Sharpen Your Drill Bits

Author: Phil B

http://www.instructables.com/id/Sharpen-Your-Drill-Bits/?ALLSTEPS

Sharp drill bits are fun to use. They work so well. Dull bits are dangerous. They can break. One broke for me once and went through my thumbnail and out the other side of my thumb.

**Step 1** A dull bit and a sharp bit

The bit on the left is a little dull. Notice the glint of light on the cutting edge between the two flutes. Compare that with the crisp edge on the freshly sharpened bit on the right.

**Step 2** My favorite sharpening tool

People who know what they are doing can sharpen bits by hand. In theory, hold the bit with the shank angled off to the left at about 59 degrees. As the bit contacts the grinding wheel, simultaneously move the shank farther left and downward while twisting it clockwise. I have tried, but I have never been able to make it work for me.

**Step 3** Set to 59 degrees

This sharpening guide can accept drill bits with several different profiles. My bits have a 59 degree profile on the cutting edge. Set the tool to 59 degrees and tighten the thumbnut.
**Step 4** Catch the edge

The tool has a small tip and the edges of the bit's flutes rest against it. You may have to raise or lower the tip so it fits against the flute edges properly.

**Step 5** How much overhang

As a starting point make the overhang (space between the yellow lines) equal to the radius of the bit (space between the green lines). See the next step for why it matters.

**Step 6** Width and angle of the cutting edge

Notice the angle of the red line. If there is too much overhang in the previous step, the red line will approximate the cutting edge at the tip of the bit. It is too wide and the bit profile will be too flat. The bit will skate on a metal surface and the hole will be hard to start. You can reduce the bit's overhang quite a bit, but be careful. If you reduce it too much, the tip you adjusted in step 4 may come into contact with the grinding wheel and you will damage your sharpening guide.

**Step 7** Ideal cutting edge angle

The ideal is to have the shortest cutting edge possible. This would be a cutting edge that runs between the low points in the valleys of the fluting. See the yellow line. This bit is close to ideal and will cut steel very well.

**Step 8** Clamp the bit in the tool
When you have the overhang set, turn down the screw that clamps the bit in the tool's trough.

**Step 9 Set the tool for bit length**

Set the sharpening guide for the length of the bit you want to sharpen. Keep the end of the bit in the moveable trough, not hanging in the air. Loosen the metal colored nut. Adjust the black nut. Tighten the metal colored nut.

**Step 10 Align for height**

The end of the bit should be squarely aligned with the grinding wheel. I use a radial arm saw for my grinding. The tip of the bit should be even with the center of the motor shaft.

**Step 11 Clamp the tool to the table**

You want the bit to kiss the grinding wheel while sharpening it. If the bit is too close to the grinding wheel; sharpening will be difficult, the bit will become too hot, and you will remove a lot more material than necessary.

Keep the base of the sharpening guide square to the surface of the grinding stone (green lines), but turn the upper portion of the guide so the tip of the drill bit is just a little to the left of the center (angle between long green line
and the yellow line). Slide the guide forward so the bit lightly touches the grinding wheel's surface. Clamp the guide to the table.

**Step 12 Get ready to grind the bit**

Swing the tip of the bit to the right. Start the motor.

**Step 13 Grind**

Swing the rear of the sharpening guide to the right (red arrow) so the tip of the bit moves into the wheel. The yellow shower of sparks is added in a photo editing program, but the actual grinding happens when the bit is in about this position.

**Step 14 Rotate the bit one-half turn**

Continue swinging the guide until the tip of the bit is beyond the cutting wheel. You need to rotate the bit one-half turn and repeat the process in order to sharpen the other half of the bit.

It is safer to turn the motor off and wait for the wheel to stop. Loosen the hold down on the bit and turn the bit one half turn. Make sure the flute rests on the guide's tip. Repeat the process from the last two steps.

Shut the motor off. Remove the bit. Check width of the center cutting edge on the bit. Adjust the overhang and repeat the grinding process if it is not satisfactory.

**Step 15 The finished bit**
This is how your bit should appear. Notice there are no longer any worn, rounded cutting edges casting glints of light. Everything is sharp and crisp. The length and angle of the cutting edge at the tip of the drill bit are good, too.

**Step 16 Small sizes**

A sharpening guide like this one works well for bits 1/8 inch and above. It does not work with smaller bits than 1/8 inch.

Make a special wooden block to serve as a guide for a handstone when sharpening small bits. The angle of the lines in red is 77 degrees. Make the block about 4 inches long.

**Step 17 Compound angles**

This is the edge of the block. The angle between the red lines is 59 degrees.

**Step 18 A guide line**

Notice the "V" in the top surface of the block. It runs the length of the block and makes a place for the small bits to be cradled. The angle between the red lines is also 59 degrees. This serves as a guide line to align with the leading edge of each half of the bit. A visual alignment is satisfactory.

**Step 19 Placing the bit against the block**
Place a bit into the "V" groove on the back face of the block. Place the block into a vise so the end of the bit rests on top of and against the jaws and so that it just barely extends above the angled surface of the block. Turn the bit so the leading edge of the first half follows the guide line. Use a "C" clamp to hold the bit in place. Put some oil on a small handstone, like those used for sharpening fishhooks. Stroke along the angled surface of the block so the bit is being sharpened at the same time. When the stone is no longer cutting on the bit, turn it half of a turn and sharpen the other side. Inspect the bit with a magnifying glass, if necessary.