

# Sharpening

**What is it?** - The process of grinding a tool to provide a keen edge for cutting.

**Why do it?** - A sharp edge cuts more efficient requiring less effort and it leaves a cleaner finished surface. “WHICH MEANS LESS SANDING “

**When do you sharpen?** 1. When the cut surface begins to deteriorate.

2. When it starts to take more effort to make a cut. 3. Always before a final finish cut.

In order to sharpen a tool there are a few basic things you need to understand. If you don't understand these concepts you end up wasting a lot of steel on an expensive tool through trial and error.

**What is a cutting edge?** It's the intersection of two sides of metal at different angles. The more acute the angle the sharper the edge but the shorter it's life because there is less steel under the edge supporting it.

**Why different cutting angles?** A. They provide clearance for manipulating the tool. B. Changing the angle varies how aggressive the tool will be

**Why different bevel lengths?** A longer bevel will have more drag. A shorter bevel will have less and go around a tighter curve. This is basically one of the reason for the double bevel. The double bevel is easily done with a spacer block in the tool holder of the v-arm

When working with any kind of a burr set the lathe speed around 500 rpm any faster just prematurely wears out the burr.

**What is a burr?** It is a small curl of metal formed from the fire and heat in the grinding process. Note: this is what turners call the coarse burr. It is used to remove large quantities of wood quickly. It does not necessarily leave the best finish and depending on the type of wood there may be some tear out. This burr is best formed on carbon and M2 steel. You must raise the tool handle way up. It is because of the curl of the burr not because if you get a catch it will throw the tip of the tool into open air rather than draw it into the wood. Tool rest height is not critical as long as it is close to center

**What is a micro burr?** It is a burr formed with a stone or burnisher not a grinder. The steel is crushed or displaced at the cutting edge by the stone or burnisher. This is a finer burr which will last longer and leave a smoother surface than the coarse burr. It cuts best at the center of the wood with the tool flat on the rest and horizontal.

No burr – a scraper can be used to shear scrape by rotating the tool 45 degrees to the wood rotation and riding the bevel. It is great for removing torn grain and hard dense tropical woods.

## **RULES OF SHARPENING TURNING TOOLS**

1. Profile the shape of the tools first.
2. Start at the heel of the bevel and raise it to the cutting edge.
3. Always use a **LIGHT TOUCH**.

# Grinders

There are many types of systems on the market. They include belt systems which can cost \$500 plus accessories. Belts don't last long and get expensive fast, wet systems like the Tormax start around \$600 plus accessories adding up to several hundred dollars, dry wheel grinders are the most widely accepted and most economical, with a good grinder averaging around \$125-150 dollars. A pair of wheels ranges from \$125-200 dollars. It is what I use and will be talking about.

## SAFETY, SAFETY, SAFETY

Whether you are using a high or low speed grinder they can be very dangerous.

1. Make sure you are running your grinder below the maximum speed the wheels are rated for. Onehalf the maximum speed is highly recommended in several articles I have read.
2. Stand to the side of your grinder when you start it.
3. Never grind on the side of the wheels they are not made for side pressure and the sides are not dressed and should not be. This practice can cause a wheel to explode.
4. **Always wear a face shield.** Those little plastic shields on the grinder are worthless

**High speed VS. Low speed** High speed cuts faster, causing more heat and vibration. Low speed removes less steel at a time resulting in less heat and vibration, making shaping the tool easier with better control.

## Grinding Wheels and Dressers

What do the numbers on the side of the wheel mean?

**Grit Size** 36-46 for roughing, 60-80 for finishing. I use a 46 roughing and a 60 finishing wheel. Any wheel you use should be classified as friable. This means

the binder of the wheel breaks down slowly during sharpening exposing fresh sharp cutting edges of the grit while running cool and clean. Most wheels today are aluminum oxide. The newest technology is the ceramic wheels. They claim for most people they will last a life time.

