



HARDY

MADE IN LIVERPOOL



HARDY UK LIMITED
RE-BLADING

TECHNICAL GUIDE



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RE-BLADING

Spiral blades used in most tanneries can be divided into two primary types – those that cut and those that do not. This booklet focuses on Hardy blades that cut; including shaving and fleshing blades.

The quality of the housekeeping, maintenance, re-blading and grinding will all have a profound effect on the quality of the shave finish and the yield achieved. For this reason, the process of de-blading and re-blading should always be undertaken by qualified individuals with proven experience, who should be suitably equipped with the correct tooling and personal protection equipment to perform the task safely and to a high quality.

MANUAL RE-BLADING, BALANCING AND INITIAL GRINDING-IN

Machinery assisted re-blading generally produces the best results, particularly when combined with machine grinding and cylinder balancing. However, it is recognised that not all tanneries have access to machine re-blading so the following provides guidance for a 'manual' de-blading and re-blading operation and is appropriate for either shaving or fleshing knives.

De-blading

Once the cylinder has been removed from the machine, it should be secured on a pair of trestles to allow safe and convenient removal of the used blades (de-blading). We would suggest the use of a purpose-built pneumatic impact wrench (available from Hardy UK) for this process.

Place a V-form chisel on the centre of the remaining blade at the end of the cylinder. Using an upward motion knock the blade up and out of the groove to ensure no damage occurs to the groove walls. At this point, use the power fork underneath the blade and the continuous action of the impact wrench will lift the blade completely clear from the cylinder. The cylinder will be rotated on the trestles during this operation.

Continue to remove all blades from the cylinder. Occasionally, a blade may fracture and break during de-blading. In this case, simply repeat the procedure and gently remove the leading edge of the used blade

to lift it from the bottom groove and then use the power fork to complete the removal of the blade.

If a pneumatic impact wrench is unavailable, de-blading can be performed using a purpose built chisel set and mallet but care must be taken not to damage the cylinder in any way. Only ever use sufficient force to enable the blade removal and rotate the cylinder on the trestles to ensure the angle of the chisel is facing away from the operator.

'Soft Bottom'

Hardy blades (shaving and fleshing) are manufactured in such a way that the portion fitted into the cylinder groove is slightly 'softer' than the portion of the blade used for shaving or fleshing without compromising the performance. This facilitates a much easier re-blading process and provides for a quicker and safer operation. Alternative manufacturer's blades may be much harder at the bottom groove section and it may require increased effort to remove them effectively and safely and they may have a tendency to fracture. Once the blade is removed from the groove, the caulking can be extracted easily using purpose built grips. Grip the old caulking and simply rotate the cylinder in the trestles. Old caulking should be disposed of and never reused. Reuse of caulking may lead to potential damage to new blades and the cylinder. This may also affect the shaving or fleshing quality and yield. It could also cause a risk to the health and safety of the machine operators.



The alternative blade removal technique is to remove the caulking first by either spiralling out or pulling out the caulking using various homemade devices. This can be a laborious and time consuming method as the caulking may break more frequently and particular care needs to be taken not to damage the cylinder bottom groove.

Cylinder Preparation

The cylinder is now ready to be prepared for the installation of new blades. There will be an accumulation of debris from the shaving machine, from the caulking and possibly from rusting and it is important that the cylinder is thoroughly inspected and cleaned before installing the new blade set. Carefully remove all debris paying particular attention to the bottom groove, which must be clean.

The cylinder should be protected with a suitable paint designed to eliminate oxidation and chemical attack. Do not paint the machined surface of the bottom groove as this may cause the blades to be incorrectly locked by the caulking. Do not paint the blades. Hardy blades are finish coated, which will provide adequate protection against normal chemical aggression and oxidation experienced in a tannery. Painting of low cost blades is done for aesthetic purposes and may cause damage to the grinding wheel by clogging the abrasion/epoxy void.

Cylinder Walls

The walls should not be deformed in any way as this can affect the 'lean' of the blade or cause snagging when using the pneumatic chisel. There may also not be enough 'grip' on the blades if the walls are worn away or rounded off.

