

Hand-crafting a split-bamboo fly rod

A step by step summary

A hand-crafted split-bamboo fly rod is a unique, precision casting tool whose underlying design is tailored to the delicate presentation of hand-tied flies to wary trout and other target species. The sequential steps involved in making a split-bamboo fly rod are based on traditional techniques developed over 120 years ago and for the most part these procedures (or their slightly modified versions) are still utilized by bamboo rod artisans today. The following series of photographs highlights some of the traditional steps that I use in hand-crafting my own split-bamboo fly rods. Some makers may prefer to use slightly modified variations of what follows.

1. **Rod-makers tools.** Pictured below are some of the hand tools that are used for making split-bamboo fly rods. These include block planes, Japanese water stones for sharpening plane blades, Japanese Dozuki saw, files, scrapers, dial calipers (with and without a Waara V-block attachment for strip measurement), dial depth indicator, center gauge, files and adjustable steel planning form. Although some makers still use planning forms for primary and secondary treatment of bamboo splines, I complete these steps with my bench-top rough beveller (Bellinger Inc., see Step 9 below).



2. **Seasoned culms of Tonkin cane.** At the heart of the rod-making process is a supply of quality bamboo. Tonkin cane *Arundinaria amabilis* (aka: *Pseudosasa amabilis*) has been used by master rod-makers since the early 1900's. It originates in the Tonkin Gulf region of Guangdong Province in China. Tonkin cane is preferred by quality rod-makers because of its superior quality, depth of power fibres, widely-spaced and generally flat nodes (growth rings), natural straightness, straw-yellow color and relatively clear surface. This photo shows bamboo culms that are supplied in 12' lengths and are ~2" in diameter (my culms came from the Bamboo Broker). Typically, the rod maker introduces a "check split" into each culm to allow for expansion and contraction, which reduces the likelihood of producing cracks elsewhere in the culm during storage.



3. **Cutting the culm.** After deciding on the length of the rod and its taper design, the first step in making a bamboo fly rod is to cut the 12' culm at a point that is determined by a simple formula relating to the size of the finished bamboo rod (for simplicity this usually involves cutting near the middle of the culm to produce two ~6' sections). Since bamboo has a tendency to splinter quite easily, the cross-sectional cutting



is done with a finely-toothed Japanese Dozuki hand saw (mine has 25 teeth/inch of blade). If my intention is to make a rod that is of the light yellow/brown color of the natural cane, I will proceed to step 4. However, I may desire a darker

rod in which case I will flame tone the cane. In this process, I apply a uniform amount of flame from a Bunsen (or equivalent) burner stopping when the desired amount of toning has been achieved. The accompanying photograph shows the types of toning that can be accomplished with different amounts of flaming-the two halves of one cut culm have been darkly flame toned, while the other has been flamed to a medium brown tone. Even though there are some slight differences in the surface hue, the underlying cane itself is surprisingly consistent in tone. A definite advantage of flame toning is that the color of the final rod can be enriched, producing beautiful hues ranging from carmel to dark brown. By driving out excess moisture, the stiffness of the cane rod can also be increased, enhancing its action.



4. **Color coding the culm sections.** At this point, I will split the each ~6' section into two halves using a specialized tool called a "froe". My froe is simply an old knife blade that I have modified for this purpose. The froe is introduced into the end of each bamboo section with the aid of a tap with a rubber mallet. Once imbedded, the froe is tapped down the length of the cane section using a gentle back-and-forth action until the entire section is split in half.



This process is repeated for the other half of the culm. I then color code the two cut sections of culm on the pith side using Sharpie indelible markers- for a two piece rod, I use BLACK to mark the Butt section, and RED to mark the Tip section. If I'm making a 3- or 4-piece rod, I will use other colors to distinguish the appropriate mid-sections. The two sections of

each piece of culm are marked in ~1 inch sections as shown. The culm will be split into six ~ 1 inch sections following these guide markings.

5. **Initial node preparation.** After splitting culms in half, I use a sharp curved chisel and



rubber mallet to remove the pith from the inner portion of each node as shown in the figure on the left. After removing the pith, the inner nodal section is nearly even

with the rest of the inner portion of the cane as shown in the photograph on the right.



6. **Splitting the culm sections.** The butt and tip sections of the culm are each split into six ~1" sections using the froe and mallet in a manner similar to that described in Step 4 above. As indicated in the photograph, the ~1" strips that are produced have protruding nodes (the growth rings on the original culm).



