

Introduction to Sharpening & Honing Carving Chisels

By Larry Grohovez

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Larry has spent the past ten years running his own specialist woodcraft and woodcarving business, and now brings us the first article in a five part series revealing his tried and tested sharpening method which can be used to sharpening the Arbortech Power Chisel.

There is a lot of misunderstanding in regard to sharpening carving chisels, mainly due to the vast array of stone and systems available, many which cross styles.

There is a difference in the measurement scale between United States and Japanese manufacturers in grit sizes. Sharp tools will make your work easier and reduce or eliminate the need to sand. This series of articles decipher and arrange this information into cross-reference tables and graphs to simplify this information. Pictures and diagrams will assist in de-mystifying the art of sharpening your chisels.

The following three stages are probably the most important things to remember when sharpening.



Note: If your edge is in reasonable condition, you can skip Step No. 1, but Steps 2 & 3 are essential.

A common error made by most inexperienced sharpeners is to go from a coarse stone to a very fine stone and miss an intermediate stone, that is - they go from Step 1 to Step 2 and miss out on Step 3.

Sharpening can be compared to sandpapering in that you must sand the timber with coarse, then medium and then fine sandpaper.

Difference between Sharpening and Honing

Sharpening is to regrind the bevel giving you a new edge, therefore removing any chips or imperfections in the edge. It will also have the effect of straightening up the edge if it has worn unevenly.

Honing is to strop the bevel to remove fine scratches that affect the edge and to remove the burr or fine metal tailings that remain after sharpening.

It is a good work habit to have a leather strop next to you while you carve so you can regularly hone your bevel for a second to touch up the edge. A sharp edge will not blunt so quickly.

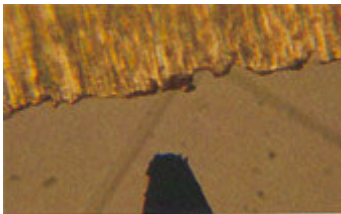
When to sharpen or hone

You should sharpen your chisel when:-

- Edge is chipped
- tool tears or crushes wood fibres
- Too develops a rounded bevel
- Tool has to be pushed with force to cut

Honing chisels should be done:-

- Immediately after sharpening
- When unable to slice thin shavings
- Every 15 minutes or so during use as a good work practice



Chisel pictured through a microscope magnified 60x. It shows the scratches on bevel from a 800 grit stone. A scratchy edge to either the bevel or inner canal will result in a jagged edge. A jagged edge will dull quickly. This tool requires honing to remove burrs and saw tooth edge.

NB: Black triangle in bottom of picture is a pin point.

There are a large variety of stones available in the market place. They fall under two types, hand stones or electric spinning stones. Of these there are many types of materials using both wet or dry formats.

Generally, electric stones turn at a faster rate and therefore removal metal quicker so a coolant as well as a lubricant should be considered. Listed below is a reference table of stone types, their nature and recommended lubricants.

LIST OF STONE TYPES & RECOMMENDED LUBRICANTS

Type	Material	Origin	Lubricant	Hardness
Arkansas (Washita)	Natural Stone	Natural	Oil/Water	Hard
Japanese Water	Aluminium Oxide	Man made	Water	Soft
Indian	Aluminium Oxide	Man made	Oil	Hard
Ruby	Ruby/Aluminium Oxide	Man made	Water	Hard
Ceramic	Clay	Natural	Dry	Hard
Wheel type	Aluminium Oxide	Man made	Dry	Hard
DMT*	Diamond	Man made	Water	Hard
Ezelap*	Diamond	Man made	Dry	Hard
*Registered Trade Brand				

Hint!

- Traditional Carborundum stones are in fact India stones
- As stones fill with metal particles they should be washed occasionally.
- Soft stones wear down quickly but are easy to flatten again.
- Some stones are available in coarse/fine combinations.
- Store stones in a dust free container.