If the cylinder bottom groove needs to be re-machined, this should be undertaken at a suitably equipped and qualified machine shop. Only the minimum amount of material should be removed and the initial profile of the groove must be maintained. Always refer to the machinery manufacturer's recommendations.

Re-blading and Caulking

Once the cylinder has been completely prepared, the new blades can be installed. To ensure the re-blading is undertaken correctly and efficiently, we recommend:

- a general purpose caulking chisel
- a pneumatic impact wrench
- a general purpose power chisel
- a blade clamp should be available
- all products are available from Hardy

IMPORTANT - Ensure that the compressed air pressure is set at the correct pressure (5.5-7 bar) for the pneumatic tools being used.

All Hardy blades have an individual identifying stamp mark so you can be sure your Hardy blade is both legitimate and fully traceable.

To ensure that the blades are correctly installed, all Hardy blades are supplied with an identifying transfer adhered at the end of each blade. The blades should be installed to ensure that the diamond transfers meet in the middle section of the cylinder. This will ensure that the blade angle of lean is in the correct orientation. It is normal to install the corresponding opposite blade to ensure that they meet correctly at the centre point of the cylinder. The process is repeated until the full cylinder is completely re-bladed. The blades should easily rotate into the bottom groove without any excessive force. If the blades do not spiral easily into the cylinder groove, do not fit them.

There are many varieties of cylinder groove patterns and it is recommended that the blades are installed in line with the machinery manufacturer's recommendations.

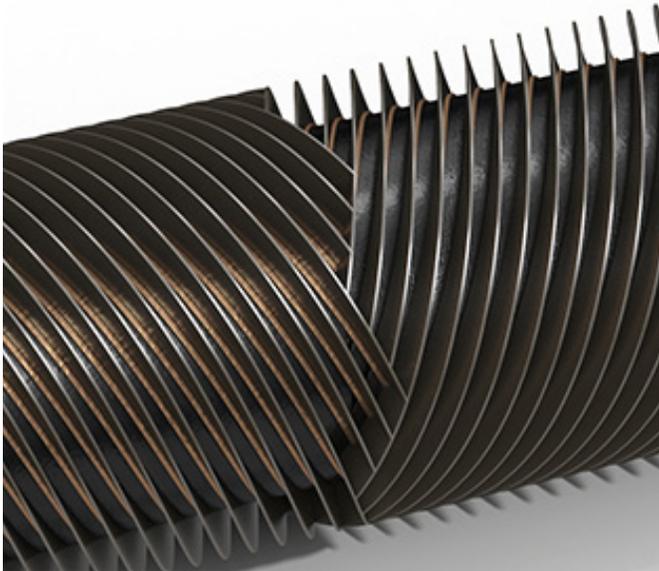
Hardy blades must not be hit with excessive force as the impact shock could crack or fracture them (this is the same for any blade). If it is necessary to lightly tap the blade because of the cylinder condition, care must be taken to use a soft mallet and with minimum force but it is better practice to remove any obstruction before applying force to the blade. The Hardy blades are produced 'slightly longer' in length than required to help the re-blader. Best practice is to bevel the angle of the blade where it will meet the opposite blade at the cylinder centre line so that the left hand and right hand blades butt together with either no gap or a minimal gap.

IMPORTANT - Where a gap is left this may cause 'snagging' issues on the leather, in some cases it may be filled with solder or left if experience dictates.

Each blade must not protrude into the groove of the opposite side. Any excess blade length at the end of the cylinder should be cut flush after the blade has been caulked. It is important not to apply too much cutting force as this could alter the metallurgy of the blade.



The picture below shows a correctly butted joint line for staggered bottom groove design. This is a common pattern and ensures that the blades produce a consistent shave across the full length of the cylinder.

