Amateur Experiments with Planing Forms

Text by Tapani Salmi

After completing the first cane rods using hand tools some bamboo rod makers start to use more or less complex mechanized tools: bevelers, lathes, mills etc. Some builders try to make a ”perfect rod” with no visible or invisible errors with more expensive and more beautiful components. I wanted to try other compositions of bamboo rods in addition to the traditional six strip rods. I was curious to see and feel what difference there is between a six, four and five strip rod! I also wanted to try swelled butt and hollow building using my simple tools.

To make these variations of bamboo rods, you first need special planing forms for quad and penta rods, then special forms for swelled butt structure and tools for hollow building. I have tried different types and materials for planing forms and tried to build various types of cane rods with my tools.

Traditional planing forms

Traditional planing forms are manufactured using metal (steel, brass, aluminium etc). A steel planing form can be made manually or purchased. The steel form certainly is the ”gold standard” for serious and/or professional rodmaking. An amateur builder can, however, use a wooden form – it is cheap and easy to manufacture and sufficient accuracy may be achieved for making fishing rods that will be given to friends and family members. The wooden form may need some occasional sanding after the plane blade makes cuts to the surface. Several rods (tens of rods) may certainly be planed with a single wooden form.

My first forms were wooden and they were done according to the common instructions from the books and on the Internet. When I was thinking about quad or penta rods I realized that I needed a new and a more complicated planing form with different planing angles for each new composition. I understood that mechanical bevelers or other special mills with cutting blades would be a much easier or more versatile solution, but I wanted to carry on with my hand tools.

I was curious about different hard plastic materials and visited the local store selling plastics for households and industry. I bought some small and cheap pieces of some promising materials. After simple experiments, I was quite impressed on the properties of Ertalon (nylon). It seemed to be suitable for a planing form. It is white in color and the surface is ”slippery.” You certainly have seen it used for different purposes. Ertalon is sold as plates of different thickness and I took two long pieces (200cm, 80”) with 25 mm (1”) thickness to make long planing forms. They sawed the pieces of Ertalon with quite neat corners and surfaces at the store. The costs depends on the thickness but typically the price of the material is less than $100 (50-80€).

Planing form from Ertalon

Ertalon (nylon) is quite easy to machine. You may drill, cut or sand it almost like wood. Somebody told me that best drilling result is achieved when a sharp cutting edge and slow drilling speed is used. I only have a very simple one-speed drilling machine. The fast drilling makes the material melt! The pinning and the holes for pulling/pushing bolts were very easy to make even with my simple tools. The threads for the bolts also were very easy to make with a manual tool. This all resembled work for a wooden form!

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The groove for a wooden form may be made with a file glued to a wooden plate. The file works quite poorly on the nylon because it loads with the filings. I have used different sharp metal blades and cutters to scrape the groove. To make a 60 ° groove you need a blade with a tip of that angular degree. It was also quite easy to find a 45° blade. I fixed the blade firmly between two metal plates and scraped the groove slowly by hand. The possible roughness in the groove has to be sanded or filed thereafter.

Other planing form configurations, quad and penta rods

The six strips in a hex rod are very special – they are totally symmetric in cross section with three 60° corners (Figure 1 below). This is not the case in quad (4) or penta (5) strip rods. You need two different grooves or forms to get the right and left corner to appropriate angles (45º in Figure 2 for quad rod and 54º in Figure 3 for penta rod).

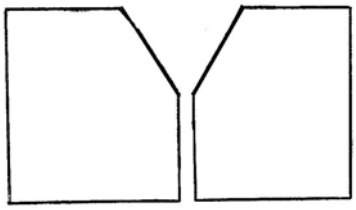

Figure 1 (Standard Hex (6 strips) planing form, the groove is 60°)

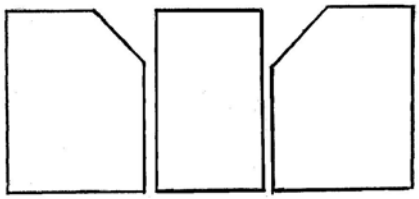

Figure 2 (Quad rod (4 strips) planing form, the angles of grooves are 45°, 45° and 90°)

