

# THE LINE FOIL PLAN

Originally published at the Twisted String web site (<http://beam.to/kites>)

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## Background

The Line Foil is identical to a regular parafoil except internal lines are used in place of material ribs. The internal lines are evenly spaced throughout the kite. The kite is bridled to fly totally flat. There has been no attempt to introduce any curvature in the form of anhedral or dihedral in either transverse or longitudinal directions by means of differential internal line spacing to the top and bottom skins, or by the introduction of non-parallel diagonal internal lines or additional internal lines between the evenly spaced internal lines. The Line Foil's air intake has an even depth across its entire width. The kite flies well, at a relatively high angle of attack, but relies upon a tail to generate drag and prevent typical instabilities associated with parafoils.



## Construction

This section of the plans details all the dimensions needed to construct the kite. The plan is fairly straightforward, especially if you have previously made parafoils. If you have never made a parafoil before you could try one of the many plans available on the internet first.

## Skins

Figure 1 shows the layout of the grid pattern on the skins of the kite. As you can see it is really simple! The kite consists of rectangular front and back skins 320 cm x 240 cm. Both skins then have an identical grid of line sewn onto them. This grid is used to reinforce the material, and allow you to sew the internal supporting and external bridle lines. A light weight line can be used for the internal supporting. I used some dyneema as this is what I had available, however, I guess any braided line of approximately 50 Kg breaking strain would suffice.

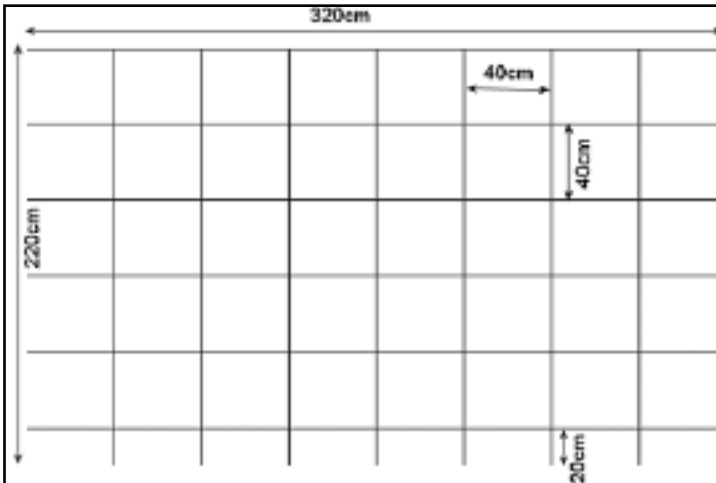
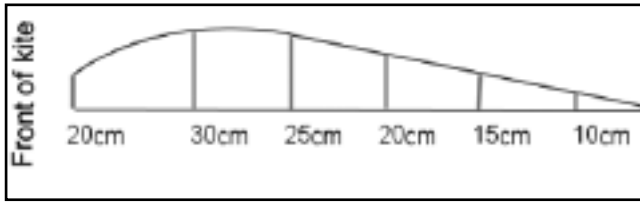


Figure 1. Top and bottom skin grid arrangement (not to scale).

Internal Support lines  
Figure 2 shows the lengths of the internal support lines. As the diagram shows they are set at these lengths to give a rough aerofoil shape to kite.

Figure 2. Lengths of the internal support lines (not to scale).



I didn't bother reinforcing the points where lines will pass through the material, and have not had any rips yet (even on quite windy days!) – but, in hindsight I think that it is a good idea to reinforce these points with small Dacron squares.

### Primary Bridle

The primary bridles have been calculated so that the kite is bridled flat. Figure 3 gives the lengths of the primary bridles, which are sewn onto the kite around the skin reinforcement line cross over points. I recommend using a line of approximately 50 Kg breaking strain for the primary bridle lines. There are 6 rows of primary bridles to maintain the kite's flat shape. These rows begin at the very front of the kite.

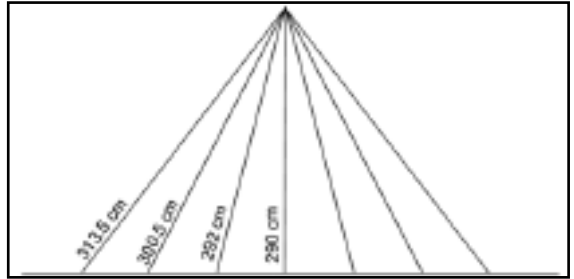
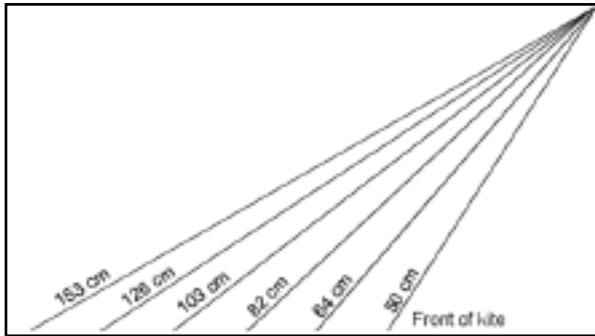


Figure 3. Primary bridle line lengths (not to scale).