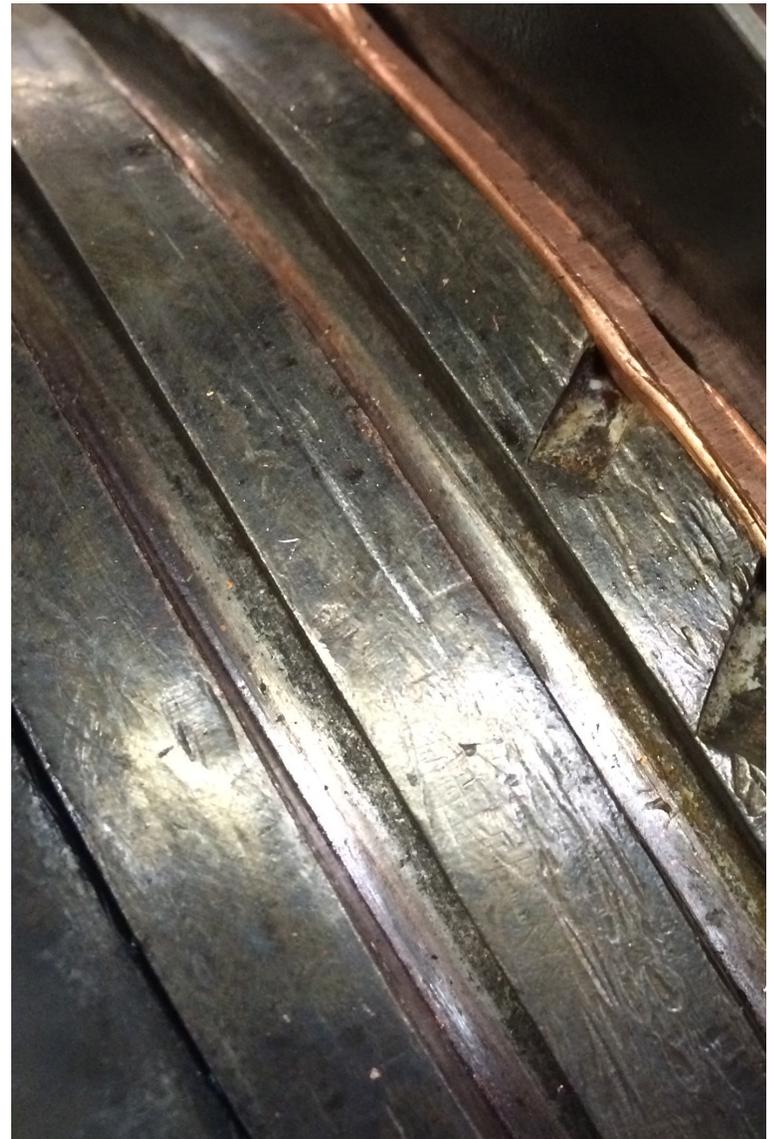


On this cylinder, the blades are butted with almost no gap as required by the specific application. Some cylinders may be re-bladed with a small gap at the butt joint particularly where high temperatures may result from the shaving process.

IMPORTANT - The bevelled joint can be made by lightly grinding before installing the blade.

Caulking

For holding the knives in place Hardy recommends the use of copper caulking as it is both soft and pliable but also tough. Once the blade is positioned correctly in the bottom groove, caulking can begin. The caulking must fill all of the bottom groove when impacted in and must be of an even height throughout the length of the cylinder. The correct copper must be used at all times as the purpose is to lock the blade into the groove without the potential for the blade to vibrate. For this reason, copper caulking should only ever be used once.



Caulking is supplied in coils and an experienced re-blader may choose to use the continuous coil during re-blading, which will provide an even caulking across the length of the cylinder, or cut sections of caulking into individual strips. The blade must be positioned in such a way that the back edge is perfectly square to the wall of the cylinder whilst ensuring it sits firmly onto the bottom groove throughout. Best practice is to use a device to hold the blade in position but care must be taken not to use excessive force - just enough to hold the blade into position. The best results will be obtained by using a grooved soft-wheel device to hold the blade into position whilst allowing the cylinder to be rotated.

IMPORTANT - Some re-bladers choose to solder the centre butts of the cylinder. This should be done at your own discretion.

Some re-bladers prefer to use a short piece of caulking to set the blade in position in order to check the lean as the blade will become square to the cylinder as it is held in place. Also, it is possible to check the butt and bevelled edge is correct before installing the blade.