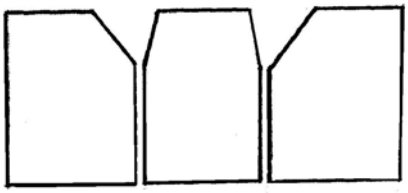

Figure 3 (Penta rod (5 strips) planing form, the angles are 54°, 54° and 72°)

In addition to the standard groove type planing form (Figures 1-3) I have used other kinds of forms (Figure 4 and 5:

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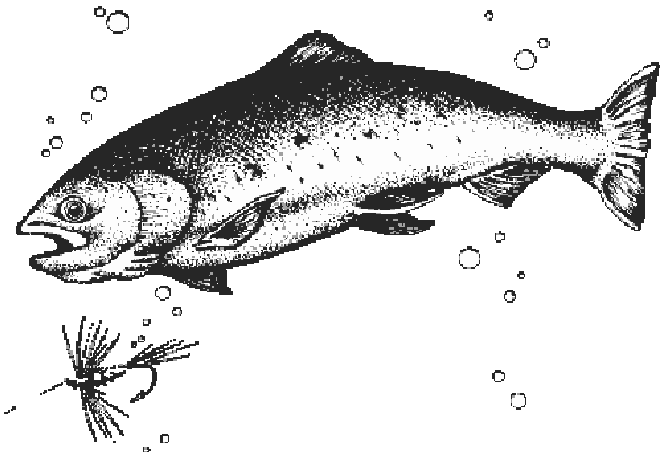

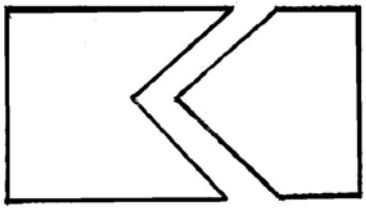

Figure 4 (Planing form cross section for quad rod, the angle is 45º)

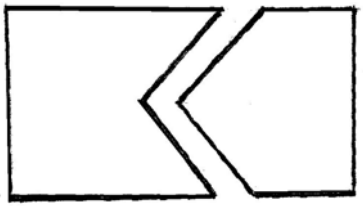

Figure 5 (Planing form cross section for penta rod, the angle is 54º)

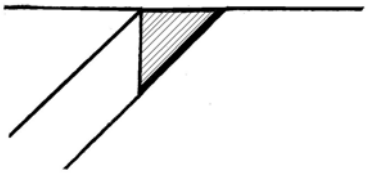

Figure 6 (The strip for a quad rod in the planing form, the angle is 45º)

planing forms with < -shape structure). The Ertalon (or wooden) plate is split by sawing to a fixed degree (45°, 54°) from both upper and lower site to get the right geometry and right angle to the strip during planing. This structure is quite easy to saw with adjustable sawing machine using a blade with small, sharp teeth. In Figure 6 you see the strip in the groove and how the angle is determined on the final corner of the strip.

When making quad strips by manual planing with a 45° form, the corners are not very easy to keep accurate. Actually in my hands the form in Figure 4 is better than the traditional ”groove” in Figure 2. If the other corner is initially not near 45°, the form with a groove pushes the strip and makes the other corner the wrong angular degree. The ”<”-type form (split type form in Figures 4 and 5) allows the strip to be in a ”neutral” position and the corners are easier to maintain. In practice I start the quad strip planing with the ”<”-type form and finish the strip with the groove-type form.

It is possible to make quad and penta rods with still more simple forms (Figures 7 and 8).

