Instructions for sewing an inflatable kite

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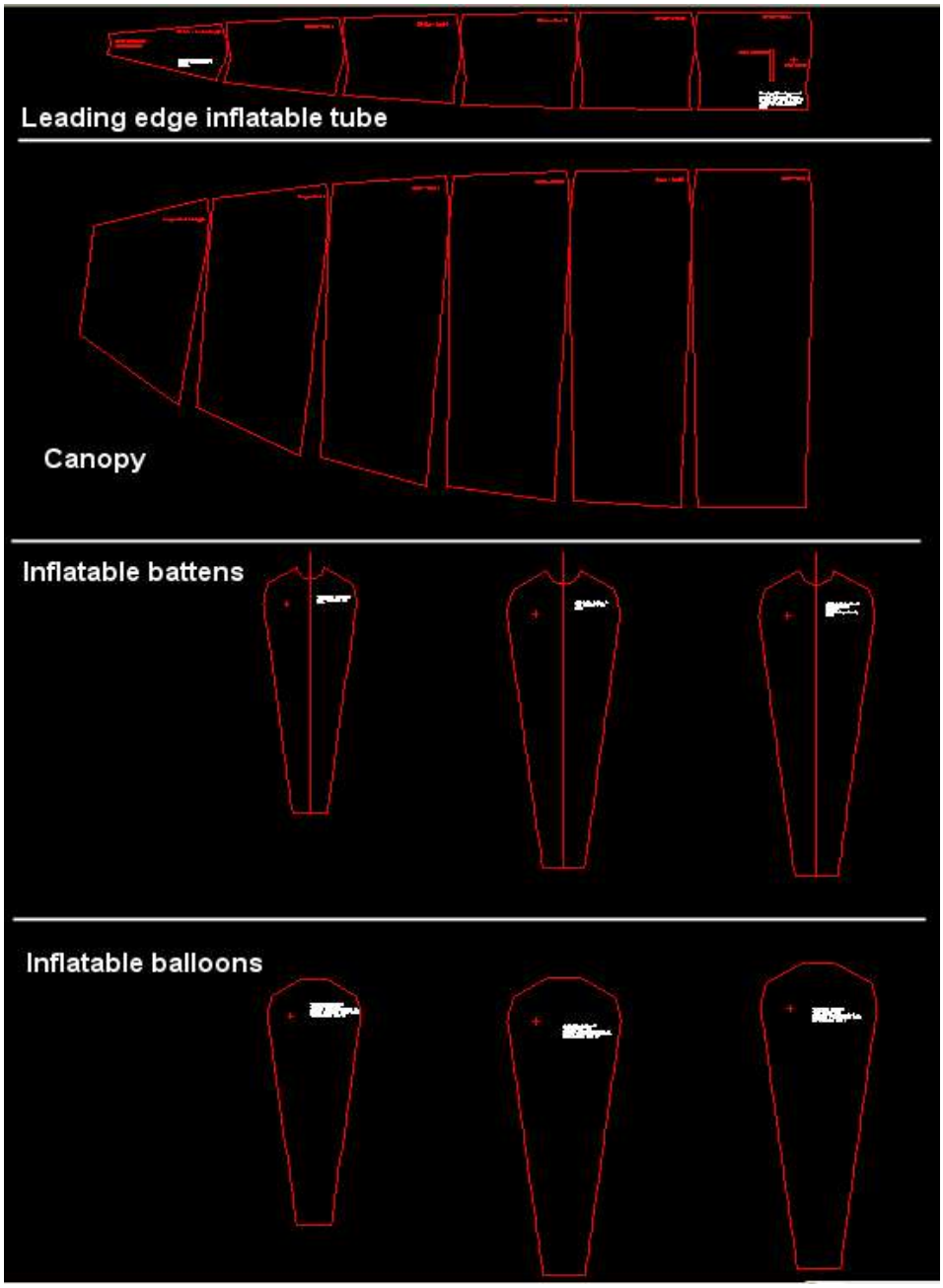
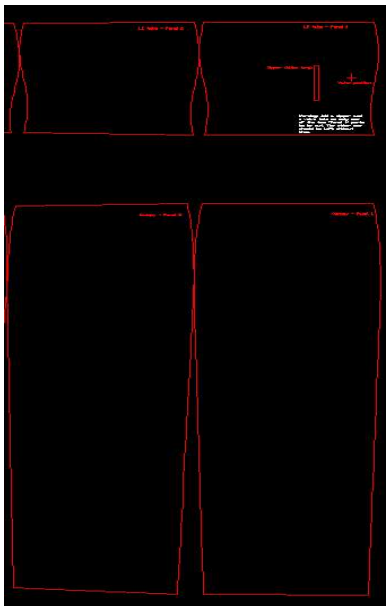
Introduction

An inflatable kite is made of four main parts:

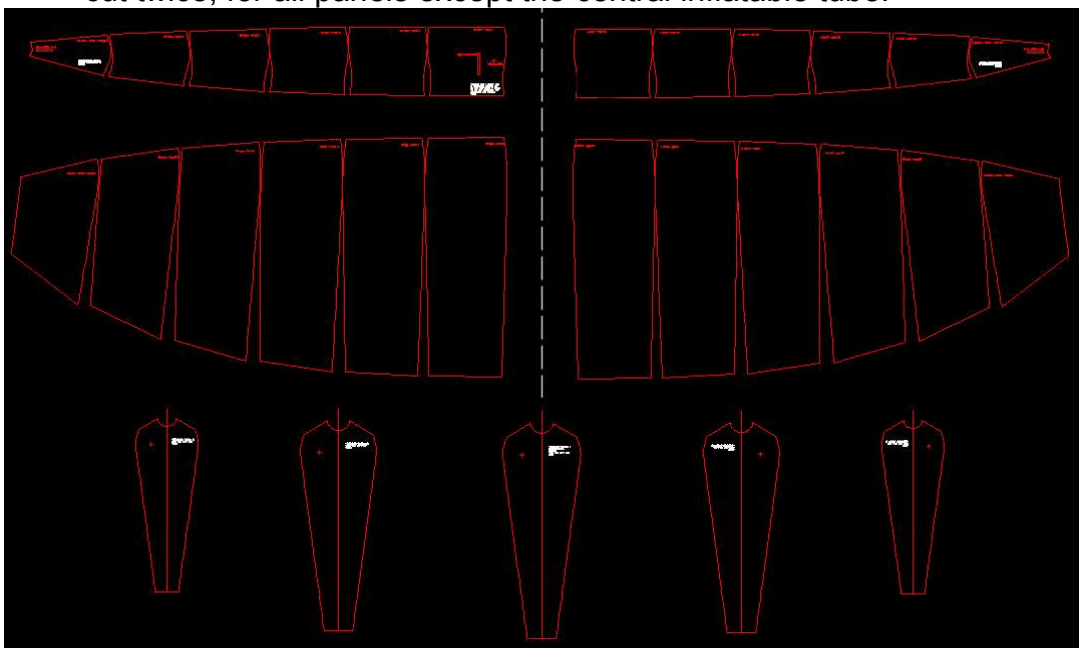
1) The Leading Edge inflatable tube
2) The main canopy
3) The inflatable battens
4) The balloons which go into the inflatable tubes.



- There is also a fiberglass or carbon fiber batten at the wingtips, as long as the wingtips, for tip stability.
- Depending on the degree of accuracy the designer would like to have, each of the kite's parts can be divided into 5, 6, 7 or more panels. The number of panels on the LE tube is equal to the panels on the main canopy and they have the same width at the points where they are sewn together.



- Because the kite is symmetrical, the plans contain the panels' shapes for half the kite. In order to have the complete kite we need the plans cut twice, for all panels except the central inflatable tube.



General sewing instructions

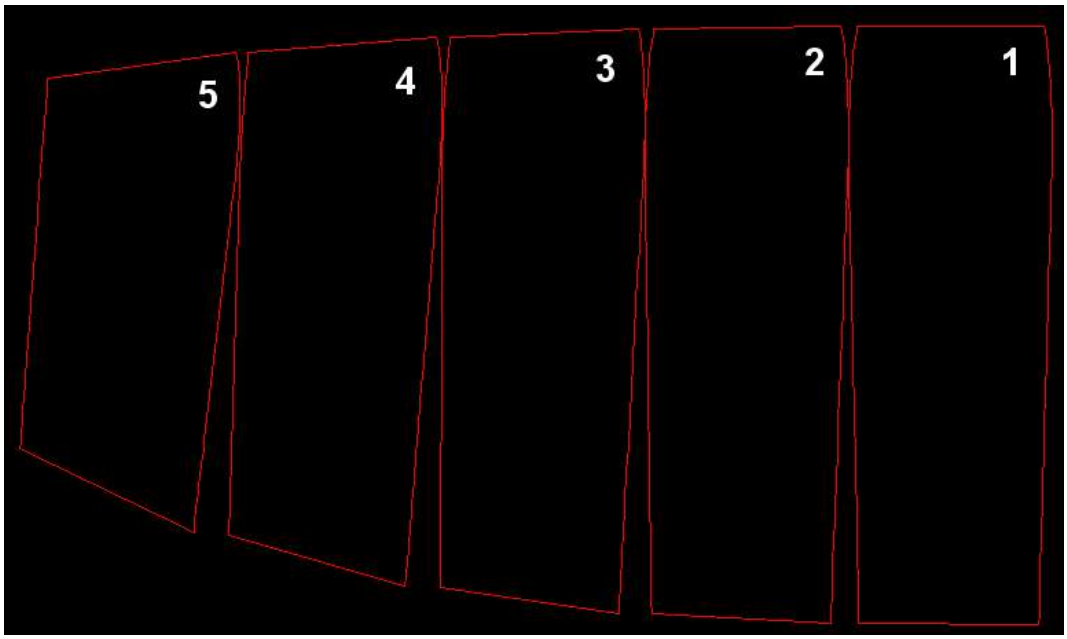
Sewing the inflatable kite should be done with a very thick polyester thread. The stitches must be straight and zig-zag only where is mentioned in the instructions. Zig-zag stitches are used for reinforcements.

Straight stitches must be about 5mm long so that the thread doens't tear ripstop or dacron at the seams when pulled hard.