Grit	Arkansas	DMT	EZELAP	Ceramic	Japan Water	India	Ruby	Wheels	Rubberised
36									Coarse
46								46	
60								60	
80								80	Medium
100						Coarse			
120								120	
180			Coarse		#240	Medium	Coarse		Fine
220		X Coarse					Medium		
240									
270			Medium						
280						Fine			
320									Very Fine
325		Coarse					Fine		
350	Washita								
425					#800				

500	Soft				#1000				
600		Fine	Fine		#1200	X Fine	X Fine		
700	Hard			Medium	#2000				
800									
900	Black			Fine					
1000					#4000				
1200		X Fine	Super Fine	Ultra Fine					
1600					#6000				
2200					#8000				

Note: The description used to define the grits is that used by the respective manufacturer, so the same grit stone may have a different name. For example X Fine (1200) is also known as Ultra fine and Super fine by different manufacturers. There is a difference in the way the Japanese and USA systems grade the grit sizes of their stones. This is the cause of much confusion. As a rule if you are unsure, the Japanese tend to use very high numbers whereas the USA use numbers under 900. Listed below is a comparison table.

Note: The grits do not increase incrementally.

USA	Japanese
100	150
180	240
240	280
280	360
320	500
350	600
500	1000
600	1200
700	2000
900	4000
1200	5000
1600	6000
2200	8000

Hint!

- Remember to sharpen from coarse to medium to fine to get consistent results.
- Electric drive wheels turn faster so the cutting action seems to be a little finer. A coarse grit will cut slightly finer than the same grit in a handstone.

Systems Available

The systems of stones can be grouped into four categories:

- Hand stones
- Bench grinder wheel type (high speed/dry)
- Bench grinder wheel type (slow/water)
- Flat wheel type (water)

Type	Advantages	Disadvantages
1. Hand Stone	<ul style="list-style-type: none">• Cheap• Combinations in one stone• Portable• Oil or water	<ul style="list-style-type: none">• Slow• Hard to maintain bevel
2. Bench Grinder (fast)	<ul style="list-style-type: none">• Fast• Common• Useful for other tools	<ul style="list-style-type: none">• Easily over grind bevel• Hollow grind bevel• Easily overheat tool• No fine stone available
3. Bench Grinder (slow/water)	<ul style="list-style-type: none">• Cannot overheat tool• Good control	<ul style="list-style-type: none">• Patience required• Expensive• Not easily portable
4. Flat Wheel	<ul style="list-style-type: none">• Water or dry• Flat grind to bevel• Perfect speed• Good visibility• Interchangeable wheels	<ul style="list-style-type: none">• Expensive• Not easily portable

For sharpening I would recommend systems 1, 3 & 4. System 2 is too harsh on the tools and it is very easy to over grind your chisel.

I spoke about the differences between sharpening and honing and last month, gave detailed descriptions on stone and the various types, brands and grades on the market.

This month, I'll discuss honing which is probably the most important and misunderstood part of the whole sharpening process.

Honing is the last stage of the sharpening process. It is the fine sharpening which polishes the bevel. This removes the scratches left by the coarser grits and also removes the burr or tailings on the edge. A spin-off advantage of honing is that a polished bevel leaves a smooth surface as timber has the ability to burnish. This also seals the end grain slightly letting the timber refract more light and therefore finishes will not appear to be so dull.

Honing can be achieved by two methods:-

- a powered wheel
- a hand strop

In both methods, the honing wheel or strop needs to be charged with a rouge or compound. It is this compound that polishes the metal.

There are different compounds that cut or polish at different rates and these are listed in the table below.

Types of Honing Wheels

<u>TYPE</u>	<u>GRADE</u>	<u>COMPOUND</u>
Leather	Medium	Rouge
Felt	Hard or Medium	Rouge
Paper	Fine	Rouge
Rubber	Coarse to Extra Fine	None (Impregnated in Wheel)
Scotchbrite	Coarse	None

- Honing wheels do not polish the bevel, they are the holder of the compound. It is the compound that polishes the metal.
- Honing on a power wheel will still generate heat so be careful not to overheat tool edge.

