

Delta Developments - The Delta Keel

I built my first delta early in 2001 (Photo 1), using Fred Broadhead's Mi-Delt design (Ref. 1). Although it soars beautifully in light winds, it tends to drift off after a while, and is difficult to recover. In stronger winds, it definitely needs additional stability, so I always fly it with a spinner for drag.

This instability disturbed me, as I didn't think that it should be like that, and I got to thinking about the keel shape. I felt that it should have more area behind the tow point to improve stability, and less in front to reduce front end steering (Ref. 2), and I came up with what I called the Delta Keel (Diag 1). As the lower edge of the keel now ran straight from the front to the back of the kite, it needed a spar, but I wasn't sure that the spine was needed in the normal place as well, so I made a trial version (Photo 2). It is small and overweight, using Mylar (survival blanket) and wooden kebab skewers, but it made me think that I was working in the right direction, even if the keel, at 1/4 of the sail area, was much bigger than necessary.

Then George Webster's article about the delta appeared (Ref. 3), and gave me more food for thought. He said the keel area should be 6 - 8% of the sail area, so this gave me a starting point for my Delta Keel area - 5% seemed reasonable. The reference to the Trefoil Delta of Helen Bushell sent me to my kite books. I found it (Ref. 4), and although the spine had been moved to the base of the keel, the keel was almost the same width from front to back. The flight was described as "lively" - unstable?

What I also found during my searches was Jim Rowlands' Folded Keel Delta with a polythene sail (Ref. 5) - there was "my" idea already in print! There was even a note that "Ripstop versions of this design also fly particularly well". So I was right, and the only deciding detail was the keel area.

It was back to the survival blanket Mylar, with some 3/16 inch diameter spruce from the local model aircraft shop, and I came up with a 5 ft span eXperimental Delta with which I could test out the 5% keel size (Diag 2 and Photo 3 - the face is reflective tape applied for Light Up The Sky for Children in Need, very effective with a spotlight). The sail

area includes the spar tubes, but the spine tube at the bottom of the keel is additional to the keel area. The holes for spreader attachment (F) and bridle are cut after glueing. Tube ends can be closed with tape after installing the spars. I used a bridle to make adjusting the trim easier, the front point is about a third of the way from the nose, the rear about a quarter of the way from the trailing edge. If you wanted a single tow point, you could probably do it with hole(s) in the keel above the spine, or a slot in the keel tube, with fore and aft adjustment using rings on the spine.

It works, but the wing spars would be better if they were a smaller diameter, say 1/8 inch, and all spars made of bamboo or carbon fibre (the spruce grain is not straight enough for strength). One 6 ft by 4 ft blanket will make one kite, a second could be made from the two remaining pieces overlapped and glued about 1/2 inch along the centre line.

As a result of my research, I am not claiming originality, just rediscovery, but I think that the principal is important enough to be better known, hence this article. All the credit must go to Jim Rowlands, except that I still prefer the name Delta Keel, as it describes the shape: it need not be folded if the material used for the keel is strong enough to be single. I think Helen Bushell's design would also be much improved (made more stable) if it too used a Delta Keel (Diag.3).

There are other aspects of the delta that I think could be improved and I am still experimenting.

Roy Martin

References

1. The Kiteflier No. 79, April 1999
2. Modifications to the Aurora in "Two pints of good lager and a bottle of wine - a different route to kite making" by John Eaton, The Kiteflier No.83, April 2000
3. The Kiteflier No. 88 July 2001
4. Kiteworks by Maxwell Eden, also in other books
5. Making and Flying Modern Kites by Jim Rowlands