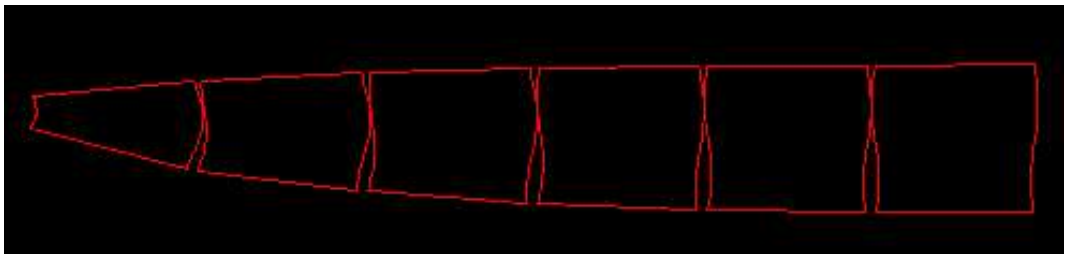
Building the kite

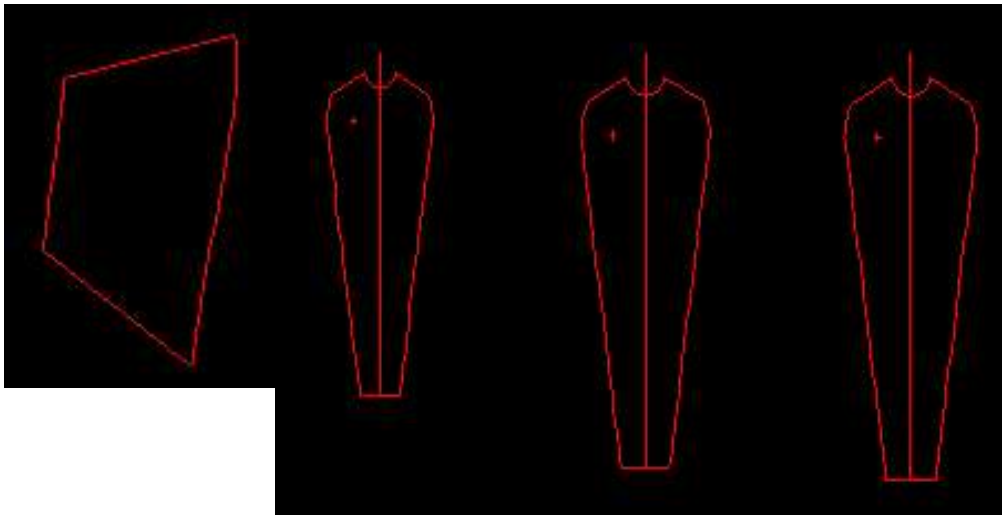
In order to make the inflatable kite, you have to do the following steps:

1) Trace the plans of the kite on polyester or nylon ripstop for the main canopy. Each piece of material must be cut two times, one for the left and one for the right side of the kite. This does not apply to the central inflatable tube.



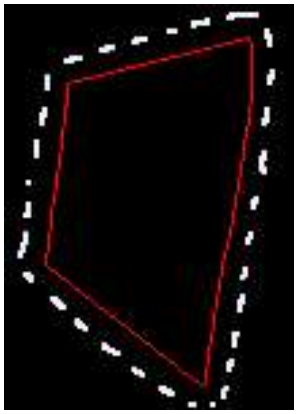
2) Trace the plans of the kite on Dacron for the Leading Edge inflatable tube panels, the inflatable battens and the wingtip panels of the canopy.





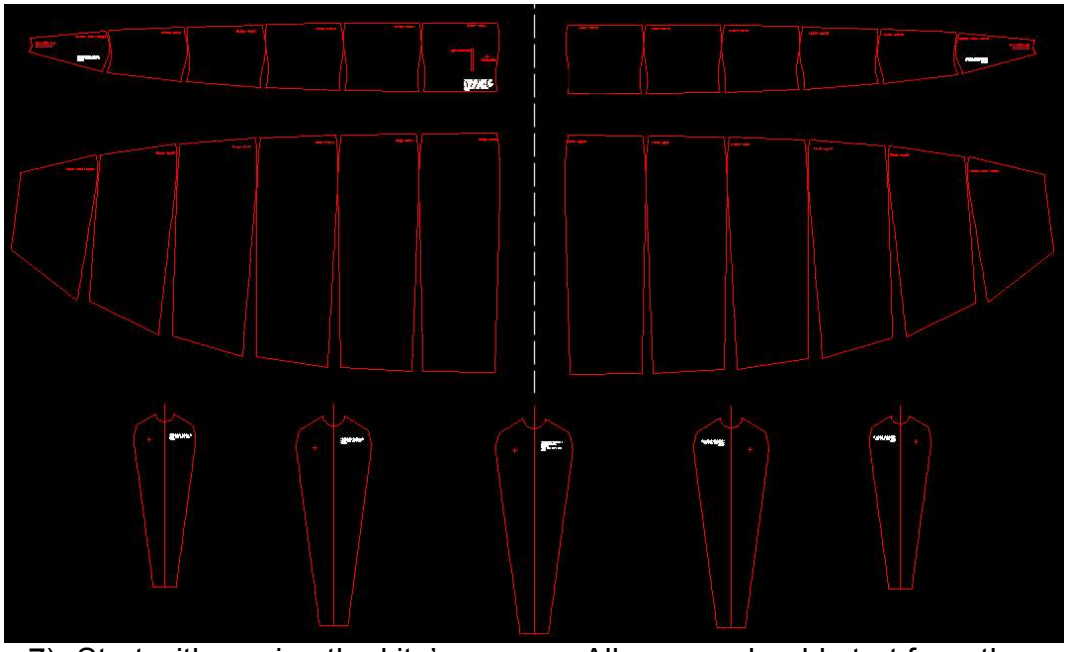
3) Place numbers on the pieces of fabric. The bigger parts, at the middle of the kite get the first numbers, and the number should increase toward the wingtips. This applies for LE inflatable tube parts, canopy parts and inflatable batten parts.

4) Add seam allowance outside the lines shown in the plans. 10 mm is a good seam allowance.

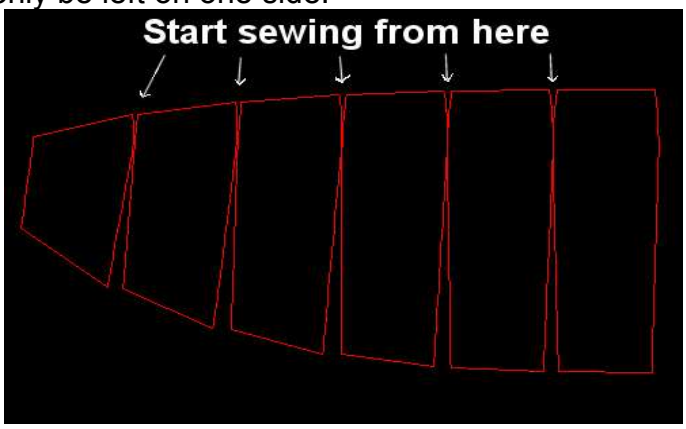


5) Cut the fabric. It is better to cut it using a hot-cutting knife so that the materials do not fray in time after that. Dacron panels should be hot-cut for best results.