Starting from the centre of the cylinder, position the caulking into the groove and, using the pneumatic impact wrench and correct chisel, apply pressure to the caulking from the top whilst ensuring the blade is held firmly and correctly in the bottom of the cylinder groove. Trace the spiral of the blade to ensure the caulking is completed in a smooth action. The blade must be firmly locked and caulking must not be forced underneath the blade, which will cause it to lift out of the bottom groove.

IMPORTANT - Ensure the pneumatic hammer is held in a vertical position to avoid impact with the blade.

Ring Test

It is possible to conduct an unsophisticated test at the end of the re-blading to ensure that the blades have been correctly locked. Using a soft metal mallet, lightly tap the top of each blade, a 'ringing' sound should be heard and should be consistent across the length of each blade. If there is a variation in the sound, that particular blade could be damaged or not correctly locked into place and should be replaced or re-caulked.

IMPORTANT - Do not use steel or iron hammers when testing or applying light force onto the blade. Do not shock-impact the blade at any time and do not apply excessive force on the blade.

Initial Grinding

This is a vital process before refitting of the cylinder into the machine. The objective of initial grinding-in is to grind the edge of the blades along their full length in order to ensure the blade cutting edge is parallel to the centre line of the cylinder.

The cylinder is mounted between two centres and checked for both concentricity and that the cylinder is parallel to the grinding wheel carriage. It is recommended that the bearing blocks are not removed as this could affect the balancing of the cylinder when they are refitted. However, it is good practice to check the condition of the bearing before installing the cylinder onto the grinding machine and, if necessary, replace the bearings following the machine manufacturer's recommendations.



The grinding process should be conducted using 'conservative' speeds and traverse feed rate to ensure that there is no excessive generation of heat, which could temper (soften) the blades. Feed the grinding wheel until it touches the edge of the blades. Ensure there is no high spot along the full length of the cylinder by making small adjustments to the feed whilst continually traversing the grinding carriage until a small grinding spark is observed.

Some customers choose to change the rotation of the grinding wheel to the same direction as the cylinder (commonly referred to as reverse grinding) to speed up the grinding-in process. It is critical that in-feed speeds are reduced to a minimum. Initial grinding-in is complete when the grinding spark is of a common size across the full length of the cylinder, at which point the cylinder is ready for reinstallation into the shaving machine.

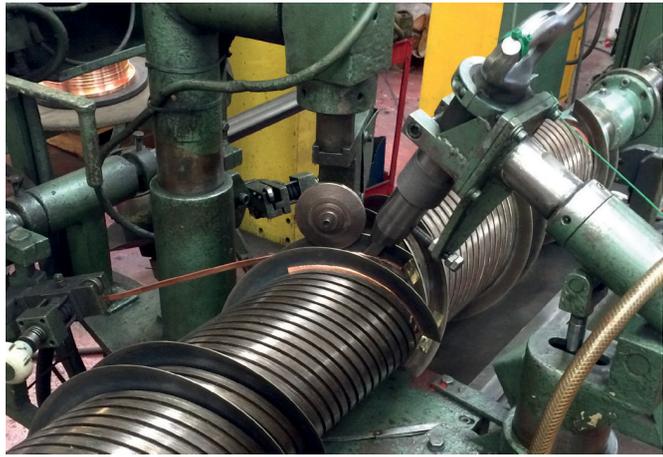
IMPORTANT - Once ground in it is important to revert the grinding wheel back to its original rotation and continue to grind softly for a short period of time. This will complete the edge and avoid any extra wear on the blade as a reverse grind is extremely abrasive.