Honing Compounds

Honing compounds are waxed based materials that contain different abrasives. It is the abrasive that removes metal. Some compounds contain a coarse fast cutting abrasive while others have fine abrasives that polish rather than cut. Honing where you polish rather than fast cut is also known as buffing. Manufacturers use a colour code for their compounds and while they all vary a little in their formulate they do not have comparable cuttings grits.

There are three basic groupings of honing compounds :

A.	ABRASIVE CUT	FAST CUT, REMOVE COARSE SCRATCHES
B.	MEDIUM CUT/FIRST STAGE POLISH	GOOD ALL ROUNDER
C.	FINE POLISH	BUFFING AND POLISHING

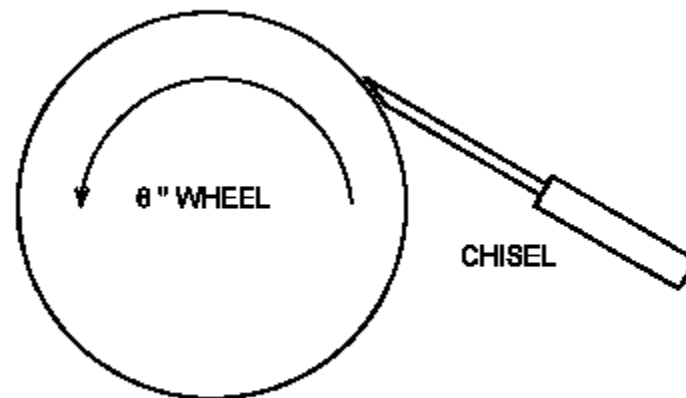
- Never mix different compounds on one wheel as they melt you will have neither one nor the other.
- Apply a small amount of compound often rather than a lot at once, a second on a fast spinning wheel is adequate.

COMPOUND CHART

<u>COLOUR</u>	<u>TYPE</u>	<u>ACTION</u>
Black (Grey)	A	Fastest Abrasive cutter
Green (Dark)	A	Best All rounder, fast
White	B	Good all rounder, medium
Brown Rouge (Tropili)	B	Slower Cut
Blue rouge	C	Polisher, Very slow cut
Green (Light)	C	Polish Only

When honing on a bench grinder type wheel, it is important to note that the direction of the wheel must be reversed. This can be easily achieved by swapping the tool rest and covers left to right.

Note the rotation of the wheel in relation to the chisel in Diagram 2 below.



WHEEL ROTATES ANTI-CLOCKWISE

Diagram 2

When honing on a bench grinder, care must be taken not to roll over the edge. Often a lot of hard work is ruined by one second of lost concentration at the grinder.

Felt bobs are not recommended as they are soft and roll over the edge easily. They are useful in the very beginning of the sharpening process to remove scratches or rust from the inner canal.

- Felt wheels contract as you tighten the the nut on the arbor and therefore can lose shape. It is recommended that once you have a wheel on your bench grinder you do not remove it too often as you may have trouble centering the wheel again.

Tool Terminology

When you first purchase a chisel it will have a straight cutting edge and a flat bevel. The bevel may be scratchy because few manufacturers hone the bevel, however this is the shape you should try to keep the chisel in during its working life.

Some experienced carvers develop shapes to enhance their carving style or to suit a particular timber. An example is to remove the wings or have a secondary bevel. Though these can be of benefit to some carvers, I do not recommend the practice until you have a lot of experience. It only takes one error to do a lot of damage to a chisel, particularly a fishtail or amateur size gouge.