**Wheel Dressers** - They range from the old star wheel which is not recommended any more, to single point diamonds mainly used for shaping wheels; to the T shaped multi diamond dressers which today are the most popular. **(With any of them use a very light touch)**

## **Type**

There are several on the market. By far the most popular and most recommended is the OneWay Wolverine system. It is the one I use and will be talking about. It costs about \$140, including the vari-grind jig. One additional jig that is very handy is the one for grinding a skew. If you have trouble sharpening the skew I highly recommend it. Cost is \$30

## **Advantages**

It puts the same grind on the tool every time so it cuts the same every time. This eliminates the guess work of how the tool will cut.

It also cuts the learning curve of sharpening way down and in turn cuts it for turning too because every time the tool cuts the same.

## **One problem with the vari-grind jig**

The tool cradle of the jig is too long and it prevents you from sharpening the full length of the tool.

## **Solution:**

Make your own jig as I did or use one of the new metal handles that allow you to slide the tool in and out.

## Question:

Regarding the new fixed post for the vari-grind jig; does anyone have it and can you do a long Irish grind with it? I'm betting not.

Before we actually get into sharpening we need touch, just a little bit, on what we are going to sharpen. Without getting into a technical metallurgy subject I'm going to high lite some of the basic characteristics of the metals we use as turners.

**Carbon steel** – Obviously it is a steel high in carbon. It produces a very keen or sharp edge but has very poor wear resistance so the life of the edge can be very short. It will raise a good burr and is easily honed with an India or Washita stone. When grinding it you will see a white spark with a pattern that easily breaks apart. If you *blue* the edge you have changed the temper of it to a hardness too soft for wood turning. You must let it cool and re-grind the *blued* edge away. Keep the edge cool by dipping in water often.

**M2 tool Steel** – It will not get quite as sharp but holds an edge 2-3 times longer. It raises a good burr and can still be honed with a natural stone. When ground it produces individual orange sparks with a much tighter pattern. A *blued* edge is no problem. **DO NOT QUENCH IN WATER! IT CAN CAUSE CHIPPING AT THE EDGE.**

**Kryo Steels** – undergo a cryogenic treatment that changes the molecular structure of the steel, increasing its ability to hold an edge, 3-6 times longer. Next it is triple-tempered to prevent chipping and breakage during use. A burr is harder to draw and honing can only succeed with diamond hones.

The reality is that the wear resistance of the tool increases with each step up from carbon steel through the various grades of high-speed steel, to the new ASP2060 and beyond. However, with each hardness increase your ability to form a sharp edge decreases. **For most of us we do not use the tools enough to justify the cost of the higher alloy steels beyond a good grade of M2 tool steel.**

## Using the Wolverine System

**Use a light touch** – it removes steel at a slower rate, builds up less heat in the tool & is easier to get a smoother shape because you are less tense

**Use a slower speed** –for the same reasons as above

**Cutting angles** – are measured on the tool not on the jig .

**Tool cutting angles** – are changed by sliding the base v-arm in and out or a combination of adjusting the platform angle and sliding the v-arm

**To match an existing tool angle** – set the entire bevel of the tool on the wheel so there is no gap between the wheel and the bevel at either the top or bottom (LOOK FROM THE SIDE OF THE WHEEL). Tip: color the tools bevel with a sharpie it makes it easier to see where the grinding wheel is cutting

**Vari-grind jig** – Is for gouges only for the system to work the tool over hang must be set by either a stop block on the grinder base or a grinding jig stop block like Lyle Jamieson's

**Vari-grind jig setting** – Put the top surface of the leg on the flat of the fourth notch and leave it alone **DO NOT CHANGE IT**

**V-arm fine adjustment** is done by putting your thumb and index finger on opposite sides of the arm & use a squeeze push or pull to move the v-arm in or out.

**Scrapers** – are set flat on the platform surface and the handle swung back and forth to keep the edge of the tool on the grinder

**Parting tools** –can be sharpened on the platform or in the v-arm, it depends on the tool shape

**Curved skews** –The handle of the tool is set in the v-arm. The cutting end is moved in an arc, from the heel to the toe across the wheel, stopping when the top surface of the tool is perpendicular to the face of the wheel.

**Straight skews** – are easiest sharpened in the skew jig.

**Gouges** – are done in the vari-grind jig. The angle is set from the end of the tool not the side.