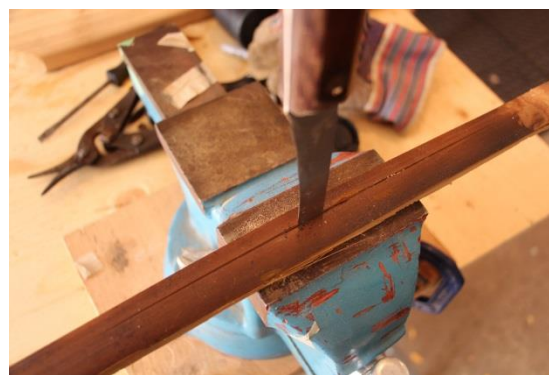
These must be smoothed by filing to facilitate the next steps of splitting. I use a single cut flat-mill bastard file to carefully remove the nodal ridge until it is just smooth with the cane surface on each side of the node. I do not flatten the node and so a slightly raised, but smooth surface is left (see photo on right). Later steps in the rod-



building process ensure that each node follows the curvature of the natural cane on each side.



7. **Hand-splitting sub sections.** The next step is to divide each ~1" section of cane into multiple sections of ~1/4 in in width. Some cane rod makers use a band saw to cut the sub-strips, but I prefer to hand-split each strip, which permits each piece to be fractured along the natural cane grain lines rather than sawing across the grain. The process of hand-splitting is favoured by filing the nodes as explained in step 6. In my process of hand-splitting, a knife is driven into the mid-point of each 1" strip, following

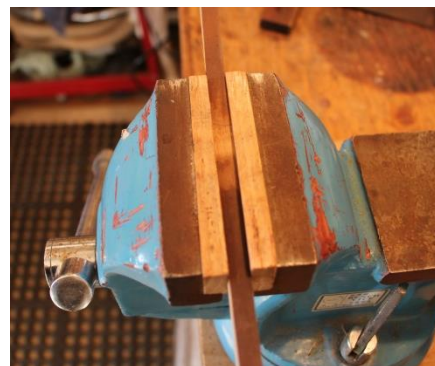


which it is held in a vice and the split enlarged down its length. With experience, the split can be hand-steered straight down the section without veering off course, thus ensuring a straight split. Each half is then split further by the same process. For my rod making, I usually split each ~1" butt section into 3 strips, while each ~1" tip section is split into 4 pieces. If done properly, at completion, I have 18 butt pieces (3 from each of the original six ~1 inch Butt sections) and 24 tip pieces (4 from each of the original six ~1 inch Tip sections). As indicated above, Sharpie markings denote individual Butt or Tip section strips as being #1-6.

8. **Strip alignment, cutting, straightening and node flattening.** For the Butt section, I select six strips, one from each of the original 6 split sections. For my rods, I usually make two identical Tip sections, so I select two strips from each of the original 6 split Tip sections. The individual strips are aligned on my workbench and the strips are shifted to properly align the nodes



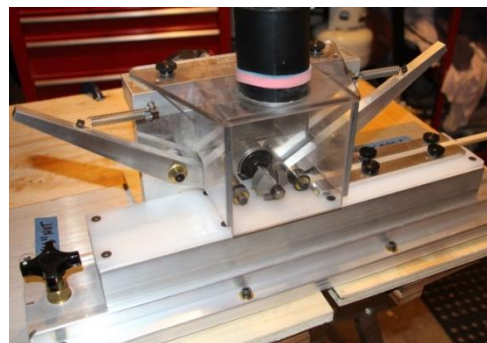
to ensure they are not adjacent to each other in the glued rod (adjacent nodes weaken that position of the glued rod).



There are various node-spacing protocols, but I usually tend to use 3 by 3 spacing pattern. After node displacement, I use my Dozuki saw to cut the Butt and Tip strips to their proper length (which varies for each rod). The smooth protrusions that remain after careful

