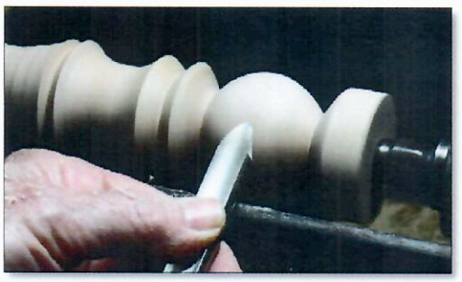
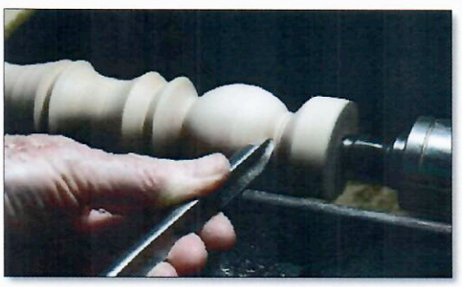
MULTI-AXIS SPINDLES

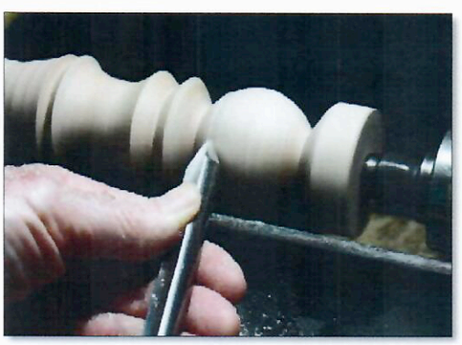
Who can do this work?

The skills required to make multi-axis turnings are the same skills needed to turn regular spindles. In my opinion, there is no "right tool" to use for spindle work. Whatever tool you use to cut a profile reliably is the correct tool to use for multi-axis work.



I prefer using a half-inch spindle gouge for creating beads and v-cuts. The bevel of the spindle gouge rides on the wood, keeping the tip high on the wood and the tool pointed slightly in the direction of the turn. When rolling to the right when making a bead, the right tip is used and the tool is pointing to the right; the left tip is used when cutting to the left and the tool is pointed to the left as seen below. The wood is cut with the tip. The bevel must ride on the wood to create the utmost control and success of the cut. For better control of a cut, the tip must be fairly close to the tool rest.





Having the skill to turn beads and coves and v-cuts on one axis makes turning on multiple axes more fun and more successful!

Photo 1

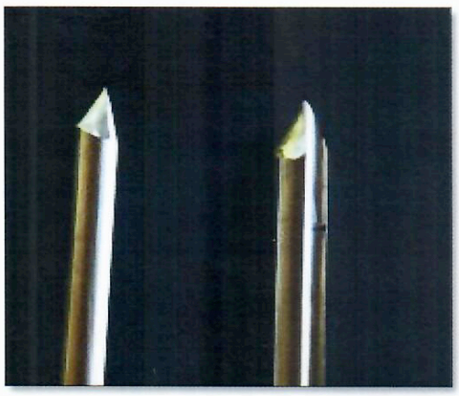


Photo 2

Photo 3

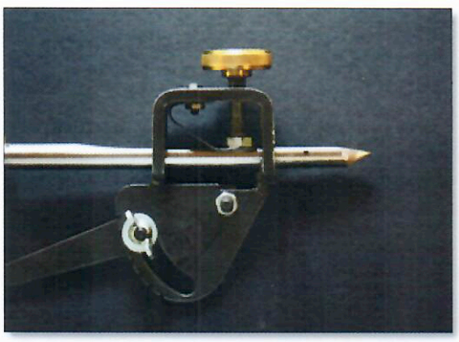


Photo 4

These images show the way I sharpen the 1/2-inch spindle gouge and the 1/2-inch bowl gouge that I use for a roughing gouge and for making long coves. These are the tools that I use 99 percent of the time. The spindle gouge is sharpened to about 30 degrees off of the tool bar (see photo 2) and the bowl gouge is sharpened to about 40-45 degrees off of the tool bar (see photo 1). Remember that these angles are merely a starting point. I often change the angles depending on the cut I'm making.

