A Single Twist of Fate

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First I would like to thank both Allan Batty and Stuart Mortimer for teaching me the basics of twist work. Allan helped my cut my first twist, which spurred my interest and Stuart pushed me down the path and gave me the encouragement to pursue this discipline. Without my interaction with either of these men, I would still be wondering how in the world they are made. In the words of Allan, "Cutting a twist is ever so simple."

The twist had always been identified as a spiral or helix and those who did twist work had no marking outs or terminology to explain what they were doing or how the process was performed. Spiral work was learned through doing an apprenticeship. A string or piece of tape was used to define the twist and as most things, experience through trial and error lead one down the path. Stuart Mortimer's book, Techniques in Spiral Work, was the first publication do explain in detail how a twist was cut. In fact, it was Stuart who devised the current terminology we use today to define the type of twist and the complete marking out terms.

Twist work, simply put, is the process of drawing a grid on a cylindrical piece of wood, in order to cut a variety of circular grooves. In this demonstration, I will introduce you to the twist language, which will help you understand the marking out process, a simple marking out process which will help you cut a proper twist, and show you my process for cutting several different twists, using a variety of hand and power tools. Although these demonstrated twists will be cut on a cylinder, they can be applied to any shape or form with simple modifications.

In order to understand the process of cutting a twist, a number of lines are drawn on the form in which the twist will be cut. In essence, we are laying out a grid on a circular piece of wood, connecting certain points. In order to do this, it is helpful to understand what we are laying out and what each drawn line represents. Below I have written the most commonly used terms in twist work with a simple definition.

Terminology:

Pitch, bine, apex, hollow, start lines, pitch lines, pitch dividing lines, cut control lines, bine apex lines, width control lines are all terms used in the complete marking out in twist or spiral work. Although complete marking out is not commonly performed, it may be of use for more complicated twist work or in the early stages of learning twist work. Other terms used are descriptive of the type of twist you cut: Barley (single), double Barley (double), open double Barley, triple twist, multi-start, cable or rope. Descriptive terms are self explanatory.

Bine: The bead which spirals around the length of the twist.
Apex: The highest point on the bine.

Hollow: The trough which runs between the bines along the length of the twist, depth varies on the number of bines in the twist.
Start lines: Horizontal lines used in determination of the number of bines.
Pitch lines: Vertical lines which are used to determine the angle of the bine.
Pitch dividing lines: These lines divide the pitch into segments required for a particular twist.
Cut control lines: The diagonal lines marked from the start lines to the intersection of the pitch lines, indicating the angle of cut.
Bine apex line: Diagonal lines which indicate the apex of the bine.
Width control lines: Diagonal lines used to indicate the width of the bine.
Pitch: The angle of the bine and hollow along the twist. More accurately, it is the distance between apex on the bine, in relation to the material.

When cutting a twist you are afforded artistic freedom in whether you lengthen or shorten the pitch of a particular twist. Lengthening or shortening a twist may also be used when an error occurs in cutting the twist. Traditionally the pitch of a twist is dependent upon the width of material. Listed below are the traditional measurements:

Single twist: 1 to 1 1/2 times the width of material.
Double twist: 2 times the width of material.
Triple twist: 2 1/2 to 3 times the width of material
Ribbon twist: 3 times the width of material, for a 3 bine twist. Stretch the pitch for each added bine.
Multi-Start and cable twist: Multi-start twists begin with 4 bines or more. Cable or rope twist traditionally has 9 bines and the pitch is approximately 4 times the width of material. Naturally, the more bines, the wider the material.
Open twist is a term used to describe when the hollows between the bines have been cut all the way through. All twists, except two can be opened. Those which can not be opened are the single or Barley twist and the pineapple twist (combined right and left hand twist).

The **depth of the hollow** will vary with the number of bines. Typically, as the bines increase in number, the hollows tend to be more shallow. Traditionally, the depth of cut for a single twist is 1/3 the width of material, for a double twist, the hollow is 1/4 the width of material, for a triple twist, 1/6 the width of material.