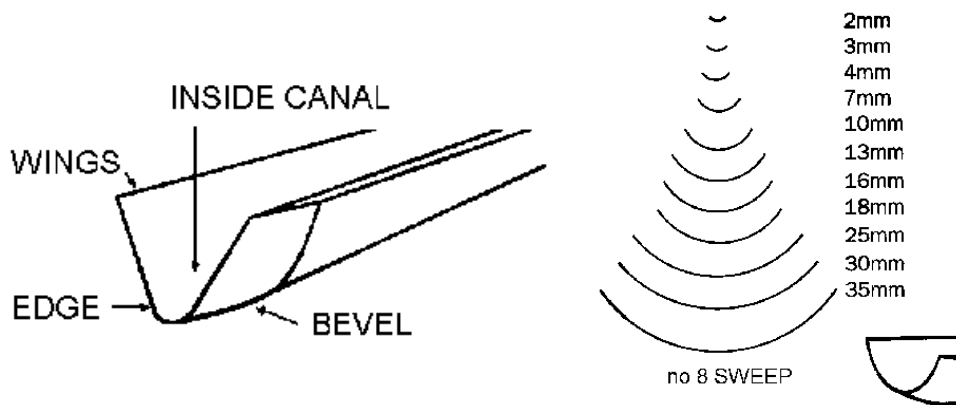


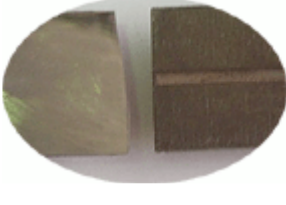


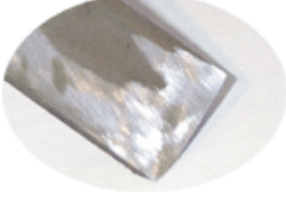


Diagram 3

The sweep is the shape of the arc of the cutting edge. The edge is the only part of the chisel that cuts. As in Diagram 3, a number 8 sweep will come in many sizes, usually indicated in millimeters. A chisel with a number 8 sweep that is 10mm long is called an 8-10. As is the case with most things to do with carving and sharpening, many countries have their own sweeps and they are not always the same. Check carefully with your manufacturer before mixing brands.

Common Sharpening Problems

 <p>Figure 1</p>	<p><u>The Crooked Edge</u></p> <p>This is caused by not rotating the chisel evenly while sharpening causing extra wear on one part of the bevel.</p>
 <p>Figure 2</p>	<p><u>Moon shaped Edge</u></p> <p>This is caused by rotating the chisel too much during sharpening. To remedy you will need to flatten the edge of your chisel and start again.</p>
 <p>Figure 3</p>	<p><u>Skewed Edge</u></p> <p>This is caused by not keeping the chisel body at right angles to the stone while sharpening.</p>
 <p>Figure 4</p>	<p><u>Hook</u></p> <p>This is caused by sharpening the sides but not sharpening the bottom fold of the chisel. An equal amount of time will be required to sharpen the bottom fold as on the wings.</p>
 <p>Figure 5</p>	<p><u>Hollow side</u></p> <p>This is caused by not sharpening the side wings parallel to the angle of the inner canal. The "V" tool should be considered as three chisels in one, the two sides and the bottom fold.</p>
 <p>Figure 6</p>	<p><u>Scratchy Face</u></p> <p>Scratches on the inside canal caused by a rough stone will transfer to the edge causing a saw tooth effect.</p> <p>Conical stones to touch up the inner canal</p>

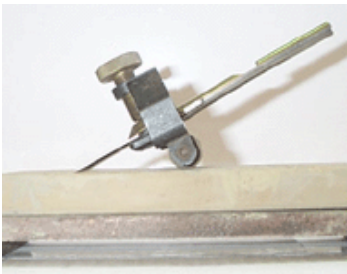
should be of a fine grit 700 (USA) or finer.