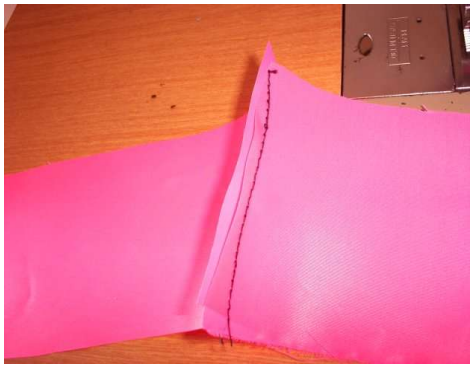
6) Separate the pieces of fabric for the different parts of the kite. Ideally they should be layed down flat as in the plans. Left panels to the left, right to the right.

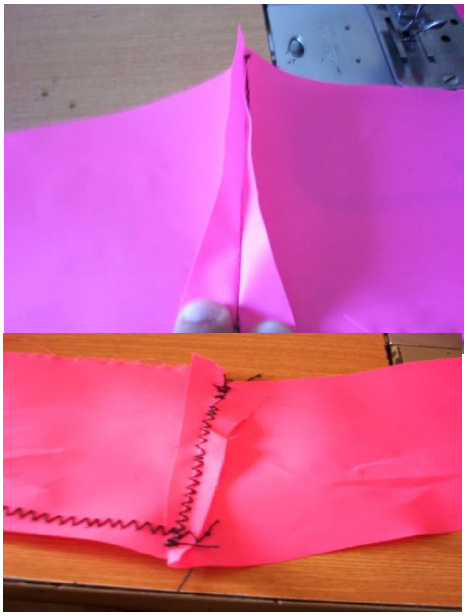


7) Start with sewing the kite's canopy. All seams should start from the Leading Edge and any excess fabric after sewing the whole canopy should only be left on one side.

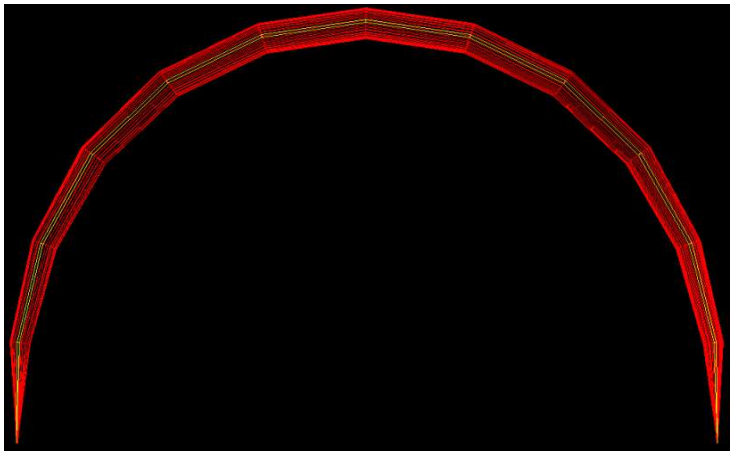


8) Do the same with the Leading Edge inflatable tube. Apart from the main sewing work that is needed to sew the panels together (with straight stitches), we also need extra zig-zag seams over the regular straight-line stitches in order to reinforce the inflatable tube to withstand pressure. We also need the zig-zag stitches in order to hide all sharp edges of fabric on the inside of the tube, otherwise they might cause the inflatable balloon inside to burst.





9) Once the LE inflatable tube's panels are sewn together, there is only one seam left to close the tube. This is the seam which goes from tip to tip and runs all along the kite's Leading Edge. Don't close it yet!



10) All zipper positions should be hot-cut with a special thermal cutting knife, or a soldering iron. Otherwise the edges of Dacron will fray in time.

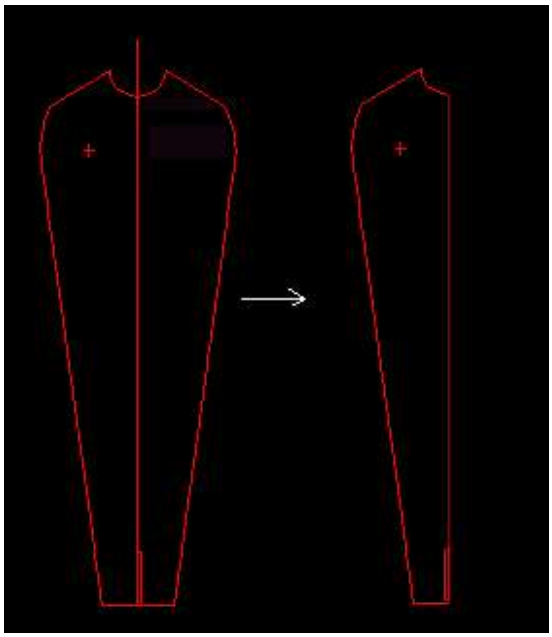
11) All zippers must be made of plastic, because the kite lands in seawater very frequently.

12) Sew the zipper for inserting the plastic inflatable tubes. Add zippers at the two ends of the tube, near the wingtips,too. All zipper positions are indicated in the plans. Zippers should also be sewn with a zig-zag stitch over the initial straight-line stitch, and the sharp edges of fabric covered on the inside.

