

Tips for the Frugal Woodturner: Christmas Ornaments and other Small Turnings
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This presentation is intended to present some ideas and tips that are only a starting point on which a woodturner can build as need and experience dictate.

A. TOOLS

General: A number of useful shop-made turning tools and replacement tool bits can be made using inexpensive shop tools and materials. High speed steel can be formed with a grinder or belt sander. A 1" belt sander (Fig. 1) can be used to both form a tool bit and to sharpen it. Special metal grinding belts can be used or use a belt that is no longer sharp enough to sand wood. HSS can cut using a high speed cut-off tool (Fig. 2) with an abrasive disk (blade); however, cuts should be limited to straight lines. The cutting action depends on grit embedded in the disk grinding away the metal. Any attempt to use the side of the disk risks causing the disk to break-up with likely injury to the operator. As a safety precaution always clamp the metal to be cut in a vice, wear eye protection and if there is significant grinding to do wear a respirator.

Tools from square tool bits: Square tool bits are available from many suppliers of machine shop tools. Square tool bits are available in a variety of sizes, most useful are 1/8", 3/16" and 1/4" x 2 1/2 ". Breaking the bits into two or three pieces makes them a more usable size. Don't try to cut them, they are way too hard. One way to break them is to score one side at the desired break point with a grinder, wrap the bit in a cloth, put it in a vice and tap the bit with a hammer on the side that has been scored. Wrapping with cloth contains the brittle metal in case it shatters. These pieces are useful for making tools but also as inexpensive replacement bits for catalog bought tools. For example 3/16" sq bit is a common cutter size for hollowing tools. From MSC the bit will cost about \$3 and can be broken into two or three usable bits. From a turning supply catalog a 3/16" bit 1" long will cost \$10.

Figure 3 illustrates (l to rt) a shop-made bit holder; three square tool bits (1/8", 3/16" and 1/4"), and a commercially available bit holder for 3/16" sq bits. All bits can be sharpened using a grinder or belt sander (safest) to have either a rounded or square tip. The shop-made bit holder is a piece of 1/2" square cold rolled steel, with an appropriate sized hole drilled in the end for the bit (3/16" dia hole for a 1/8" sq bit; 1/4" dia. hole for a 3/16" sq bit), and with one side drilled and tapped for a 1/4" set screw. A drill press makes this easier but is not essential. A square tip bit makes very consistent groves in projects. These can be decorative themselves or a groove to hold a veneer accent strip. Veneer strips of several standard widths (1/8", 3/16" 1/4") of many species or stained a color are available.

Figure 5 illustrates two tools used for hollowing small hollow forms through a small opening. The tool is a total of 19" long with a 6" long handle. The shank is a piece of 1/4" black plumber's pipe. The bit is a piece of 3/16" sq tool bit. The bit just fits inside of the 1/4" pipe. Medium superglue is used to fill the voids and keep the bit in place. If the bit needs to be replaced the end of the pipe is heated with a torch until the super glue breaks down, then the bit can be grasped with a pair of pliers and pulled out. The handle is designed to not roll and provide a good grip so that the tool will not twist easily out of your hand. This small bit has a very aggressive cutting action and is intended to remove wood without regard for leaving a smooth surface.

Tools from planner blades

Figure 4 illustrates tools made from planner blades (l to r) two shop-made goose necked scrapers, a planner blade (raw material) three shop-made scraper blades (compare at \$33/ea from Craft Supplies), and a catalog-bought tool holder from the Dennis Stewart system. HSS planner blades are used in lumber