Balancing

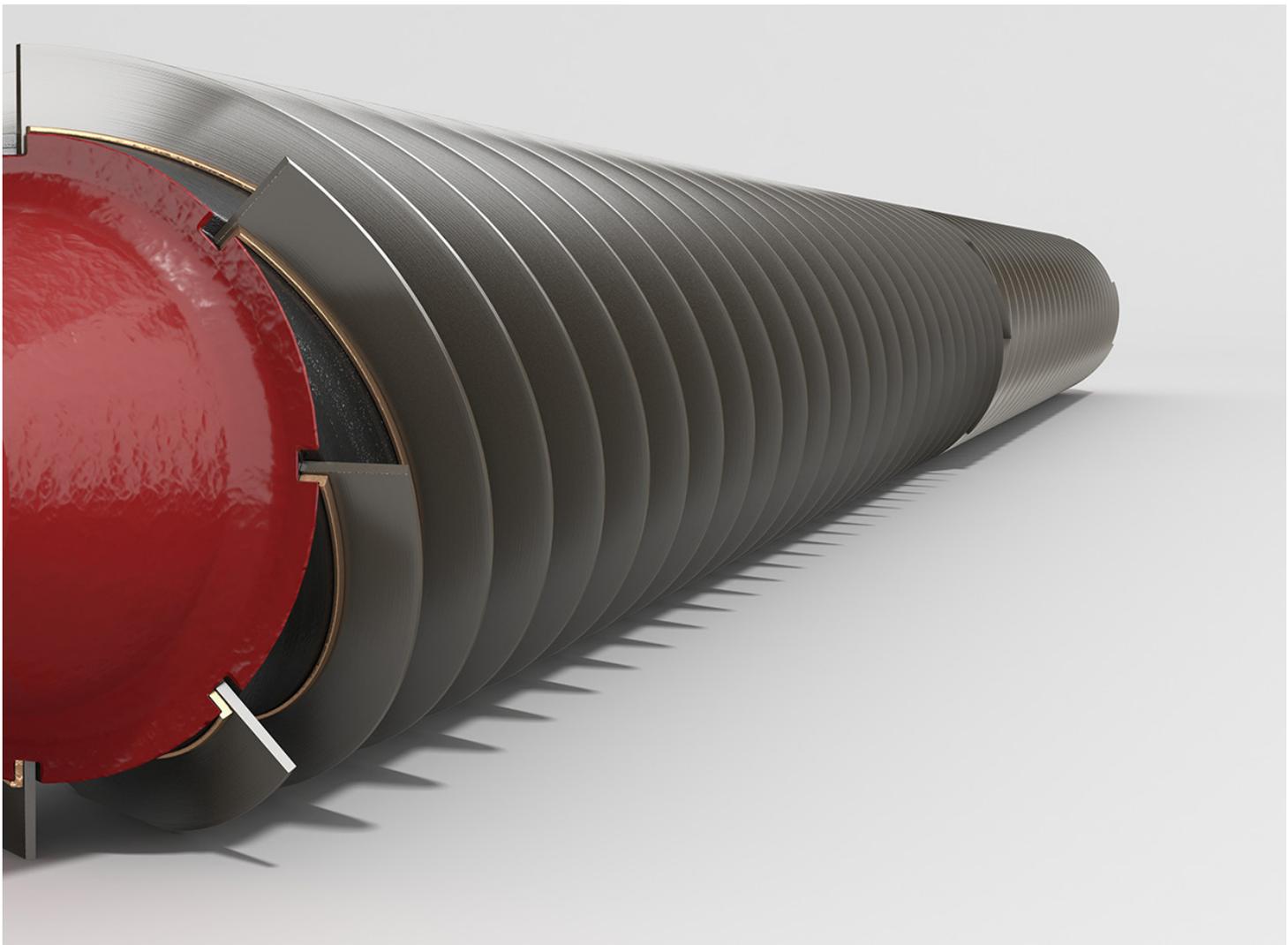
The total mass of the cylinder, blades, caulking and bearings should be rebalanced to ensure that there is no deflection during rotation. There are many devices to check cylinder balancing from simple hand held devices to integrated systems on reblading or grinding-in machines. Each device will have certain sensitivity settings and will rebalance to varying tolerances and cylinders can be rebalanced by removing material or by adjusting moveable weights. However, the total mass should be rebalanced every time the cylinder is removed from the machine.

The picture opposite shows a fully re-bladed cylinder. Note how the end of the blades have been cut to fit the length of the cylinder and also how the caulking is of uniform height.





Machine re-blading process



CUTTING EDGE
PRECISION BLADES
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