General Twist Information

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Overview

- Twist work is spindle work even if you put a twist on a bowl.
- Twist work is purely decorative.
- All twist work weakens the structure of the finished product.
- In twist work sanding is a shaping tool.
- All Twist work can be defined by 4 key elements
  1. **Diameter:** The diameter or width of the object. Not the circumference. Twists are always a function of the diameter.
  2. **Bines:** The number of beads that spiral and run the length of the twist.
  3. **Pitch**: The distance between the tops or apexes of the same bine in relation to the material. Generally defined as the slope of the line.
  4. **Other**: Graduated, Open, Laminated, Ribbon Etc. These are factors that affect the appearance and strength of the Twist.

Nomenclature and Guidelines

- **Single Twist:** Has only one bine and one hollow. Sometimes called a Barley Twist but not often. The Traditional Pitch is 1 to 1½ times the diameter of the material. The depth of the hollow should be approximately 1/3 of the diameter of the material. This is a weak structure.

- **Double Twist:** Usually called a **Barley Twist**. It has two bines and two hollows. The traditional pitch of a double twist is 2 times the diameter of the material. The depth of the hollow should be approximately ¼ of the diameter of the material.

- **Triple Twist:** Has three bines and three hollows. The traditional pitch is 2 ½ to 3 time the diameter of the material. The depth of the hollow should be approximately 1/6 of the diameter of the material.

- **Four Start Twist:** Has 4 bines and 4 hollows. The traditional pitch is 4 times the diameter of the material. The hollows should be between 1/6 and 1/5 of the diameter of the material.

- **Cable Twist:** 8 to 9 bines and the same number of hollows. Traditionally, the hollows or troughs should be "V" shaped. A rope twist traditionally had 8 bines and a cable had 9. The traditional pitch is 3 to 4 times the diameter of the material.

Layout of the Twist.

Marking Out: The process of drawing horizontal, vertical and diagonal lines to define the character of the twist to be created. Horizontal lines (with the lathe bed) consist of Start Lines and other lines to ease the creation of diagonal lines. Vertical lines consist of Pitch and Bine Segment Lines (around the circumference of the cylinder), and Diagonal Lines consist of Bine Apex lines, Cut Lines and the Bine Width Control Lines. The combination of Horizontal and Vertical lines should be viewed as creating a piece of graph paper wrapped around the spindle. In a full layout, the Diagonal lines are the apex of the bine, (2) width of the bine and the bottom of the hollow. This requires 4 start lines for each bine. In a partial layout, which is usually used, only the apex of the bine and the bottom of the hollow (cut line) are used. The partial layout requires 2 start lines for each bine.

Start Lines: Lines running horizontally (with the lathe bed) that are used to **start** the bine apex, bine width lines and the cut control lines (hollow). The number of lines created can be more than the number of bines and hollows but it is always a multiple of the number of bines. Example, for a double twist there would be 4 Start Lines for a partial layout, one for each of the 2 bine apexes and one for each of the 2 hollows.

Pitch Control Lines: Vertical lines running around the circumference of the work piece that are a multiple of the diameter and are used to define the type of twist being created. Example: a double twist should go around one time in twice the diameter. So the Pitch Control Lines would be at a length of twice the diameter. This space is called the Pitch Control Segment.

Bine Segment Lines: Vertical lines that are used to divide the Pitch Control Segments into equal part to make the drawing of the diagonal lines easier.

Bine Apex Lines: Diagonal lines originating at the Start line for the top of the bine or bead and drawn diagonally to reach the same Start line where it crosses the pitch control line. This line will be the top of the bine as it works its way down the cylinder. It will always be the top of the bine. When cutting and sanding the bine, this line is always left.

Bine Width Control Lines: A diagonal line created between the Bine Apex Lines and the Cut Control Lines to determine the width of the Bine and defines the appearance of the bead. Used in full lay out mode.

Cut Control Lines: The diagonal lines that are marked out from the Start Line to the intersections with the Pitch Control Lines that indicate the bottom of the hollow as it works its way down the cylinder.

Other definitions:

Open Twist: A single, double, triples or four-start twist that has a hole drilled down the center of the twist is called open. Usually, Open Twists are stretched (the bine segment is lengthened) to increase strength unless very strong wood is used. The number of bines, width of the bines and the stretch of the twist determine the strength. The thinner the bine the more the bine should be stretched for strength. Do not attempt to open a twist until all of the finishing has been done on the top of the bines. There are no hard and fast rules for open twists because this is mainly a modern approach. Some Victorian furniture had open twists that were doubles and stretched. Sometimes open twists are used and then split to create very stretched simpler twists that would be very hard to produce singly.

Rules of thumb for Open Twists that work:

- **Double Open Twist:** For a 1 ½" diameter cylinder of material a 3/8" hole in recommended. For a 3/8" diameter cylinder of material a 1/8" hole is recommended. Note: that the hole drilled in the center of the cylinder is actually much smaller than it will appear when the twist is finished.
- **Triple Open Twist:** For a 1 ½" diameter cylinder of material, a 3/8" hole or larger is recommended. The reason for the larger hole is that 3 bines provide greater strength and if thin bines are desired, a ½" or 5/8" hole or larger can be drilled.
- **Four Start Open Twist:** For a 2" diameter cylinder of material, a 5/8" hole is recommended.

