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LAMINATING A BAMBOO SPINE
- PART 2 -

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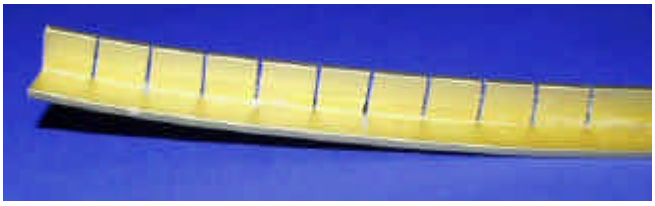
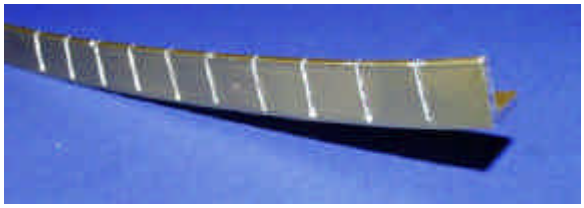
An interesting aspect of one person's ideas is that they often spark new ideas, especially among enthusiastic fighter kite fans! That is what occurred with the idea of laminating a bamboo spine that I described in my original article.

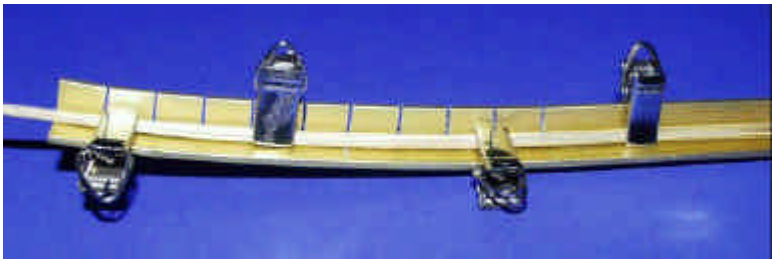
A couple of days following my email to Mathias Rosbund that included my article about laminating a bamboo spine, I receive an email with the photos in this page of this 'Part 2' article. What is interesting is Mathias saw a solution to a problem differently than I did…..he saw a clearer and more complete solution.

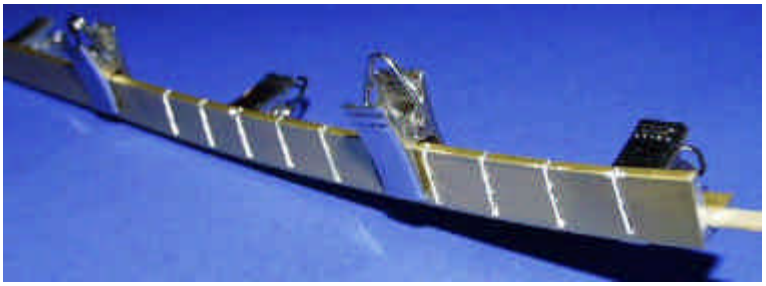




Rather than using a flat piece of metal as a form to clamp the glued laminated bamboo spine to while the glue is drying, Mathias thought if the metal had a vertical edge, it would serve two purposes. One to clamp the bamboo in a curve **parallel** to the skin side for the nose portion of the spine, but also it would serve as a clamping form for the laminated tail portion of the bamboo spine to make it perfectly straight. This is true even if the bamboo was split perpendicular to the skin side in the tail portion of the spine.

Mathias used an angled piece of aluminum into which he cut several slots along part of one edge to allow him to bend that portion of the aluminum.