The Single Twist:

The term ‘Barley twist” was the name give to a piece of wood with a spiral. It likely originates from the **Solomonic column**, also called **Barley-sugar column**, a helical column, characterized by a spiraling twisting shaft like a corkscrew and dates back to the 4th century. Constantine the Great brought a set of columns to Rome to be used in St. Peter’s Basilica in the high altar. The columns were said to come from the Temple of Solomon. The spiral pattern likely represented the oak tree from the original Ark of the Covenant. After 1660, such twisted columns became a familiar feature in the legs of French, Dutch and English furniture. The term Barley twist was

adopted from “barley sugar twists" a popular children’s sweet traditionally sold in this shape. The name is most commonly associated with a single, double or open double twist.

I will show you the full mark out for the single twist, this can then be applied to all other twists. I would recommend when first learning to do twist work you use a soft straight grained material, free of knots. 2” x 2” pine or fir is a good choice. Select a piece approximately 12” in length and center it on the lathe. Go square to round (1 1/2”) with the center 10” of material, leaving the ends square to assist with drawing your start lines and when hand rotating the lathe. Using each corner, strike a horizontal line (start line), this will divide the material into four quadrants. The tool rest is used as a straight edge. Number each line 1-4. Strike a vertical line (pitch line) at the center point. At 1 1/2” intervals from the center line, continue striking further pitch lines. We have now divided the material into 1 1/2” segments. Divide these segments in half, and then half again. These are your pitch dividing lines. Their intersections with the start lines are your pitch control lines. For the complete mark out we will now draw the diagonal lines to mark the cut line, bine apex line and width control lines. The pitch for the single twist is one width of material. For a right hand twist, begin on the right side, from the start line, number 1. Mark with a black pencil, going right to left, clockwise and diagonally across each successive pitch segment so that with one revolution you end up back at start line number 1 (You have moved 4 pitch segments to the left). Continue the length of material. This is your cut line. From start line 3, mark similarly with a green pencil, this is the bine apex line. From start lines 2 and 4, mark similarly with a red pencil, these are the width control lines. This is the complete mark out for a single twist. All combined, the diagonal lines are termed the Pitch control lines. You may use this procedure for marking out any twist. Of course, it becomes rather busy with the increasing number of bines and it becomes less important to do a full mark out as you progress with your twist work.

You are now ready to cut your first twist. First off, remove the tool rest. Using your choice of tool, with your right hand place the cutting tool at the diagonal of start line 1. With your left hand, rotate the piece counterclockwise, while at the same time cutting clockwise with the right hand. This is a synchronized motion and will develop quickly. Be sure to keep your saw/rasp at the correct angle, and in the case of using a saw, count the number of strokes for each cut and repeat the process the length of the material. Counting saw strokes will insure an even depth of cut along the material. For a single twist, the final hollow depth is 1/3 the width of material, in this case about 1/2”. Using various power tools, repeat the process while widening and deepening your cut to the width control lines (red). Using rasps, smooth out the hollow as best you can. It is now time to round the bines. Using a palm plane or smoothing rasps remove the sharp edges but do not remove the bine apex line (green). Doing so will alter the shape of the twist. Once you have rounded the bines (leaving the green line), you will be ready for sanding.

When sanding, I use a sanding stick which will fit snuggly in the hollow. With the same coordinated motion with your left and right hand, begin sanding smooth the hollow. Use long strokes and do not sand in one spot or else you will form a flat. Once completed, I will bend sand paper between my index and middle finger and begin to sand the bine. With practice, you will be able

to sand the bines and hollows with the lathe turned on and sand at 200-400 RPM. Go through the grits to the desired finish.

Finish the ends of the twist with your preferred profile. Traditionally, turn a cove at either end of the twist to 1/4 of depth of material. Start the coves on the end of the pitch line. The cove may also be cut before cutting the twist. If done prior to cutting the twist, you may need to clean up the cove.

This material has been inspired and liberally taken with permission from the twist reference, Techniques of Spiral Work by Stuart Mortimer.