There is only one corner (right or left) but because there is no taper in the planing form

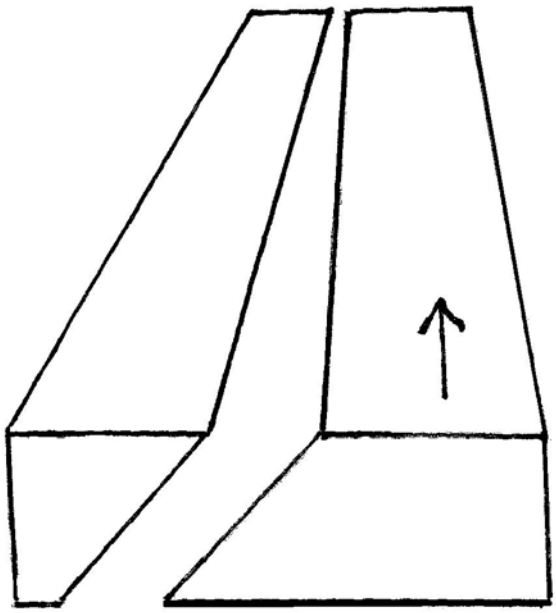

Figure 7 (A planing form without tapering. The right corner is planed first to 45º angle, planing direction indicated with the arrow)

it can be used in two directions (planing directions are indicated by arrows in Figures 7 and 8). First, the strips are planed to right angles (eg 45°) with constant width without any tapering. Then the groove is adjusted nearer to the final taper and the right corner is planed to the final (eg. 45 °). Thereafter the form is re-adjusted, the direction of the planing is changed and the former tip

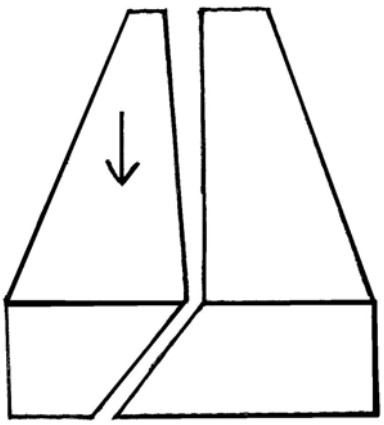

Figure 8 (The planing form is re-adjusted for the left corner planing. Planing direction indicated again with the corner)

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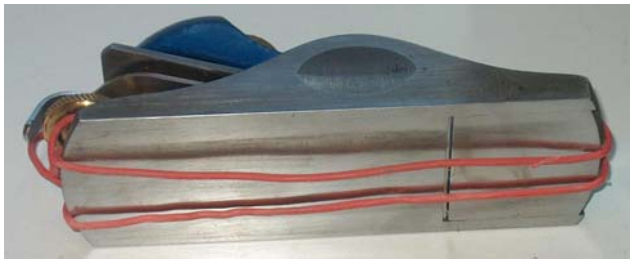
end of the form is changed to butt end. Now the left corner is planed and the final taper is achieved. The strips are perhaps not totally ”symmetric” – there may be more power fibers cut on the left or right corner but in practice you do not see any difference.

Swelled butt

The nylon is flexible and the form built from Ertalon may be bent using the pushing/ pulling bolts, which is not possible with a steel (or wooden) form (see Picture left). As I have the very long forms I have space enough for the swelled butt area on the thick end of the groove. I have combined the swelled butt always with hollow building.

Hollow building

I have made a very simple tool for the thinning of the strips (see Picture below). There are two wires attached to the bottom of my Record plane. By choosing a wire of proper thickness, it is easy and fast to plane the strips to the right thickness (eg 2 mm, 0.08”).



Tapers

I have made a simple Excel program (Tapercalc, http://personal.inet.fi/private/ tapani.salmi/TAPERCALC.HTML) to change the tapers from inches to European (millimeter) values. I then developed the spreadsheet so that it calculates the strip dimensions for quad and penta rods. The idea is to keep the cross sectional area (and mass distribution of the rod) constant. There is a small difference in modulus of inertia between the rods calculated using this simple formula, but the difference is very small. In practice you may change any taper to quad or penta using Tapercalc calculator.