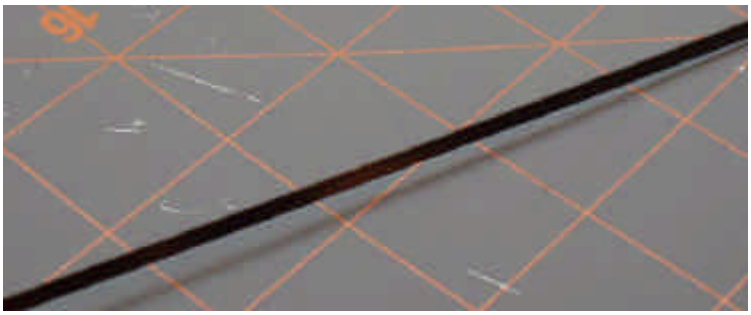




This 'jig' or 'form' allows Mathias to clamp the nose portion of the spine into a bend of his choice that is parallel to the skin side of the bamboo and also allows him to use the same form to clamp the laminated tail portion to be straight. However, the straight tail portion of the spine Mathias split **perpendicular** to the skin of the bamboo and clamped it to the vertical edge of his 'angled aluminum form'.

After I saw what Mathias did, I decided to blend his ideas, both the aluminum form and the splitting of the

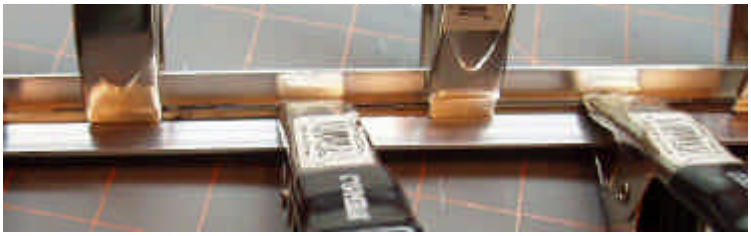
tail portion of the bamboo perpendicular to the skin side, together with an idea I got from Manny Alves.



Manny bonds bamboo and carbon fiber together in rather complicated combinations to make his 'superspines'. So I thought why not incorporate carbon fiber into the tail portion of the spine. Here's what I did.

I laminated the nose portion of my spine as described in my original 'laminating' article by splitting the bamboo parallel to the skin side; gluing it and clamping it to a curved form while the glue dried. Then I split the tail portion of the spine as Mathias did, perpendicular to the skin side of the bamboo, **but before gluing and clamping the tail portion**, I first inserted a piece of flat carbon fiber into the split and then glued and clamped the two outer bamboo parts with the flat carbon sandwiched in between them. The size of carbon fiber I used is 0.019" thick x 0.118" wide; 0.48mm x 3mm. This is a very thin piece of flat carbon.

The glue I use to bond the carbon fiber to the bamboo is carbon fiber impregnated superglue. I bought it at a model airplane shop. Other glues will probably work well also. However, before using a specific glue it would be wise to test the glue's ability to bond carbon fiber to bamboo.



After the glue dries, I trim the carbon fiber so it's flush with the bamboo spine on the skin side, the back side plus the very tail end.

There is no question that this is a much more time consuming process than quickly shaping a piece of bamboo to use as a spine. However, this is one place where I believe the time is more than rewarded with extra kite performance.

The result is the carbon fiber provides a substantial degree of additional front to back stiffness and straightness to the tail portion of the spine but adds very little weight. However the weight that is added is in the tail of the spine where weight is normally beneficial.

So far I really like the kite performance with this bamboo/carbon fiber combo-spine. There is one indirect aspect I also like about this spine arrangement. Even with a high wind kite; only one lower bridle connection is needed. Multiple bridle connection points along the spine are unnecessary. The carbon/bamboo laminated tail portion of the spine is so stiff that even with only one lower bridle connection point it has no tendency to flex backwards even in high winds.

So far my experience is this spine provides a slightly faster kite. And one that tracks very well even out beyond the wind window edges. Its stiffness prevents virtually any wind energy being used in bending the lower portion of the spine backwards; instead all the energy from the wind is converted to energy used to push the kite forward.

Hopefully, after reading these two articles and experimenting with spines yourself, you will think of a way to make an even better performing spine! If so, please share it with the rest of us!

More Huge Fighter Kite Grins,
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