Techniques and Tools for End Grain Turning
John Horn

By understanding the theory of how end grain wants to be cut, both the tools and technique choices become much more manageable.

1. **What should we consider when we want to hollow end grain?** Since it is not efficient to cut directly into end grain, we need tools that can cut into the side grain on the inside of a vessel.

2. **Why is end grain turning different from side grain turning?** With end grain turning the grain runs parallel to the bed of the lathe, with side grain turning, which is the way most bowls are oriented, the grain runs 90 degrees to the bed of the lathe.

3. **What major types of tools can be used in end grain turning, their advantages and limitations?**

Spindle Gouges –3/8 inch for smaller and 1/2 inch for larger, deeper vessels. The spindle gouge features fast removal of material for relatively small projects. The depth of the cut is limited by the mass of the gouge. Smaller diameter gouges start to vibrate as the length over the tool rest is extended. Good tool control is highly desired for removing material without catches. Richard Raffan's back cut technique removes material very quickly but is prone to catches until considerable skill is developed.

Bowl Gouges - From 1/4 inch to 5/8 inch A bowl gouge can be used to remove wood quickly if used with controlled cuts.. When used for end grain hollowing, the bowl gouge is very aggressive and it can be dangerous if the turner has limited experience. Depending on the depth and angle required for the cut, the gouge may not be able to be positioned for an effective cut on some shapes. Then other tools are employed for final shaping.

Scrapers – Various sizes and shapes The scraper will remove wood efficiently and safely but not quite as quickly as the bowl gouge, the ring tool, or the hook tool. Scrapers are more popular and usually easier to control and less risky through smaller openings than most other tools. The scraper must be pointed slightly downward or just less than 90 degrees to avoid catches. A 3/16 wide cutter is the most common size used by many professional turners for hollowing vessels with small openings at the top. A wide variety of scrapers are available for different situations. The scraping cutter is placed on any number of different holding systems from the short handled Bob Rosand type scraper to the long handled David Ellsworth, Trent Bosch, and Michael Hosaluk style handles to the various systems like the Stewart and Sorby Systems, Jamieson style system and the Elbo Tool. The small scrapers will cut into tighter corners. Larger broad curved scrapers can be used to remove material or smooth out tool marks left by the more aggressive smaller scraping cutters. Square nosed scrapers can shape flat bottomed surfaces.

Scrapers in general are prone to leaving tear out or sub-surface damage due to the scraping action of the tool. Consider using scrapers when other, more efficient cutting tools like the gouges, ring or hook tools cannot be positioned properly or would not be considered safe for the desired shape of the vessel.

Ring Tools

Oneway Termite Tool –

The Termite Tool, made of M4 steel, is the only pure ring tool on the market at this time. The ring tool is similar to a hook tool but the tool circle is completely closed. The tool cuts efficiently when properly controlled.

Modified Ring Tools

Hamlet Hollowing System – Big Brother and Little Brother
Hunter Tool - Nano Carbide circular cutter 3/16, 1/4, and 1/2 inch sizes
Rolly Munro Hollowing Tools
Woodcut Pro-Forme Hollowing System

Each system is similar to a ring tool in some respects but offers different features to reduce the possibilities of catches. Some of the systems feature articulated boring bars which make them more versatile Cutting efficiently, the modified ring tools are usually easy to master. The expense of the tool system seems to be the primary negative feature.

Hook Tools

Michael Hosaluk
Andre Martel

Hook tools have been around for centuries and are widely known for removing material very quickly when used properly. Each manufacturer uses a slightly different grind and thus requires different tool positioning to make a cut. Hook tools are not usually made of high speed steel and thus require frequent sharpening preferably with a diamond hone. Since making a hook can be rather low-tech, many are shop made and are not widely available commercially for several reasons. The hook tool is famous for getting catches and sometimes breaking at the time of a catch. Used in the hands of an experienced hook tool turner, amazing shavings can be produced.

Arm brace systems

Stewart System (No longer available)
Sorby System
John Jordan System

Arm brace systems were the major tool of choice some years ago for hollowing when the tool needed to extend over the tool rest a significant distance. It is still favored by a number of experienced turners due to the ease of movement and the sensitivity to feeling the surface of the wood. The arm brace helps to control the tool movement, but it is not recommended for beginners. The potential for arm and shoulder injury in unskilled hands is very real.

Captured handle systems

Elbo Tool (Tim Yoder)
Carter Captured Hollowing System
Jaimeson Hollowing System
Kelton Hollowing Rig
Oneway Deep Hollowing System

Several captured handle systems have entered the market in the last few years which make deeper hollowing much more manageable than the arm brace systems for less experienced turners. Most of the systems may be equipped with laser wall thickness gauges which can greatly reduce the errors in wall thickness. Although much safer than arm brace systems, they are somewhat more inconvenient and slower to use. Overall, a person must consider the positive features versus the negative features as well as the cost.

5. Rules for handle length. The ratio of the distance the tool is over the tool rest to the length of the rest of the tool plus the handle should be 5 to 1. In other words for every inch the tool extends over the tool rest there should be 5 inches of tool and handle extending behind the tool rest.

6. How to select the tool or tool system best suited for the end grain project.

1. Suit the tool size to the project size.
2. Use smaller tools in relatively shallow depth projects until tool control issues are solved.
3. Use cutting tools, like gouges, ring tools, modified ring tools or hook tools when possible.
4. Captured handle systems are especially effective when cutting 4-10+ inches deep.
5. There is no one tool that will work in all situations.

