

KITES FOR CONNOISSEURS

PRETZZL

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Kites for Connoisseurs is a collection of plans for kites designed by Andreas Ågren. These kites often have a unique technical twist. The plans can be found at <http://windman.se/kite-plans> and they may not be used for commercial purpose without written consent.



Pretzzl is a single rod kite, where the rod is bent in two bights to create the wing shape. The wings are vented, what the Japanese call *fu-tai wing* (kanji 風袋), that create an in-sail dihedral. The kite has two long balance sprouts with tassels at the end. It uses two tensioning strings (shape shifting strings) to create the shape of the body. However, this is not a knot kite since the rod is not weaved over-and-under itself.

Pretzzl can be stacked to at least a short train, although multiple kites probably might look better as a flock on separate strings.

The name *Pretzzl* is of course derived from the pastry.

Material

- Fibreglass rod, either
 - 1.5 mm, 3 m (or 2 x 1.5m).
 - 1.0 - 1.2 mm, 2 m.
- Washi paper, thin plastic or ripstop for skin and tassels.
- (1.5 mm ferrule if two rods are being used.)

Making a Pretzzl.

The nine general steps of making the kite:

1. Decide the size, large or small, of the kite (i.e. total length of the fibreglass rod).
2. Mark the intersection points on the rod(s).
3. Bend the rod into the approximate shape.
4. Adjust the intersections to the marked points and secure the intersections with a knot of thin thread.
5. Tie the shape shifting strings.
6. If the centre is to be in a different material than the wings: draw the contour of that panel.
7. Cut the skin according to the included template and glue it to the frame.
8. Make the two tassels and glue them to the sprouts.
9. Tie the bridle.

Detailed steps below.

Large Pretzzl - width 57 cm

300 cm x 1.5 mm fibreglass rod.

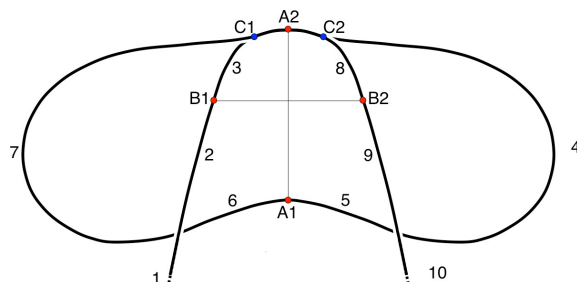
(Or 2 pcs 150 cm plus one 1.5 mm ferrule.)

Segment number.	Segment length.	Aggregated length.	
1	54	54	
2	15	69	B1
3	12	81	
4	56	137	
5	13	150	A1
6	13	163	
7	56	219	A2
8	12	231	B2
9	15	246	
10	54	300	

Small Pretzzl - width 38 cm

200 cm x 1.0 - 1.2 mm fibre glass rod.

Segment number.	Segment length.	Aggregated length.	
1	36	36	
2	10	46	B1
3	8	54	
4	37.5	91.5	
5	8.5	100	A1
6	8.5	108.5	
7	37.5	146	A2
8	8	154	B2
9	10	164	
10	36	200	



Each number indicates a section/leg between two intersections of either rod/rod or rod/string (or between start/end and nearest intersection). The number also goes for the intersection itself.

A1 - A2 is shape shifting string A.

B1 - B2 is shape shifting string B.

C1 and C2 are shape shifting knots around the double rod in the top.

Point A1 is the middle of the rod (and, if two rods are used, the joining point of the two rods).



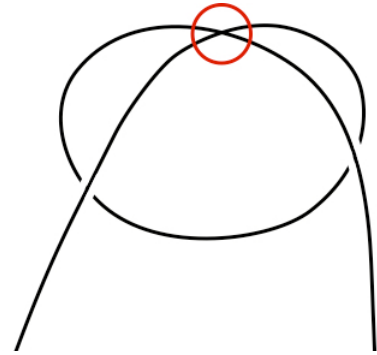
Size comparison. The angle of the sprouts may be modified by modifying the lengths of the segments 4, 5, 6 and 7.



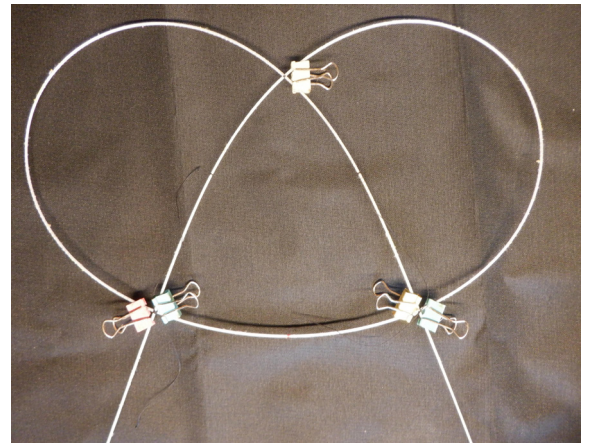
Pretzzl is not detachable, but the sprout ends can be bent into the wings to reduce the packing size; 57 x 35 cm for large and 38 x 23 cm for small kite.

The Pretzzl frame.