Ribbon Twist: Twist that has traditionally three bines and three hollows. It can have 2 bine and 2 hollows, but this is very, very weak and looks like an old drill bit. The bines should be pointed or slightly rounded. The rounding depends on the application. For example, a cane will receive abuse over time and the bines need to be rounded. A spindle on the other hand should not receive abuse and can be pointed or have a slight flat on the bine. The traditional pitch is 3 times the diameter of the material with 3 bines. The Bine Apex should be approximately 1/8" wide or less. Actually, cut and sand up to the bine apex line. There are no Bine Width Control Lines on a Ribbon Twist. This is one of the easier twists to hand make.

Traditional Twist: The bine apex always ends at the same Start Line that it starts. This is one of the major methods of determining if the twist is made by hand or with a machine.

Tapered Twist: A standard twist of any description cut on a tapered column or spindle. A true taper must be a straight edge.

Graduated Twist: The method is used to describe and explain the marking out of a twist which is measured and cut in accordance with the changing diameter of the material. A Graduated Twist is either a taper or irregular shape. The traditional method of laying out is to measure the diameter at the end of each bine segment, laying out only one bine segment at a time. Measure the new diameter at this point, and lay out a new bine segment based on the new diameter. Continue this approach until the end of the material to be twisted. Note: This will not change the horizontal lines just the vertical ones. The result of this is as the material gets smaller in diameter the twists get tighter.

Strength of a Twist: Traditional twist's pitch is a function of the diameter of the material. Reducing the pitch will make the object less strong. Stretching (or lengthening the bine segment) the twist or increasing the pitch will make the twist stronger. Sometimes in thin twisting, stretching the twist slightly will strengthen the material. Sometimes when using soft materials, stretching the twist will strengthen the material. Sometimes with open twists, the pitch is stretched dramatically to increase the strength.

Right-handed and Left-handed Twists: Right-handed twists are cut from right to left, looking are the twist horizontally. When looking at the twist vertically the twist goes from the lower left to the upper right. Left-handed twists are cut from left to right. Different twist (right and left) are usually used on table legs, bed posts, mirror images of goblets, candlesticks, or pineapple twists. Also this is used on staircases depending on the visible side that is prominent. In other words, tables where the twists pointed toward each other, were put on the legs that were thought to be seen the most. The other way the twists will point away from each other. On beds where flames were used, the flames were attached with a dowel so that they could be changed to accommodate different placements in a room. On stair cases that are against a wall, the twists were placed to that they follow the stairs up. This requires a left handed twists on stairs that are on the right and a right handed twist for stairs that are on the left of an entryway.

Notes:

It is important to mark the same start side of each spindle for placement. When they are installed the will look right.

When cutting with the traditional saw, gouge, or rasp, it is extremely important to always rotate the material to avoid flat spots.

The correct sanding procedures will even out minor changes in the depth of the hollows. Sanding in twist work is a shaping tool.

The saw cuts are not for depth. They provide a place for the side material to break off into when using a gouge.

Be extremely careful at the start and the end of the cut lines. People tend to inspect these areas in detail.

Traditionally, all twist work was ended by a cove. Some factories or shops developed their own way of ending a twist. Some used beads and some just tapered the material. This tapering is extremely difficult to get even all the way around but can be used successfully on ribbon twists.

To twist a bowl or a finale, the pitch must be varied considerably to give the appearance of a variable movement. Otherwise, the twist will look like a straight lines. Sometimes on bowls the rules must be broken to vary the pitch radically.

A Ram's Horn is a graduated single twist that only has one end attached. The other end finishes in a point. It uses the traditional graduated method of layout. It is used as an upside-down finale on stair cases and on the corners of clocks.

A Pigtail is a graduated single twist that only has one end attached. It does not use the traditional graduated method. It stretches the twist as it gets smaller to give it strength. It is used on hollow forms as a finale.

The single point twist is a twist with 2 different types of bines. One is a round over and the other is a ribbon. On a regular single point, the layout is 1.5 times the diameter, instead of 2 times because of the difference in the bine widths.

A double point twist is a rounded over bine and a bine that has two points, which are usually created by splitting a bine with a 3 start file. The layout is as a double.

The banner twist has the appearance of a ribbon that goes around a pole. It is laid out as a double. You cut between the "cut line" and the "bine apex line" with a flat cutter instead of on the cut line. Caution: do not cut deeply on the flats.

Sometimes to develop spectacular twists, a cylinder was glued over a waste material with rabbit glue. Rabbit glue is very water soluble. A twist is created, then the material is put is water and the twisted cylinder is removed and glued permanently to another piece of wood. Then the other piece of wood can be twisted and it is difficult if not impossible to determine how the twist was made.

When drilling a hole for a laminated twist, it is important to take very small amounts and keep the drill bit tip cool to drill a straight hole.