mills in many places in the Northwest. These blades are sharpened on a regular basis and discarded when they become too narrow to be held in the planner. Used blades have scrap metal value to the mill and can be had for little or nothing (plus a little begging). Blades that are 1/8" to 3/16" thick are most desirable. Chipper blades are also available, but are usually 1/4" to 1/2" thick and can be used in certain turning applications: however, they are heavy, harder to form, usually significantly shorter than planner blades and thus do not offer any advantage. The goose necked scrapers are used for hollowing spheres for Christmas ornaments. It is important to assure that the cutting portion of the head is not on the side of the blade that was sharpened. Form your tool with the thick part of the planner blade on the left as you look from the handle. Make sure that the sharp edge of the scraper is on the left. To avoid excess twisting force and thus a catch, the widest portion of the blade must always be on the tool rest and the cutting edge must never extend beyond the projected edge of the blade that is touching the tool rest. Put a handle on the scraper. In this illustration the second scraper from the left extends 3" beyond the wide part of the blade and the tool is a total of 20" long. The blade is 5/32" thick. The handle is oval with a 5/32" saw kerf. The blade is held in the handle by winding wire around the end (like a ferule) then filling the voids with epoxy glue. Tape is wound over the wire to protect the hands.

Tools from drill rod

Figure 6 illustrates shop-made tools from drill rod (l to r): two 3/8" diameter bent tools, 1/4" tool, and a 3/8" straight tool holder. Drill rod is available untempered in many diameters and is rated as to how it is to be quenched (air, water, or oil) during tempering. The most common sizes used are 1/4" and 3/8" diameter, oil quenched. The 3/8" tools are usually placed in a metal tool holder such as the Dennis Omni tool, or in one of the metal tool handles such as those made by Oneway, Kelton or Munro or in a shop made wooden handle. The first two tools are made by heating the end of a piece of drill rod red hot bending the tip. Next, half of the tip 1/2" of the rod is ground away to form a flat. The end is tempered and then sharpened as any round nose scraper. The 1/4" bent tool is intended to be used to hollow a small piece through a small hole. Note that the cutting tip is in line with the centerline of the shaft, this prevents twisting in use and thus reduces the chance of a catch. In this case the whole tool is tempered to provide more strength and less bending. The tool on the far right is a piece of 3/8" drill rod with no tempering involved. This straight piece of rod is ground at the end to provide a flat with an angle of about 15 degrees to the axis. A hole is drilled perpendicular to the flat and tapped to accept a hex head 10x32 screw. A small washer held by the screw will clamp a scraper blade such as the three shown in figure 4 or the one shown in figure 6.

B. Tips and Fixtures for small turnings

1. Holding ornament blanks

A. Wooden Faceplates with machined nut inserts.

(Common sizes: 1"x8 tpi, 1 1/2"x8 tpi, 3/4"x10 tpi, 33mmx3.5 tpc)

1) Glue blanks to faceplates

2) Form faceplates to make holding jigs for both headstock and tailstock.

B. Morse taper glue block

C. Wood collet chuck.

2. Making spheres (balls)

A. Between cup centers Ref 3, Springett, 1993, pp24-26

B. Jam Chuck Ref 1, Ernie Conover 1990

C. Using a spherical jig, David Springett, 1993, pp 27-29.

D. 42% rule, Ref 2, Henk Wolf 1996

3. Closed-ball Ornaments

A. Surface treatments before hollowing.

- 1) Grooves or threads (tool made from an old tap, can be used for pens or thread chasing)
- 2) Drilled holes (drill bushings in wooden block held in the banjo)
- 3) Veneer strips (sanding sealer before sanding if strips contrast greatly)
- 5) Burn lines Wire vs Formica

B. Hollowing

- 1) Measuring wall thickness
 - a) Shop made tool with coat hanger and brass rod.
 - b) Shop made wooden depth gauge to determine top thickness.
- 2) Hollowing approaches
 - a) Hole in the bottom end (hold by a tenon).
 - b) Part the ornament in half, hollow both halves, glue together, and disguise the joint.
 1. Parting tools
 2. Part other than mid-point, perhaps 1/3 from top, hollow each section, glue and disguise the joint.