Inside-out building

I have made some rods with a inside-out composition of the strips (each strip is flipped 60°). A hex rod with inside-out structure is quite similar to a traditional enamel side out rod. When the power fibers (outside of the culm) are inside the rod the surface of the rod blank may be planed or sanded quite freely to modify the taper. If you sand a normal enamel side out rod too much you lose the most powerful part of the strips and this results in a very weak rod. In an inside-out rod this is not the case. This could be used to adjust the taper also after gluing of the strips.

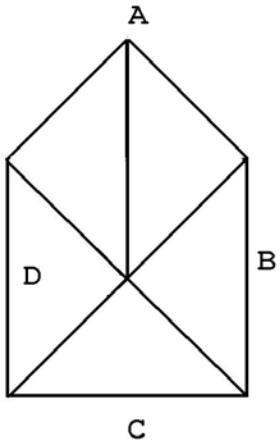


Figure 9 (A five strip rod composed from five strips originally planed for a quad rod with angles 45º, 45ºand 90º. The action of the rod is very asymmetric with very strong ”spine”)

I have also made a rod with five strips which are originally made for a quad rod (Figure 9). This type of composition causes an enormous asymmetry and makes a very strong ”spine” to the rod. The rod is much stiffer in the A-C direction compared to B-D direction. By sanding the corner A, I resulted in a rod with an asymmetric

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function but which may be used in fishing. It is fast or slow depending on the position in your hand. The roll cast is very easy with the slow position. I am not sure if this structure may be recommended to any maker to be copied but certainly it is a very funny rod.

Theoretically an octa (eight) strip rod with inside-out structure may give you some extra stiffness. The amount of the surface layer and power fibers in this kind of rod is larger than in traditional hex rods (see Figure 10). The inner corner of each strip is 45°. It was easy to make with my quad form. To get the 67.5° corners again I had to make a new planing form. I had to find a 45° blade to scrape the groove to the form (Figure 11). I put the blade between two metal plates and scraped the groove into the form. Using these two forms I finally got the 16 strips to the butt and tip of the octa Driggs River Special rod.

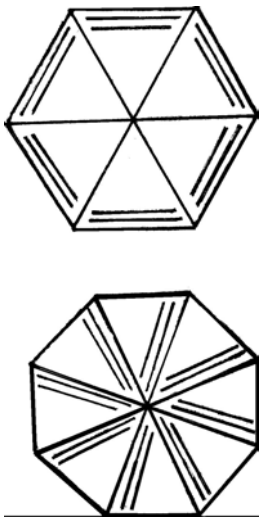

Figure 10 (Cross sections of standard six (hex) and Octa (eight strip) rods. In the eight strip rods the strips are rotated to have the inside of the culm to the outside of the rod (inside-out – building). The relative amount of the power fibers (indicated as lines in the figure) is higher in the eight strip rod compared to the hex rod.)

You may guess than I was quite anxious to test the results. I measured the stiffness of the octa rod using the Common Cent measure and to my surprise the octa rod was not stiffer than a hex rod with same cross sections surface areas. When casting a #4-5 line the rod is very similar in action compared to the standard hex rod of same mass distribution, too. This was again more or less failed experiment – I do not recommend it to be repeated.

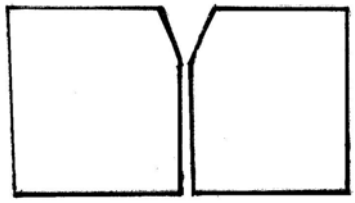

Figure 11 (Planing form cross section for an inside-out strip to an octa (eight strip rod). The angle of the corner is 45º.)

Conclusions:

It is possible for an amateur builder equipped only with hand tools to make several kinds of modifications to the standard cane rod building. This all gives new aspects and experiences. In addition, it has been nice to learn that there is about nothing new under the sun – during decent years there have been so many builders eager to try all kinds of structures to improve or modify the function of the cane rod.

If you would like to try different rod compositions I may recommend nylon (Ertalon) as an alternative planing form material. You could visit the local shop selling this kind of material. Take some small pieces of the material to test. Try drilling, cutting, filing, etc., and you can see the properties of the material and you can determine if it fits your purposes. Now – perhaps – you have found some use for plastics for your serious cane rod building!