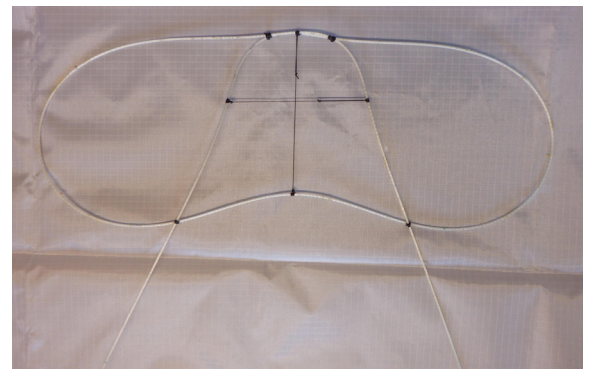
1. Mark the intersection points on the rod(s) according to the selected table. Draw the marks all the way around the rod.
2. Bend the approximate shape of the frame and put clips on the three intersections.
3. Adjust the intersections according to the marks on the rod: corresponding marks should be exactly on top of each other. Keep the intersections in place using clips.
4. Secure the intersections by tying a thin thread around each intersection.
5. Tie the shape shifting string A1 to A2. The string length should be 18 cm for the larger kite and 12 cm for the smaller.
6. Tie the shape shifting string B1 to B2. The string length should be 16 cm for the larger kite and 10.5 cm for the smaller.
7. Tie the shape shifting knots C1 and C2. They should be on either side of point A2: 4 cm for the larger kite and 2.6 cm for the smaller.
8. Put a drop of super glue at every knot when the shape is as desired.
9. If the centre is to be in a different material than the wings: draw the contour of that panel following the rod on the outside.



The approximate shape. It doesn't matter in what way the rod crosses itself in the top (encircled intersection), but it is important that the two sprouts are on the same side of the horizontal rod part in the bottom.



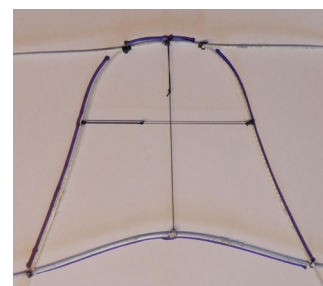
Start with tying the two intersections in the bottom to prevent the rod from slipping up.



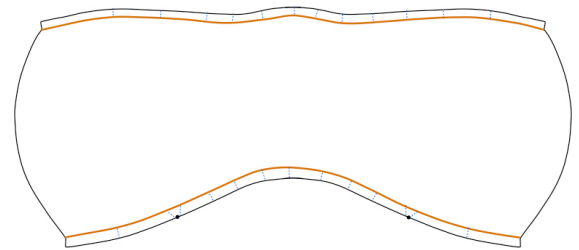
The two shape shifting strings plus the two shape shifting knots tied to the frame.



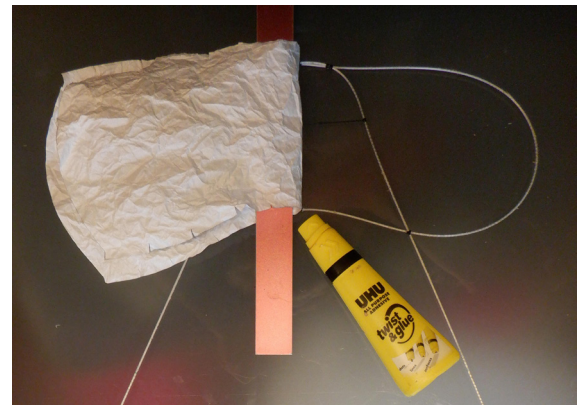
The front of the frame seen from the front with the A2 intersection knot in the middle surrounded by the two shape shifting knots C1 and C2.



10. Prepare and cut the skin according to the included template (check that the width of the template is 63 cm resp. 42 cm as the green arrows indicate) and glue it to the frame:
 - a. If the material is rather stiff, like som washi paper, crumple it up thoroughly and then smooth it out before cutting out the skin.
 - b. Draw the guide lines for the wing rod 7 - 8 mm inside the front and rear edges as indicated in the figure.
 - c. Cut slits in the front and rear edges to facilitate the material wrapping around the curved rod.
 - d. Make sure the sprouts are on the upside and facing the skin, then centre the skin on the frame.
 - e. Mark on the wing frame how far out the padding reaches (for the glue) and glue one side of the kite skin at a time with glue both on the "body" rod and on the wing rod.
 - f. Glue the padding of the front and rear of the kite skin around the frame.
 - g. If the centre is to be in a different material:
 - Carefully cut out that part just inside the frame avoiding the two shape shifting strings.
 - Cut the centre panel skin (using the template made at step 9) and glue it onto the frame.



Guide lines for wing rod indicated with orange colour. Slits indicated with dashed blue.



Gluing the first half of the skin to the frame.



The skin padding wrapped and glued around the rod.

One way of making a tassel.

11. Prepare a rectangular piece of the same material:
 - For large kite: 24 x 40 cm
 - For small kite: 18 x 30 cm
12. If the material is rather stiff, like some washi paper, crumple it up thoroughly and then smooth it out before cutting the tassel piece.
13. Fold it double lengthwise so it becomes 12 x 40 (9 x 30).
14. Cut a long fringe from the open side of the folded material, leaving 1.5 cm uncut at the fold side.
15. Cut the material piece in half (20 resp. 15 cm) for the two tassels.
16. Glue and wrap the fold side around the end of the sprouts.
17. Secure the tassels with a firmly tied thread.



Tassel material cut in half for two tassels.



Tassel on sprout before securing thread is trimmed.

Bridle.

Usually a two point bridle through A1 and A2 works well. If not, a three point bridle through A1 and sprout intersections 1/6 and 9/4 should work fine (not suitable when stacking).