C. Add on pieces

- 1) Finial Hanger - wire
- 2) Making a collet to hold the finial or icicle for turning

4. Open-ball Ornaments

A. Drill the ball with a drill press using a board with a depression to hold the ball.

B. Captured sphere chuck, Ref. 3 Woodturning Wizardry" by David Springett, 1993, pp 6-8

C. Hollowing the sphere: same tool choices as with the closed sphere above.

D. Inserted feature items: after forming the item a plug is turned from the waste block and inserted.

5. Miscellaneous

A. Sandpaper cleaner

B. Protection for fluted parting tool or beading tool

C. Wooden collets for turning bottle stoppers.

Sources for some supplies:

MSC Industrial Supply

1-800-645-7270

mcsdirect.com

Square Tool Bits, 10% Cobalt, 2 1/2" long

1/8" Part # 00370890 \$2.59 ea

3/16" Part # 02605129 \$2.97 ea

1/4" Part # 02605160 \$3.12 ea

Hardware Store

1/4" black pipe. \$1.80/ft

1/4" drill rod \$8/4'

3/8" drill rod, \$12.99/4'

Large nuts for faceplate inserts:

Beaver Bolt
14965 SW 72nd, Beaverson, OR
1-800-233-3837 or 503-620-7373

Vancouver Bolt and Supply Inc
805 W. 11th St, Vancouver, WA 98660
1-800-882-2658 or 360-694-4153

Other Supplies
The Beal Tool Co. 800-331-4718
541 Swans Road, N.#., Newark, OH 43055

Penn State Industries
2850 Comly Road, Philadelphia, PA 19154
www.penstateind.com

Craft Supplies, USA 800-551-8876
P.O. Box 50300, Provo, Utah 84650-0030
www.craftusa.com

Packard Woodworks 800-683-8876
P.O. Box 718, Tryon, NC 28782
www.packardwoodworks.com

Lee Valley
www.leevalley.com

References:

1. Ernie Conover, Turning Croquet balls. American Woodworker April 1990, pp54-55
2. Henk Wolf, Magic formula for turning balls. Woodturning Nov. 1996, No.47 p77.
3. David Springett, Woodturning Wizardry, 1993, Guild of Master Craftsman Publications

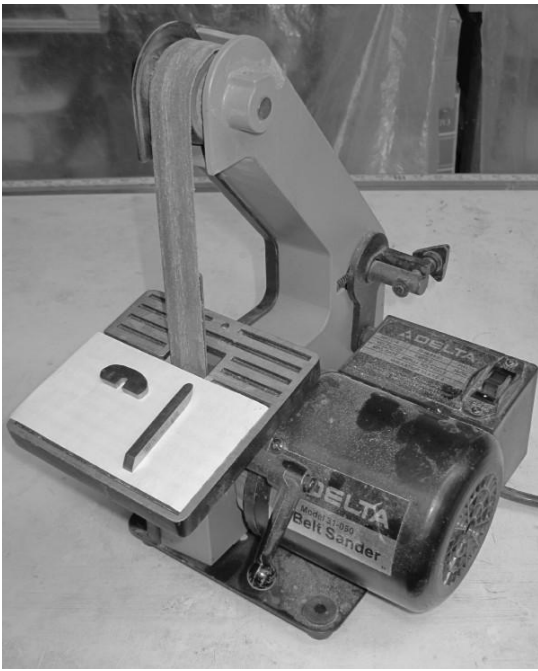


Figure 1. One inch belt sander



Figure 2. High speed cut off tool, air-powered
3" dia metal cut-off blade, abrasive.



Figure 3. Tools from square tool bits.



Figure 4. Tools from planner blades.

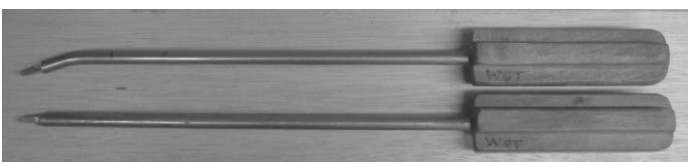


Figure 5. Deep hollowing tools, 3/16" wide bits.



Figure 6. Tools from drill rod.