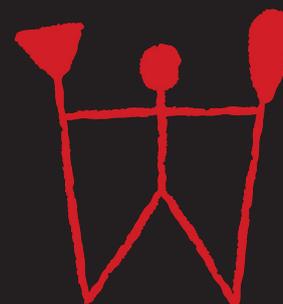


KITES FOR CONNOISSEURS

RONTRAIN

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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.



RonTrain is, as the name implies, a small kite intended for kite trains. It is based on *Ronbus 5-3* with the same concepts of a kick-up in the front and an ISD, *In-Sail Dihedral*, in the rear and the same high aspect ratio (3:2). Since it is intended for a train the name cannot be “-bus”.

RonTrain is a single point kite with tassels (preferably in different colour than the one of the kite sail). For a good flight the train requires a wind speed of more than 3.5 m/s and up to 6.5 m/s. A single *RonTrain* element flies well without tassels, but to avoid that elements in a train flip over and stay upside down the tassels are required. The elements in the train have quite a lively flight.

This is the third Ron kite:

- I. *Ronbus 5-3* which was inspired by Ron Spaulding.
- II. *Rondevoo* which was a homage to Ron Arztmann, using the AirX ripstop he gave me a year before he passed away.
- III. *RonTrain* which I now dedicate to Ron Bohart.

These three Rons are very dear friends to me and have meant a lot to me in my kite life.

Material for one RonTrain kite.

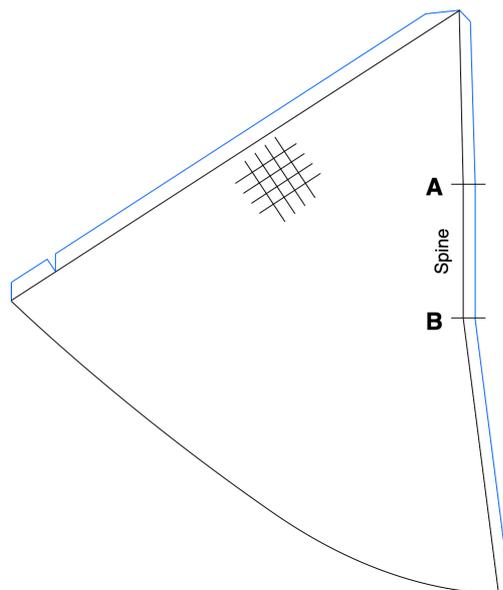
- Ripstop colour 1: 70 x 40 cm
- Ripstop colour 2: 30 x 30 cm
- 2 mm fibreglass rod, 70 cm
- 1.5 mm carbon fibre rod, 43 cm
- 3D printed Train Knee connector. The STL file is included in the templates ZIP

Making one RonTrain element.

The sail of a RonTrain element consist of two halves that are joined at the spine. The spine edge is not straight but has two knees:

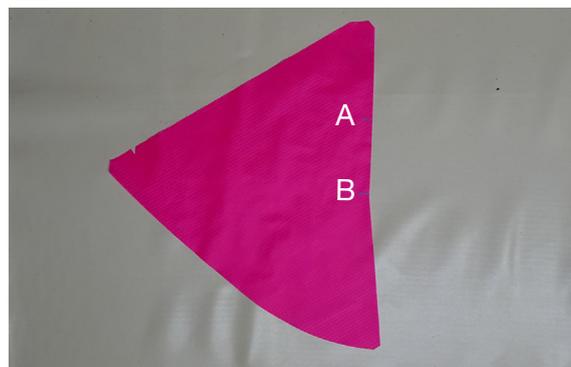
- A is where the kick-up front point is.
- B is where the rear ISD (*In-Sail Dihedral*) starts.

1. Cut out the two sail halves using the templates.



RonTrain template with seam allowance along the spine edge and a hem/sleeve along the leading edge.

2. Mark the knee spots A and B along the spine edge.



3. Sew the two sail halves together along the spine edge, with a seam 7 mm from the edge, starting from top. Observe the slight change in seam direction at mark A.



4. Fold a 10 mm hem/sleeve for the leading edges. The leading edge has a V out cut 30 mm from the outer end, and this 30 mm part should also be included when sewing the hem.

5. Sew the hem/sleeve seams.



6. Check that the mark A on the centre seam is 12 cm from the nose tip.
7. Cut 6 mm slits in the seam allowance at marks A and B.



8. Fan out the seam allowance on the centre seam on both sides.



9. Sew a wide triple zigzag seam across the fanned out seam allowances.

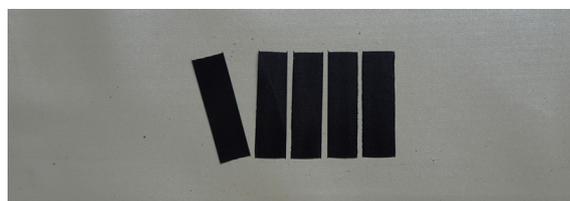


A single RonTrain element flies well without tassels, but to avoid that elements in a train flip over and stay upside down tassels are required. There are several ways to make tassel. In the **Appendix** below one way is described.