Notice that the sharpening jig is set at a different angle when sharpening a bowl gouge versus a spindle gouge (photo 3 is a bowl gouge, photo 4 is a spindle gouge).

I suggest that creating spindles with beads, coves, and v-cuts ON ONE AXIS is the first step to creating multi-axis spindles. Once this can be done reliably and once the cuts are smooth, then making cuts that are interrupted by air will be easier.

HOW DO I START THINKING ABOUT CHANGING THE AXIS?
For years I was intrigued with the multi-axis forms that others were creating. I attended demos but could not understand how a person found the form that was being turned. So I turned many spindles by randomly changing the axes. Occasionally I found forms that were pleasing to me. I had no language to describe them and no idea how to really plan a design. So I knew that I had to figure this out by turning many spindles and finding the things they had in common with each other. I found some things that made so much sense in the spring of 2006 and have been playing with these concepts since then.

THE ESSENCE
The basis of unraveling this confusing method of turning wood is quite simple:

Only two results occur when an axis is moved when turning a spindle....

either the new profile is cut on the new "solid wood," creating a circular-type outcome, OR the new profile is cut on the "air wood," creating an arc-type outcome.

Does the chisel stay in the wood (or not) at the end of its cut?

There are only two ways that the new axis can be moved relative to the center axis: it is either parallel to the center axis or any line parallel to that axis, or it is not parallel, or twisted, referring to the visual outcome of a non-parallel axis.

Are the axes parallel to the lathe bed (or not)?

These two observations are critical in formulating a way to organize the many variables and outcomes into a systematic way to understand multi-axis spindle turning. This is the essence of these ideas.

OUTCOME/RESULTS:

VARIABLES:

PARALLEL AXIS
(DOES NOT CROSS THE CENTER AXIS)

OTHER VARIABLES INCLUDE:

PROFILE : (straight, curved or v-cut) symmetry, depth of cut;

AXES: number of axes used, the many options of axis placement; distance of new axis from center; various ways to connect the axes; the axes used to finish the project.

WOOD: size and shape of wood

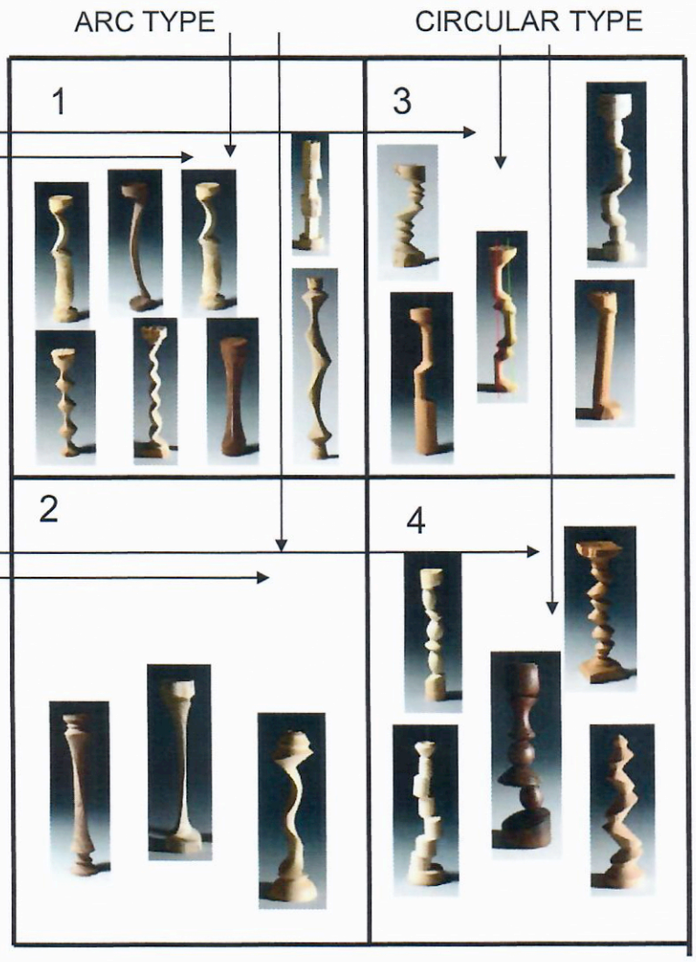
TWISTED AXIS
(CROSSES THE CENTER AXIS OR ANY LINE PARALLEL TO THE CENTER AXIS)

OTHER VARIABLES INCLUDE:

PROFILE : (straight, curved or v-cut) symmetry, depth of cut;

AXES: number of axes used, the many options of axis placement; distance of new axis from center; various ways to connect the axes;

WOOD: size and shape of wood; orientation of wood to lathe.

