

Suggested modifications for a wood Bubble Dancer.  
MD 18 Jan 10

1) Center airfoil should be switched from the AG35 to the thicker AG34.

2) There is no "right" size sparcap -- this depends on the desired strength and the acceptance of weight.

On a thin wing like this, a really dense and strong wood like ramin or maybe even oak is much better than spruce. Harder sparcaps can be made thinner for any reasonable sparcap width, which lets you put them farther apart within the airfoil. Such exotic wood strips may not be easily available, though.

3) Top sparcap should be perhaps 50% larger than the bottom sparcap everywhere. The reason is that wood is weaker in compression than tension. This will allow the wing to take more load and bend more without breaking.

4) Since the wood sparcaps are weaker than the carbon they replaced, the rest of the wing structure can be "weakened" and lightened to match, otherwise it's overkill:

4a) Thinner and/or lighter LE sheeting:  
firm 1/16" center (replaces firm 3/32")  
light 1/16" mids (replaces medium 1/16")  
light 3/64" tips (replaces light 1/16"), provided 3/64" can be obtained.

This also allows a 4% deeper and hence 4% stronger spar -- bonus.

4b) Shear webs half-width or less everywhere:  
1/4" center  
3/16" mid  
1/16" tip

4c) Wing ribs thinned:  
1/8" center (replaces 3/16")  
3/32" mids (replaces 1/8")  
3/32" tips (replaces 1/8")

4d) TE strips slightly narrower.

4e) Two ply ribs replaces CF/balsa bolt beam.

5) Ditto for the tails:

5a) Vertical tail 1/4" thick (replaces 3/8" thick)

5b) Horiz. tail 3/16" thick (replaces 1/4" thick)

6) Wing rods lighter/cheaper:  
3/8" x 1/16" wall Al tube? (haven't run the numbers yet)