

# THREE STICK SHIELD KITE - FRESH WIND

The first version of this kite was made of Mylar, with light spruce, ramin and split bamboo spars, for very light winds. This one is simply made from heavier materials for fresher winds. The precise shape of the sail has been altered, as have the proportions, but these changes were made purely for the sake of convenience, and are not, therefore, significant.

The spar materials are 1/4"/6mm diameter ramin dowelling for the spine and split bamboo for both cross-spars: the leading-edge one is ca 11/32" wide and 3/32" thick, ie 9mm and 2.5mm, and the arched one is 1/4" by 3/32", 6mm by 2.5mm. Spar lengths are: spine - 33.5"/850mm, leading-edge spar - 18.9"/480mm, and arched cross-spar - 26 3/8"/670mm.

The sail material is parchment. Using thick polythene would have been cheaper, and maybe easier in some ways. The main advantage of the parchment is that it takes both glue and paint well. It is, of course, perfectly possible to make a poly kite with a perimeter line in a taped fold (I've used that method in making a biggish Rokkaku derivative), but where such a fold is glued down, the perimeter line is held in place more firmly, I feel. That is, of course, a matter of personal prejudice. Anyway, in this case, it was the fact that parchment takes paint better which influenced my choice.

The final dimensions of the sail are indicated below; that is, the measurements shown are those taken after folds to take the leading-edge spar and the perimeter line have been glued down. Allow 3/4"/20mm or thereabouts all round for these folds.

The larger drawing of the kite is to a scale of 1:10. The design does not, as it appears, have the spine and arched cross-spar on the same side of the sail as the bridle! The features are shown that way merely to save the necessity of including the decoration on the sail separately.

The bridle has four legs, strictly speaking, but it functions as a three-leg bridle. Personally, I find this method of bridling simplifies adjustments. In effect, one uses a single length of line to tie two separate two-leg bridles, then uses a ring or loop of line to join them at the towing point. In this instance, the bridle line is lengthened with a loop on the upper side of the sail. This loop has bights round the spine immediately above the rear bridling-point, and then extends back to be hitched to a ring at the rear point of the sail. That isn't as complicated as it sounds, though it's still more complicated than I'd like. The purpose is to stop the tearing of the sail where the rear bridle-leg is attached, and also to help hold the spine in place. One point to note is that the bridle is rigged comparatively far aft. When the kite is suspended by its towing-point, a plumb-line from that point would touch the spine at about 20cm from the leading-edge. Despite this, the angle of attack is nearer 20° than the supposedly typical 30°.

This kite needs a tail, and I have used a tubular plastic one. The previous light-wind version of the kite can be flown tailless in ideal conditions, so I suppose it can't be ruled out that skilful modification might make this version tailless, but I'm content to fly a kite with a tail now and again. (One disadvantage of tubular plastic tails is that they're hard to roll up neatly once they've got air trapped inside. However, a 2 or 3mm diameter hole



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through the tail every 600mm or so will allow the tail to inflate in flight, yet bleed off air to permit rolling up the tail afterwards).

Details accompanying the main sketch:

1. Corner of sail at leading edge.
2. End of leading-edge spar, with small hole bored through.
3. Loop of garden wire through hole, to which lines are tied.
4. Bridle - front leg.
5. Bracing-line to front end of spine.
6. Bowing-line for leading-edge spar (depth of bow should be 60-80mm).
7. Short length of rubber tubing has hole punched through it and is attached to loop in perimeter line: it takes end of arched cross-spar.
8. Alloy ring is attached to loop of perimeter-line at pointed end of sail.
9. Loop is to fit into notch at end of spine.
10. Both sides of the doubled rear leg of the bridle are looped round the spine, and also round the alloy ring at 8. The spine passes through the ring to fit into the loop at 9.
11. A ring for the spine to pass through is lashed to the leading-edge spar also. (This is best done before the spar is glued in place). I have attached a piece of line to be fitted into the forward notch of the spine as the loop 9 is into the rear one. This may not be necessary, given that the bracing-line from the l/e spar ends serves a similar function, but it does prevent some distortion of the sail.

Bridle-leg lengths are approximately as follows: forward legs - 21 1/4"/540mm; rear leg(s) - 18 1/2"/470mm. Note, however, that the leg lengths vary with the size of the wire loop at each l/e spar tip. For that reason, the dimensions given for the forward legs are measured from the sail corner.

This kite was first tried with a 2-leg bridle. I supposed that as I should be using a long tail as a matter of course, I might be able to get away with such a simplification of the original light-wind kite, which also has a 3-leg bridle. I was mistaken. I varied the bridle-setting and tail-length without success. I could only get the kite to fly when I fitted the 3-leg bridle.

No loop or ring is shown for locating the centre of the arched spar because there ain't no such folderol. On this kite, I find it suffices merely to place the arched spar between sail and spine. Probably there isn't really very much pressure on it; the parchment is, after all, fairly stiff, and it is further stiffened by the glued fold containing the perimeter.

Erratum In Kiteflier no 32, July 87, p19 is my windhover plan . A note on the wing states that the minor cross spars (across the spine at E) has got no dihedral. True. There is no cross-spar at E. That should be at "F". Please accept my apologies.

**John Spendlove**

Three-Stick Shield Kite: Fresh Wind Version

John Spendlove