13) Open the hole for the plastic inflatable tube's valve. This hole should also be cut with a hot-cutting tool. Reinforce the Dacron with another layer of fabric on the inside. Use zig-zag stitches and cover the inside edges of the fabric. The hole position is indicated in the plans with a

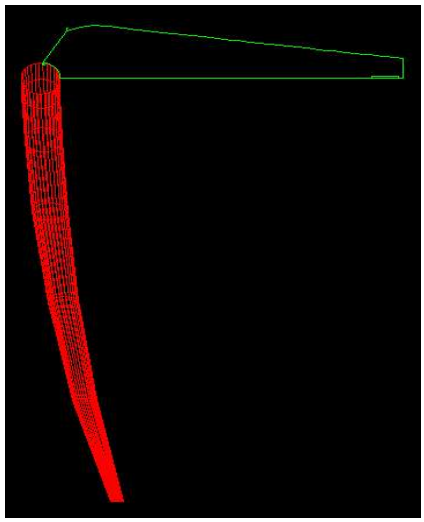
cross. Hole size depends on the size of the balloon's valve.

14) Inflatable battens: Open a hole for the valve, reinforce it with an extra piece of Dacron (with the sharp edges protected). Add the zipper (with the inside sharp edges of fabric protected, too) at the TE for inserting the inflatable balloon. Sew the inflatable batten all around with a straight stitch, leaving excess material on the outside. Reinforce the front part of the batten (the circular part, which will be sewn on the LE tube) with an extra layer of Dacron.



15) Sew the inflatable battens on the LE inflatable tube, according to the plans. There are arros in the plans which show where to start sewing the LE tube and the inflatable batten together.

16) Sew the wingtip batten pocket on the canopy. Remember not to close one side because this is where the batten will go in from.



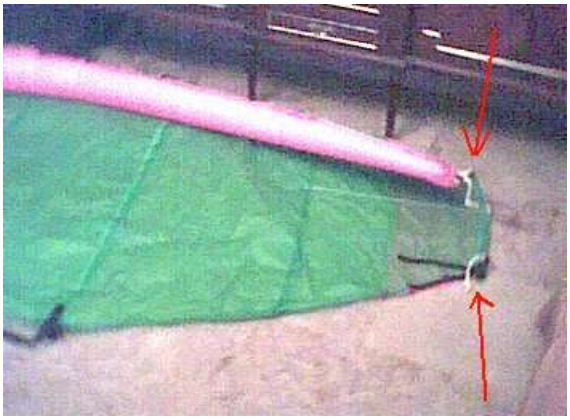
17) Close the LE inflatable tube, by sewing it in two directions. Start from the center each time and go towards the tip. Excess material should be left outside the tube, on the Leading Edge of the kite (kite's front). The seam should be made with the thickest thread available, since this takes most of the inflatable balloon's pressure. Sew excess material left outside the tube, so that no sharp edges are visible.

18) Sew the canopy on the LE inflatable tube, using the remaining fabric in the tube's front. Sew the inflatable battens on the canopy, start from the Trailing Edge and stop where the small arrow is in the plans.

19) Sew reinforcement rhombuses in the front of the canopy where different panels meet. Finish the tips and the trailing edge of the kite by sewing a 70kg or stronger line around their edges.

20) Sew the flying line connection straps in the LE and the TE of the kite. The point is marked on the kite. The straps should be as long as the width of the wingtip panel.

21) Make pigtails for attaching on the connection straps. Use thick polyester rope (4 mm) for durability.



At this point the kite is ready.