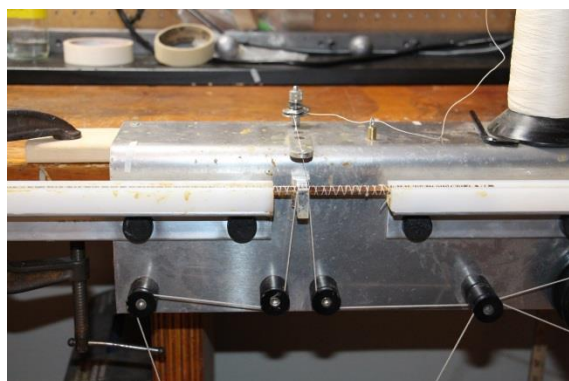
filing of the nodal ridges (from step 5) must now be corrected. I file a small groove on the pith side of each nodal area that approximates the size and shape of the nodal hump that remains. Then, using a heat gun, I heat the pith side until it is warmed, then gently press the node in the vice jaws (lined with hard-wood strips) until I'm satisfied that the raised portion from the enamel side has been displaced into filed portion on the pith side and the node is flat. After each node is properly treated in this way, I move on to straightening each strip for bends, curves etc., again by using my heat gun together with gentle hand-coaxing or vice pressure to obtain strips which are as straight as I can get them!

9. **Introducing the 60 degree linear taper.** Each strip is then made as rectangular as possible by a few passes with a hand-held block plane so that they are approximately 1/4" wide and rectangular. I then use my Little Rough Beveller (Bellinger) to introduce a straight 60 degree angle into each of the six Butt strips and 12 Tip strips. The process of rough bevelling is repeated until the Butt strips are ~.25" and the



tip strips are ~0.2". The rough beveller speeds up the process of initial strip preparation- it takes about 1 h to machine taper all of the strips, compared to ~12-15 h using a hand-plane and a set of rough wooden bevelling forms.

10. **Binding the strips and heat treatment.** At this point, I use a binder to assemble the strips in their correct order, then bind them together in my rod-binder. The next step is to heat the strips at 350 degrees F in an oven. In my workshop, I heat the bound rod sections in a vertical convection oven that I constructed from stove piping. I can control the temperature relatively accurately using a digitized heat gun and digital thermometers inserted at three positions over the vertical length of the oven. Other rod makers use less/more elaborate types of heating ovens. The main purpose of heat-treating the bound sections is to drive out excess moisture, thereby stiffening the cane somewhat. After heating, I minimize



moisture re-absorption by placing the bound strips in a heated ~90 degree F drying cabinet, which keeps the relative humidity below 30%.



11. **Final planing and rod assembly.** After heat treating, the bamboo strips are hand tapered using a block plane and a set of adjustable steel planing forms (I purchased mine from Bellinger, Inc.). The edges of the steel form are bevelled to a 60° groove down the center of the form. The



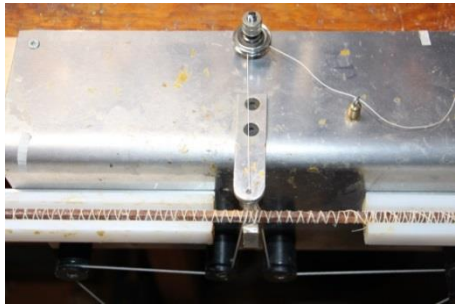
depth of the form can be adjusted at 5 inch intervals by tightening or loosening bolts that draw together or push apart the two sides of the form. This adjustment along the form is what determines how the individual bamboo strips will taper from the large butt end of the fly rod to the

smaller tip end. The precise adjustments to the planing form are done using a dial indicator depth gauge fitted with a 60 degree angle. There are an infinite number of possible fly rod tapers that can be created by making different adjustments to the planning form. To



a great extent being a good split cane fly rod maker involves understanding how different taper

designs affect the casting performance of any given fly rod (see section on the principles that I use to design my fly rod tapers).



After final planing is completed, the rod sections are glued and bound. After 3-4 days of curing, the rod sections are cleaned and buffed. This process culminates in the generation of a fine set of blanks- one butt section and two identical tip sections.

The final steps involve cutting the blank cane sections to their proper length, adding the cork handle (I hand make and shape all of my cork handles), fitting the nickel silver ferrules (which hold the tip and butt sections together). These steps can take several additional hours on top of those already spent making the blanks. Turning the



cork handle, fitting the ferrule stations and turning the wood spacer for the reel seat requires a lathe or equivalent device to permit rapid turning. Finally, the blank is fitted with quality brand Snake guides, a stripping guide and the wooden spacer/nickel silver fittings that hold the fly reel. Each rod is highlighted with hand-wrappings of Japanese silk and three coats of varnish are applied. After about a week of drying, the varnish is hand-buffed and a coat of bees wax and lemon oil is applied to the finish.

The result is a unique and beautiful, hand-crafted split-bamboo fly rod!



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