7. Some tools can be made in the shop.

1. Bob Rosand style scraper
2. Straight boring tool with 3/16 cutter bit
3. Articulated boring bar ... www.aroundthewoods.com
4. Hook Tool ... www.aroundthewoods.com or www.alanlacer.com
5. Jamieson style hollowing system

Resources

Andre Martel..... www.martel.public.netc.net 1-450-293-2186

Craft Supplies USA..... www.woodturningcatalog.com 1-800-551-8876

Michael Hosaluk ..... m.hosaluk@sasktel.net 1-306-382-2380

Lyle Jamieson Woodturning LLC www.lylejamieson.com ……1-231-947-2348

Oneway Manufacturing … www.oneway.ca,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,..... 1-800-565-7288

Packard Woodworks, Inc. www.packardwoodworks.com 1-800-683-8876

Robert Rosand ……bobrosand@Gmail.com……..1-570-784-6158

Rockler …… http://www.rockler.com/ …… 817-417-0070

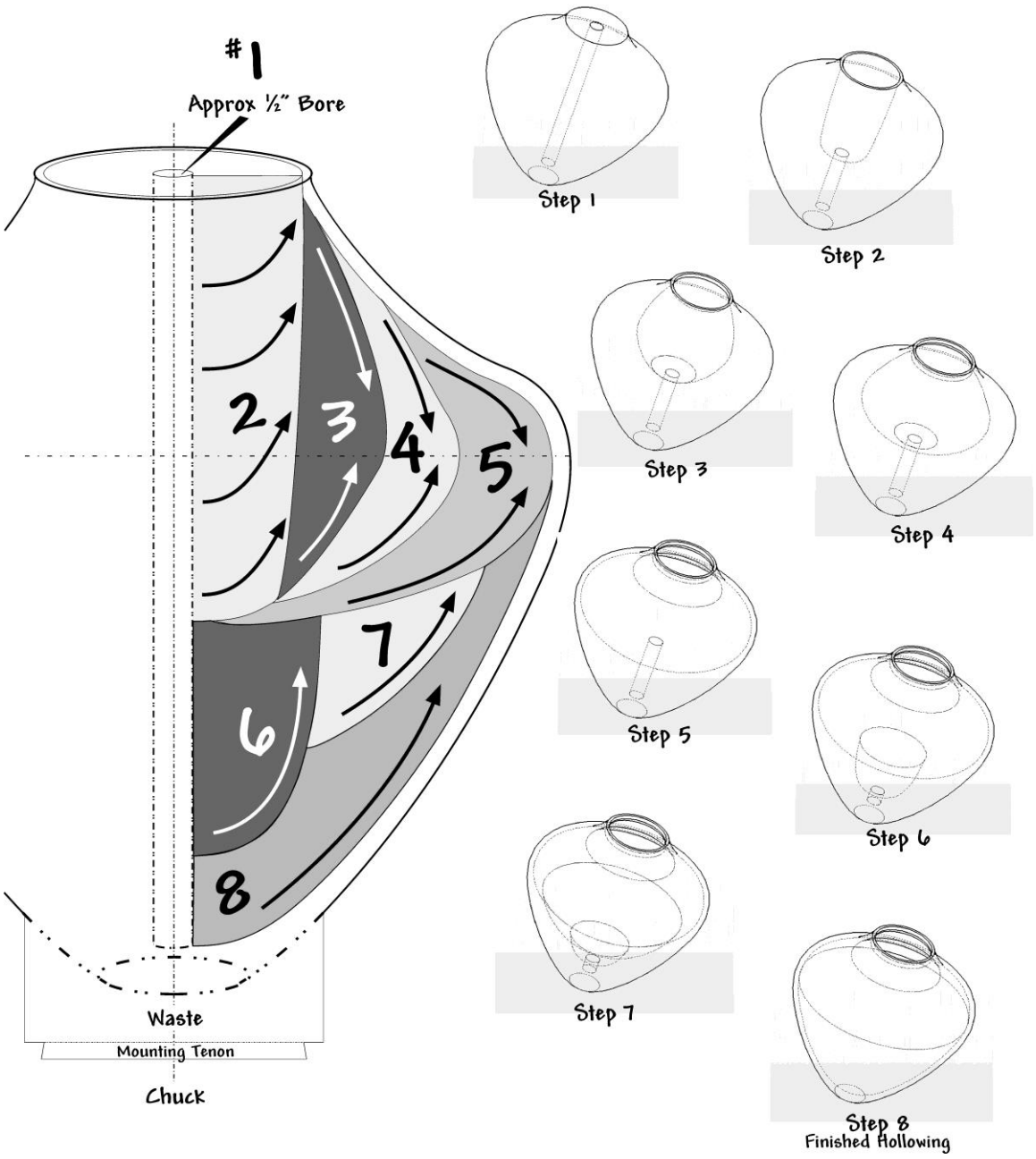
Woodcraft Supply, Inc. http://woodcraft.com/ 1-800-225-1153

Wood World ……..http://www.woodworldtxcom/ …… 972- 669-9130

Web Sites of Interest

http://www.aroundthewoods.com/ How to make and use hook tools with video clips.

http://www.alanlacer.com Alan Lacer video on making hook tools


#1
Approx ½" Bore
2
3
4
5
6
7
8
Waste
Mounting Tenon
Chuck
Step 1
Step 2
Step 3
Step 4
Step 5
Step 6
Step 7
Step 8
Finished Hollowing