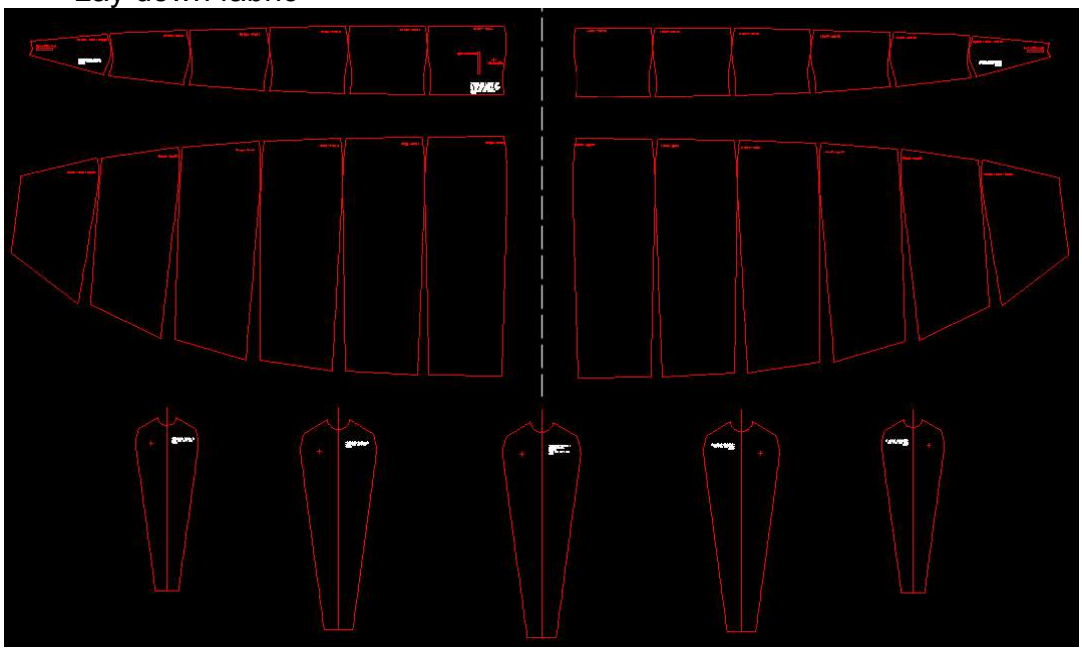
List of materials

No	***Part name***	***Material***	***Number of parts required***	***Comments***
1)	Canopy panel 1	Ripstop	2	
2)	Canopy panel 2	Ripstop	2	
3)	Canopy panel 3	Ripstop	2	
4)	Canopy panel 4	Ripstop	2	
5)	Canopy panel 5	Ripstop	2	
6)	Canopy panel 6 (wingtip)	Dacron or other reinforcement fabric	2	
7)	Wingtip Batten pocket	Dacron	2	
8)	LE tube panel 1	Dacron	2	
9)	LE tube panel 2	Dacron	2	
10)	LE tube panel 3	Dacron	2	
11)	LE tube panel 4	Dacron	2	
12)	LE tube panel 5	Dacron	2	
13)	LE tube panel 6	Dacron	2	
14)	Inflatable batten 1	Dacron	1	
15)	Inflatable batten 2	Dacron	2	
16)	Inflatable batten 3	Dacron	2	
17)	Strap material for sewing on wingtips at the strap connection points	>200kg strap	4	
18)	Balloon for inflatable tube 1	PolyUrethane or PVC or PolyPropylene	1	
19)	Balloon for inflatable tube 2	PolyUrethane or PVC or PolyPropylene	2	
20)	Balloon for inflatable tube 3	PolyUrethane or PVC or PolyPropylene	2	

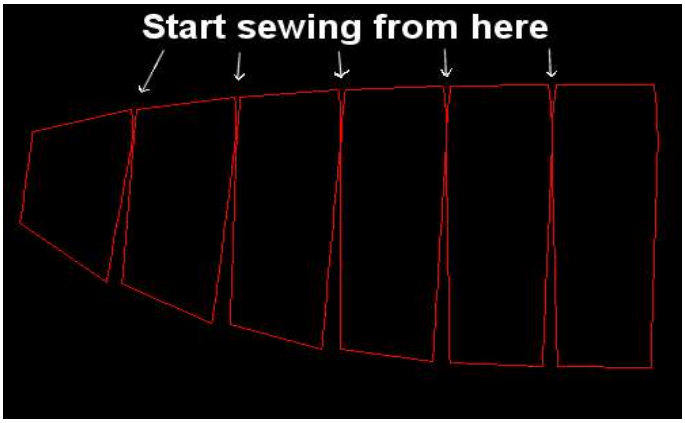
No	***Part name***	***Material***	***Number of parts required***	***Comments***
21)	Balloon for Leading Edge tube	PolyUrethane or PVC or PolyPropylene	1	
22)	Wingtip batten	Fiberglass or carbon fiber	2	600mm long (as long as the wingtip)
23)	Wingtip Zippers	Plastic	2	125mm long
24)	Inflatable batten zippers	Plastic	5	120 mm long
25)	Leading Edge tube zipper	Plastic	1	160 mm long

The kite's constructions in pictures

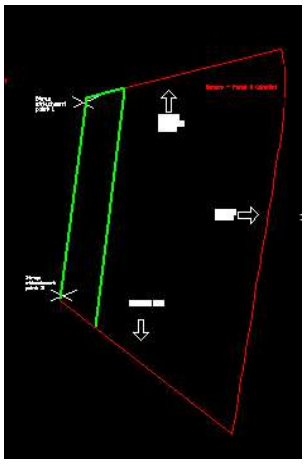
- Lay down fabric



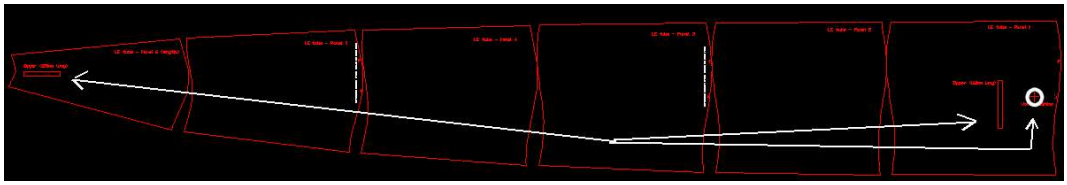
- Sew the canopy panels together, starting from LE.



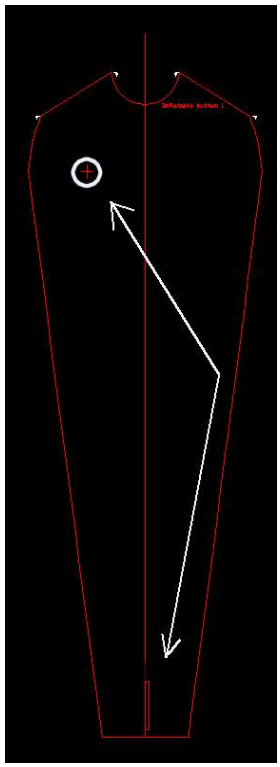
- Sew the fiberglass batten pockets at the wingtips. Seams shown in green.



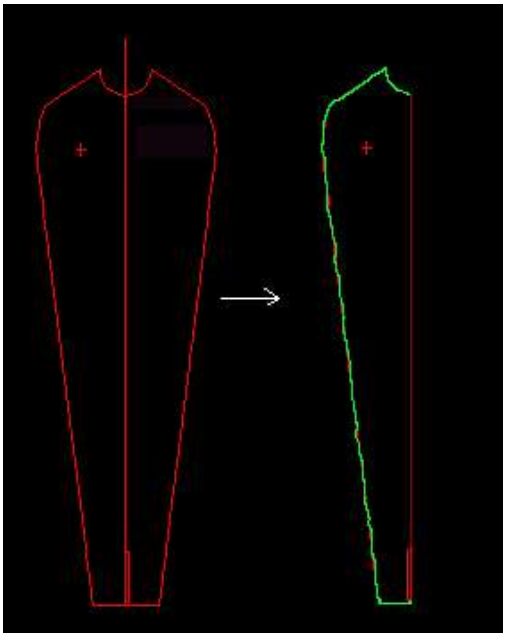
- Sew the LE tube panels together. Then sew the zippers and valve reinforcement on the LE tube.