### Secondary Bridle

Figure 4 shows the lengths of the secondary bridle lines. I recommend using a line of approximately 200 lb breaking strain for the secondary bridle lines.

Figure 4. Secondary bridle line lengths (not to scale).

### Order of Construction

The following steps show how to put the kite together.

Cut out the front and back skins, (320 cm x 240 cm). These can either be single pieces or a patch work arrangement. The grain of the material should be parallel with edges of the kite.

Add any appliqué if you are feeling adventurous, Ensure that this does not affect the dimensions of the skins

Mark on the skins where to sew the grid arrangement of reinforcement lines.

Sew Dacron reinforcement squares at the points where lines will be stitched through the skins (reinforcement line intersection points and at the leading edge bridle points).

Sew the grid lines onto the skins (sew the front line into the hem).

Sew the skins together inside out (not at the front!), then turn the right way out.

Sew tabs for the tail to the trailing edge of the kite. These should be located at a central position and at the first and last vertical reinforcement line position (20 cm in from each edge)

Stitch and tie in the internal supporting lines.

Tie on the external primary bridles. See Figure 5 for more information about the bridle line configuration.

Attach the rows of primary bridles to the corresponding secondary bridles.

Attach flying line and find some wind.

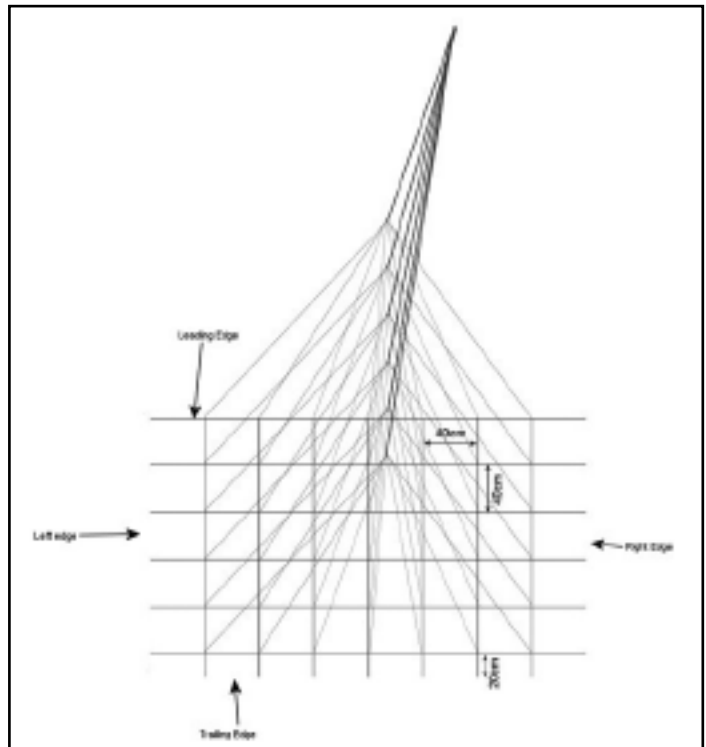


Figure 5. Schematic diagram of the bridle line layout.

### Flying and Other Stuff

Be aware that in a good wind this kite will develop a considerable amount of pull. If you have never flown large kites before please take a look at the following site for some very useful tips: <http://www.gombergkites.com/faq.html> In particular please pay attention to the ground anchoring tips to avoid dangerous situations!!

The kite needs some sort of tail or drogue to give it stability in flight. I have been using a 20 m tube tail that was made from a 40cm wide piece of ripstop, that can be attached as a 'skipping rope' or as a long streamer tail. In light winds I use the tail as a streamer to produce a low amount of drag, and in stronger winds I use the skipping rope method to produce more drag. With this tail I have found that the kite is extremely stable. I was amazed at just how stable and static it was in the sky. In the past a number of my other homemade parafoils have flown terribly (even with a massive drogue)! On a number of occasions I have used it in place of my trusty PL Pilot kite! (I can confirm this kite needs lots of drag, so give it a big hefty tail folks. Dazzz)

To see more photos of the kite visit my web site at: <http://beam.to/kites> If you make a kite from these plans please email some photos to me via the address given on the web site.

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