Delta Developments - The Delta Keel

Diagram 2—The Experimental Delta

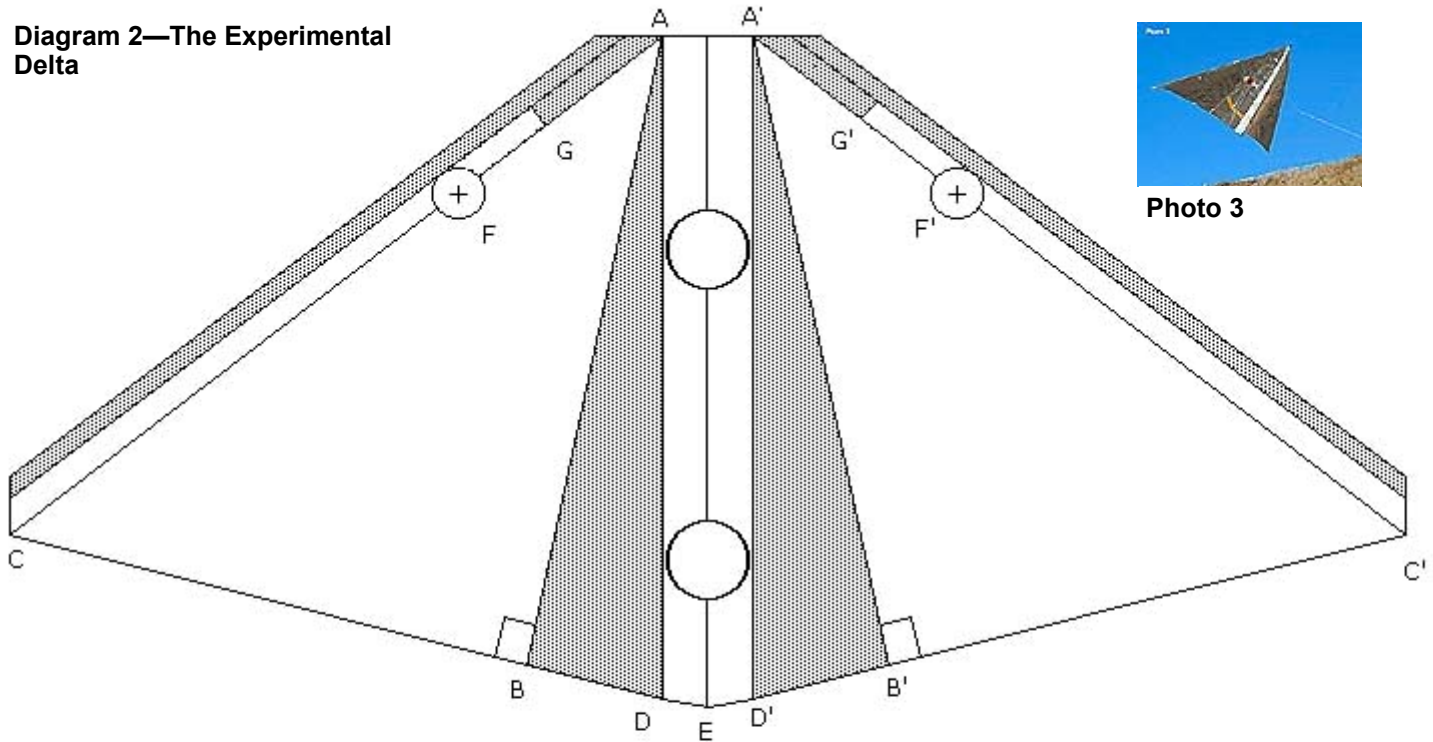


Photo 3

Dimensions (all in inches!)

- A - A' = 1
- A - B = 30
- B - C = 30
- B - D = 3
- C - F = 24.75
- C - G = 33.5
- Angle A-B-C is a right angle
- C - E is a straight line

Materials

- Sail: Mylar (survival blanket)
- Spars: 1/8 bamboo or carbon fibre
- Leading edges 33, spine 30
- Spreader about 24.75, adjust as required

Glue:

I used a contact adhesive which left a wrinkly join, but it still flies OK. Alternatively, try a clear glue, which should not distort the Mylar

Cut holes AFTER gluing. Reinforce at G and G' with a staple

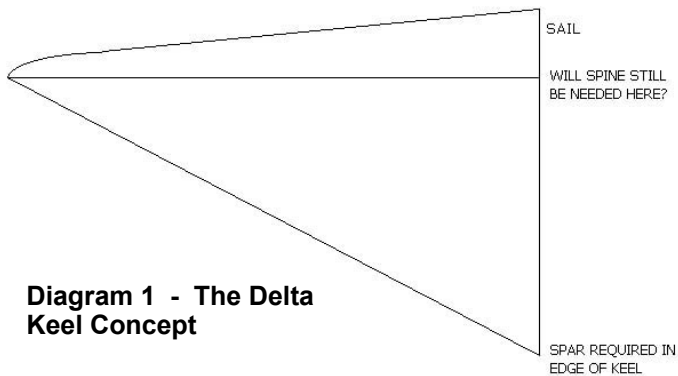


Diagram 1 - The Delta Keel Concept



Photo 2



Photo 1

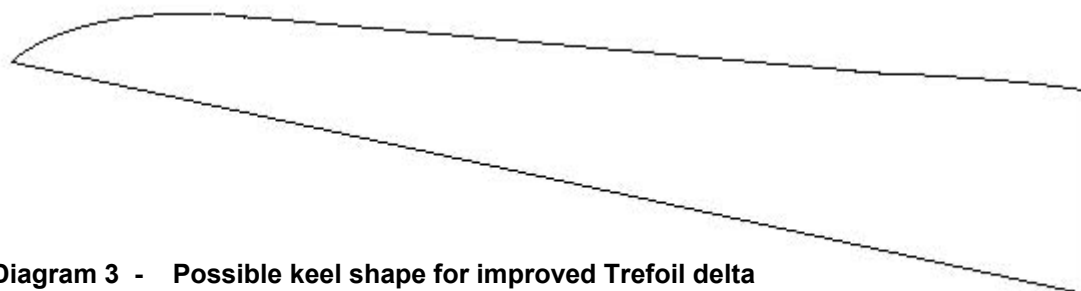


Diagram 3 - Possible keel shape for improved Trefoil delta