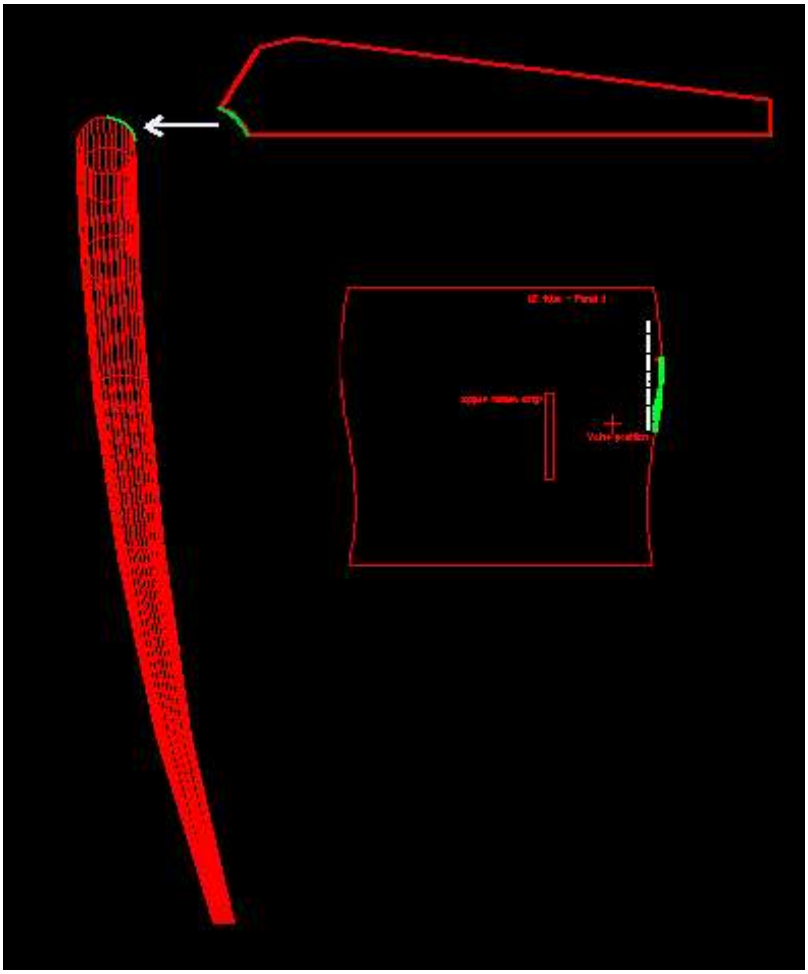
- Sew the zippers and valve reinforcements on the inflatable battens.



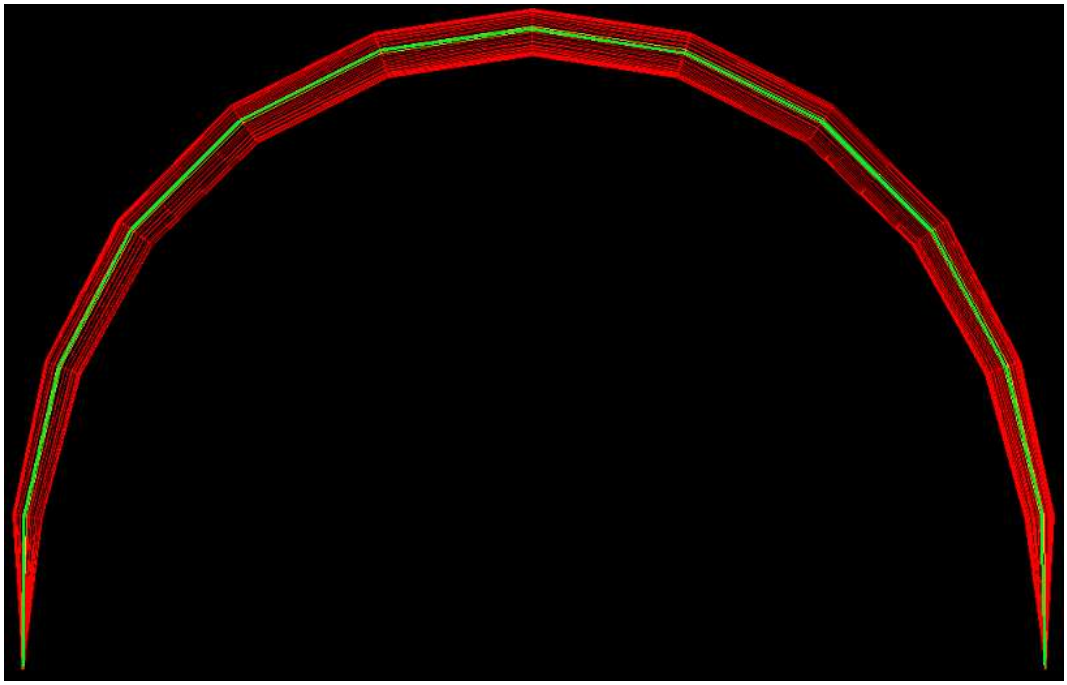
- Sew the inflatable battens closed (seams are shown in green).