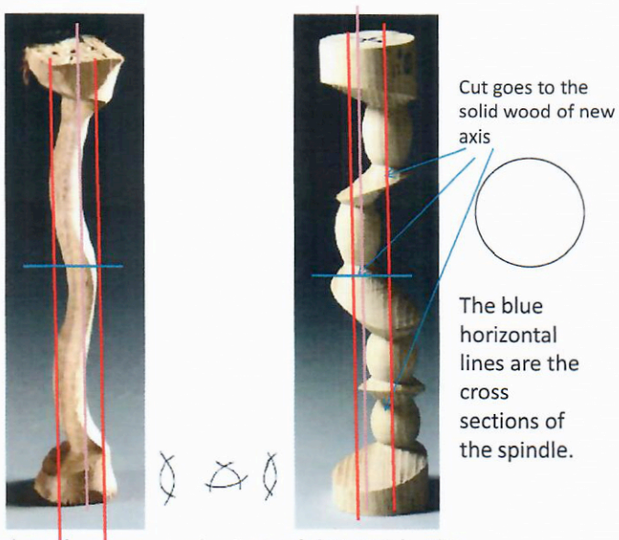


The four basic families are the consequence of two considerations: are the axes parallel to the lathe bed (or not); and does the chisel stay in the wood (or not) at the end of its cut. Understanding the four families helps one envision an outcome. And those outcomes are hardly limited: each family comprises countless variations including type/size of wood used, the placement of the new axes, and the curvature of the cut.

THERE ARE ONLY 2 RESULTS THAT CAN HAPPEN WHEN THE AXIS IS MOVED FROM THE CENTER AXIS TO A NEW AXIS

THE OUTCOMES (RESULTS):

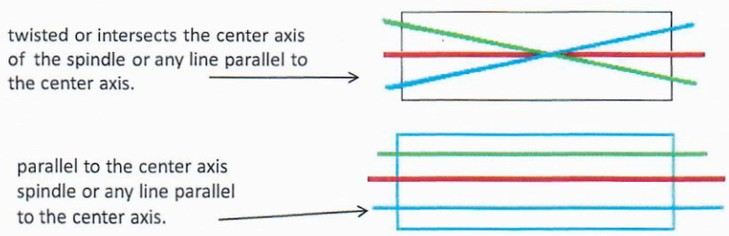
After turning many spindles, I started noticing that the cross sections on some spindles were round and on others, were not round. WOW!! There are only 2 results that happen when the axis is changed.
Arc types occur when the new profile is cut into the air wood or ghost wood, never reaching the solid wood of the new axis.
Circular types occur when the new profile is cut on the cylinder of the new solid wood of the new axis.
(The red lines represent the new axes used to create each spindle).



Ending the cut with the chisel in the wood produces a turned cylinder (obviously). The alternative, the chisel making an 'interrupted cut' or cutting in 'ghost wood', produces a segment of a cylinder.

AXIS PLACEMENT: THE 2 OPTIONS

And the placement of the axis also defines the form that results. There are only 2 ways the axis can be changed relative to the axis of the lathe. It will be either parallel or not parallel (twisted) to the center axis. (It is called "twisted" due to the resulting twist.)



Each type of axis placement is found in either type of outcome..arc type and circular type!!

With this information, I start folks with a simple form in quadrant 1. Start with 2 or 3 axes that are parallel with the center axis and on each axis, turn a long cove. Number the axes clearly with a permanent marker for future reference. And keep a form if you really like it so you can make it again. And now the fun begins!!!!

~Barbara Dill has turned and carved wood since 1987. She has investigated multi-axis turning since 2006 and has written articles and taught at symposiums and clubs in the US and Canada. For more information, visit www.barbaradill.com.