bernhard has found routine re-touching allows a typical blade to have enough metal for 12 plus trips through the machine. The same blade receiving only periodic care will actually wear out a great deal faster. The hardness or temper of the original blade is protected by the integral cooling system and the use of a ceramic grindstone. When setting up, the aim is to ensure the blade is never allowed to blue.

The Rotamaster 4000 retails for £3,527. Sounds a tidy sum compared to an angle or bench grinder. The point is this is a precision grinding tool. A modern rotary mower can deliver a really good finish. But only when it is run with properly maintained blades.

The following picture captions outline the way the unit is set up and used.



A magnetic coupling allows the blade to be quickly checked for balance, the metal bar providing fixed datum to check blade is not bent. Dirty blade pictured should have been cleaned prior to balance check.



Ceramic SuperBlue grinding stone is designed to reduce the chance of damaging the blade by overheating it during the grind.



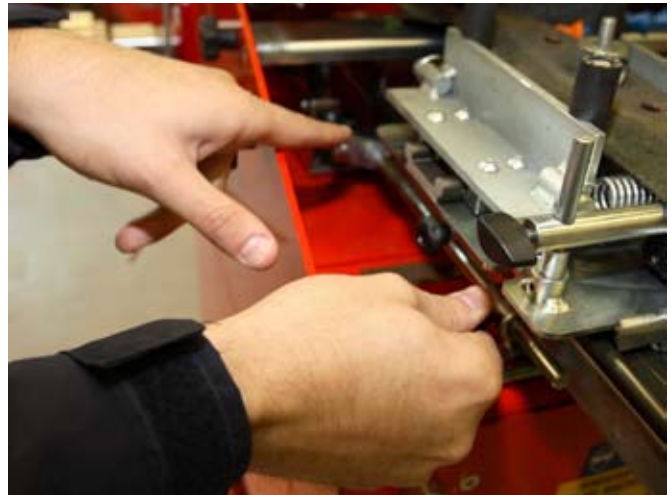
Rotamaster 4000 is able to accommodate most types of rotary blade, the machine's carriage incorporating a simple spring clamp with adjustable bar rest to keep it securely retained as it is sharpened.



For added security, a quick thread nut secures the blade through its central bolt hole. Note how the tip of the blade rests on a cross member. This provides support as the carriage moves back and forth. Blade sharpened light end first.



The distance the carriage travels across the face of the grind stone is set by setting manual stops. Once set for a specific blade type, this setting can be retained. Micro switches trigger the pneumatic ram powering the carriage to change direction.



Doing a dummy run with the carriage pushed in and out by hand is recommended. This allows the amount of travel to be fine tuned to suit the blade. Note also the adjustment incorporated for the rear blade support.



The carriage can be angled to allow the degree of blend grinding to be adjusted. This feature enables sharpening to be concentrated more at the blade tip and also reduces material removed from the blade shoulder, so retaining the blade's strength.



A simple jockey wheel can be lowered onto the blade so the grinding wheel follows a ramped profile. Simple and effective, it ensures consistent sharpening across the area to be ground.

Fine tuning

Although it may take as long as 5 minutes to set up the machine when getting used to it, practice will see this time more than halved, even when clamping in a blade type that has not been encountered before. Once the blade is clamped in place and set to match the sharpening angle recommended by the mower manufacturer, the Rotamaster 4000 can be left to automatically sharpen the blade.



The black handle to the left is used to manually track the carriage during initial setting, the adjacent switch setting the auto track mode to the left or right according to how the blade is handed. Flow control determines the quantity of cooling water pumped to the ceramic grindstone.



An enclosure is lowered to cover the action when the blade is being sharpened, a vacuum drawing most of the waste away from the work. Water is used to cool the blade to prevent it from overheating. Ceramic grindstone claimed to virtually eliminate the chance of 'blueing'.



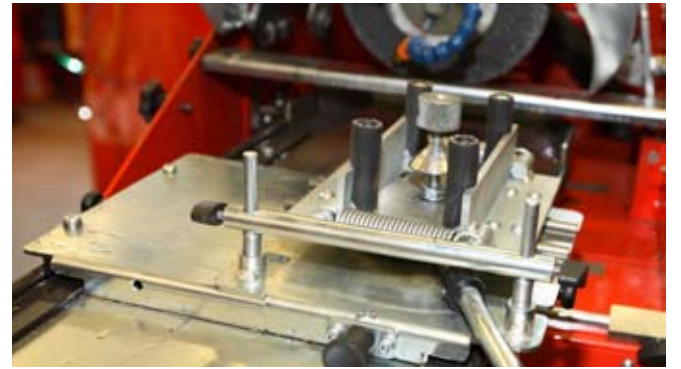
Main controls on the front panel are self-explanatory, the big red panic button stopping everything in one simple action. Thoughtful fuse position is an example of the detail that has gone into the design of the machine.

Coping with different handed blades

The carriage has two separate positions to allow left- and right-handed blades to be sharpened, the grinding wheel flipping to work on either side. The key travel settings can be retained for pairs of handed blades, but any blend grind settings will need to be re-set when switching over.



The carriage is set to the left for right-handed blades.



It is then moved over to the right for left-handed blades.



The direction of grind wheel also needs to be reversed...



...to accommodate the blade type.



Detail shot of ground blade, showing concave grind. According to Bernhard, this produces a better quality of cut. Bernhard has designed the Rotamaster 4000 so it can achieve the correct cutting angle for a specific blade.