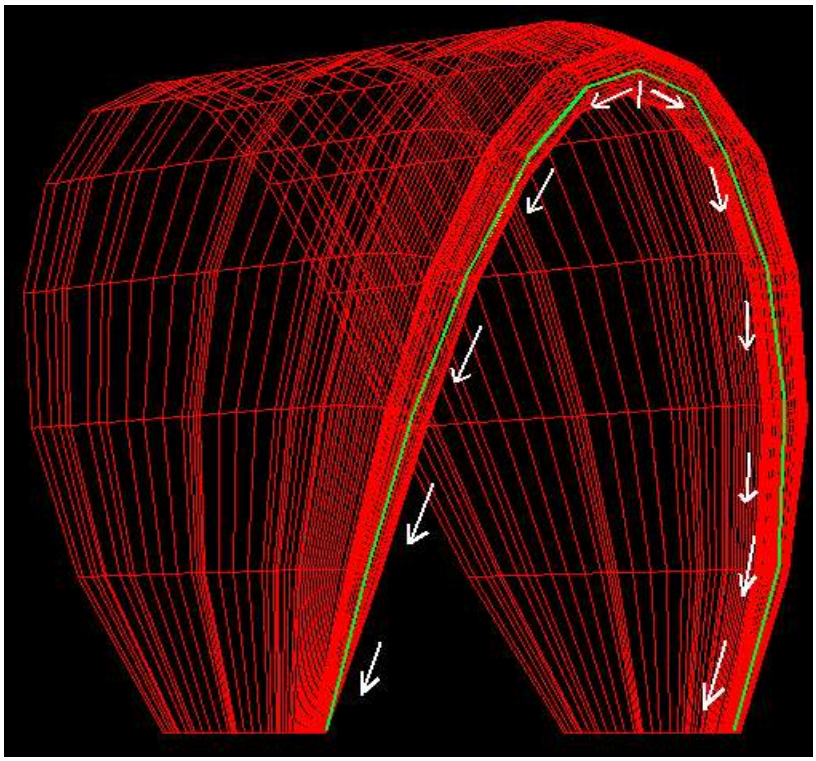
- Sew the front of the inflatable bladders on the LE tube.Seams are indicated in green. Do this for all inflatable battens.



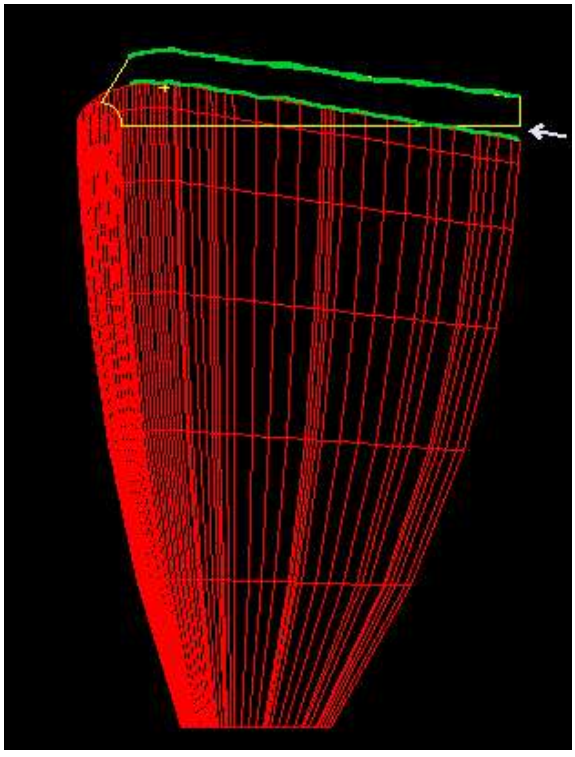
- Sew the front of the LE tube closed. Seams shown in green. Now the inflatable battens are in the back of the LE tube.



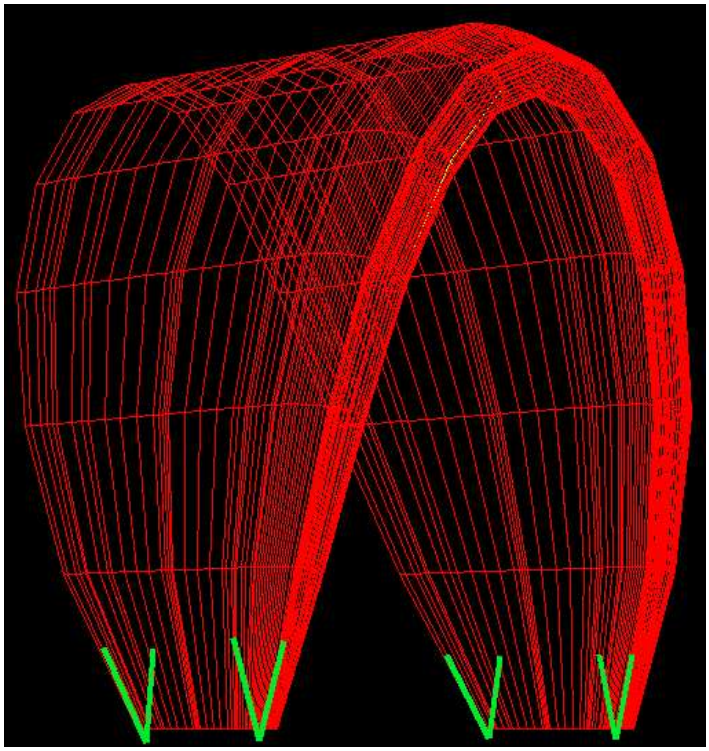
- Sew the canopy on the LE tube by sewing the front of the canopy and the excess material coming out from the front of the LE tube. Seams shown in green. The white arrows show the direction of sewing. Note that excess fabric should be left on the inside of the kite, between the canopy and the LE tube.



- Sew the inflatable battens on the canopy, starting from the Trailing edge and going up to the arrow indicated in the batten plan.The edges to be sewn together are shown in green.



- Sew the flying line attachment straps on the wingtips as indicated in the plans.



That should be it!!!