Sharpening Techniques

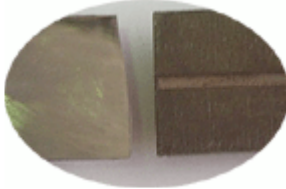
Tool Handling

The actual approach of the chisel to the stone is where a lot of carvers get into strife. If the bevel angle is not correct or you move the chisel angle whilst sharpening, you will get multi-facets to the bevel or a curved bevel. Your first aim is to try and achieve a flat bevel, the angle is not so critical as long as it is flat.

The angle of the bevel should be between 20 to 30 degrees depending on the timber you are carving. However I recommend that you keep the same angle that is on the bevel when you purchase the chisel. It is provably at 25 degrees and that is perfect for most timbers you will be carving.



While moving the chisel up and down it is critical to keep the angle constant. Any change in the angle will result in a rounded bevel.



It is important to keep the chisel at right angles to the stone while sharpening otherwise you will get a skewed edge.

Sharpening Sequence

As detailed in the introduction, the sharpening sequence listed below is critical to follow. If you skip a stage you will be trying to hone a scratchy bevel or fine-polish a bad edge.

1.	2.	3.
COARSE STONE	FINE STONE	HONE

If you are restoring old chisels that may be rusted or pitted, you must first attend to the inner canal. This must be in good condition as it will directly affect the edge.

Much has been made of how you push the chisel across the stone. Some say to only push away from you, others work in a figure eight motion and others in slicing motions as if cutting an apple.

It does not matter how you move the chisel, the stone will remove metal by friction either way, but it is critical to keep the angle which the bevel slides up the stone constant.

Most of the problems with poor cutting chisels is that the bevel is rounded or multi-faceted. The first skill you need to develop is achieving a flat bevel, then you can concentrate on edge shapes and honing.

Step 1.

Coarse grade India Stone

Using a Coarse grade India Stone, straighten up the edge by holding the chisel upright and moving it against the stone. This will true up and remove any chips in the edge.

Step 2.

Coarse grade India Stone

Still using your coarse grade India Stone, place bevel on stone at the angle you wish to have (20-30 degrees). Being careful to maintain this angle constantly, move chisel up and down the stone, rotating chisel to follow the sweep and being careful to spend an even amount of time on all parts of the bevel. Continue until an even small burr is formed across the entire cutting edge.

Step 3.

Medium-Fine grade
India stone

Using a medium-fine grade India stone, continue as in Step 2, being careful to sharpen bevel evenly. Sharpen until the coarse scratch marks have been replaced by the finer marks of the medium stone.

Step 4.

Fine Slip stone

Using a fine slip stone, gently rub a fine stone on the inside canal of the chisel to remove the fine burr left by the stone sharpening the bevel side. In the case of a chisel with a fast sweep, use the appropriate shaped stone. Be careful not to roll over the edge at this stage and do not break off the burr with a sideways motion as this will cause a saw tooth effect. The burr must be honed off at the same angle as the bevel and inside canal.

Step 5.

Leather stop or
honing wheel

the bevel. This will finally remove the burr on the edge and the bevel will give you a burnished cut. Remember that leather is spongy so the chisel should always be dragged backwards across the surface and not forwards as it will cut into the leather. This principal also applies to a honing wheel.

Step 6.

Cloth

As rouge and compounds are waxed based, it is desirable to clean off the residue on the bevel. Using a cloth, also wipe off any oil on the chisel body that remains from the India stones. If left on the chisel, these will almost certainly transfer to your timber and may effect the finish or stain the timber itself.

Step 7.

Sharpening V Tools

The same procedure applies as above, but remember that these chisels should be regarded as three chisels in one.

Firstly sharpen the two sides evenly being careful to follow the angle of the inside canal. Next treat the bottom hook as a mini gouge and sharpen it with the same angle as the side bevels. This will remove the hook so the edge should be straight.

About the Author: Larry Grohovaz has an extensive background in carpentry, joinery and machinery shops, as well as house construction and civil engineering. He has spent the past ten years running his own specialist woodcraft and woodcarving business.