10. Make three 5 cm wide tassels.
11. Sew the tassels at the wing tips and over the rear end.

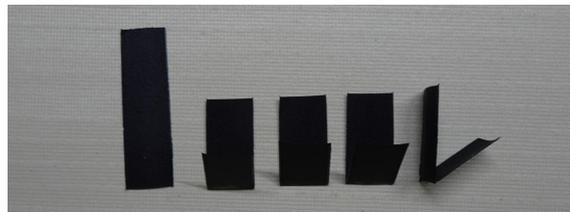


12. Cut in dacron five 15 x 50 mm pieces for pockets and for line hole reinforcement.



13. Fold four of the dacron pieces double for pockets, with the underside half a centimeter longer than the other side.

Keep the fifth piece unfolded.



14. Sew the wing tip pockets on top of the wing tip tassels.



15. Sew the top spine pocket as close to the top as possible, and then sew the spine end pocket over the rear tassel.



16. Sew the dacron reinforcement for the train line hole over the sail middle at the A mark, with the upper edge of the dacron 2 cm above the mark.



17. Punch or burn a hole for the train line at the A mark (at the slits).
18. Punch or burn two holes on each side of the middle 5 mm from the rear end of the dacron reinforcement (for stabilization of the spine rod).



19. Make a mark on one leading edge hem, 17 cm from the top.
20. Fold the sail double.
21. Punch a 3-4 mm hole (for the cross spar bow) at the mark, in the middle of the sleeve, through both the sail halves.



Holes punched in the leading edge sleeves for the cross bow rod.

Frame

The exact length of the spine carbon rods pieces depends of course on how accurately the pockets have been sewn. Thus the length of every piece has to be individually trimmed.

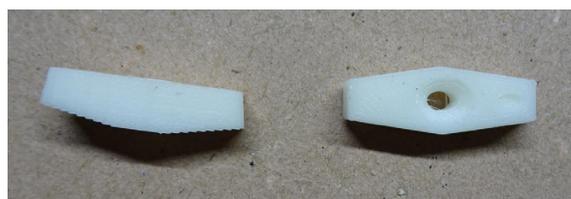
22. Cut a 69.6 cm length of a 2.0 mm fibreglass rod.
23. Insert from the back side of the sail one end of the 2.0 mm rod in one of the holes at the leading edge, inside the hem and out through the V cut opening. Insert the other end in the same way in the other side of the sail.



24. Put end caps on the rod and insert the ends in the pockets.



25. Cut 115 mm of a 1.5 mm carbon rod.
26. Insert the carbon rod piece in the front end (without the small cavity) of the Train Knee connector. The STL file for 3D printout of the connector is included in the templates ZIP.



The 3D printed Train Knee connector has a vertical hole for the train line. This hole is slightly sloping backwards to the rear. Therefore the rear end of the connector has a small cavity on the upside so it can be easily identified.



27. Put an end cap on the rod piece and insert it in the front pocket and check that the vertical hole in the Train Knee connector is exactly on top of the hole made at mark A on the sail (step 17) and adjust if necessary the length of the front carbon rod. (Normally the actual length will be ~110 mm.)



28. Cut 280 mm of a 1.5 mm carbon rod and insert the piece in the rear hole of the Train Knee.
29. Put an end cap on the rod and insert it in the rear pocket. The rod should be straight and stretch the sail without bending upwards. If it does, trim the length.

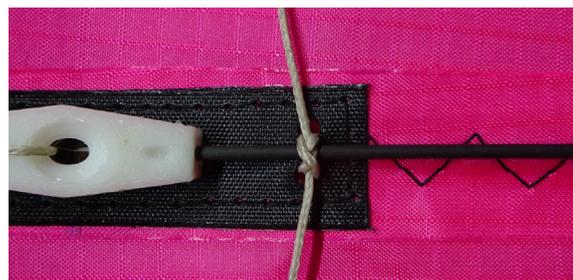


The leading edge must be very taught. This is achieved by pushing/pulling the cross bow towards the rear end.

30. Make a mark in the sail 1 cm below the cross bow and just next to the spine.
31. Cut 25 cm of a thin string and tie a loop in one end.
32. Tie the loop with a lark's head around the cross spar right under the spine.
33. Insert (from under) the other end of the string through the vertical hole in the Train Knee connector.
34. Push down the cross spar till the made mark while tightening the string.
35. Tie the string around the spine and put a drop of glue on the knot.
36. Trim the length of the string.



37. Fixate the spine in the exact middle of the sail with a fine string (or a small cable tie) through the holes just below the Train Knee connector. If tying a string the constrictor knot is an appropriate knot. Trim the length of the string.



Making the train.

- Test fly all RonTrain kites individually to ascertain that every kite flies straight and stable. There is not much to regulate straightness, but if the kite is not flying well: check that the spine has the correct length and that the leading edge is taught.
- Flexing the cross bow can sometimes change stability.
- Moving the larks head for tensioning on the cross bow slightly to either side can straighten up tilted flight.
- If a kite cannot be trimmed to fly straight (maybe due to irregularity in the fabric): mark it to be in the bottom of the train.
- Select the best fliers to be in the top of the train.
- On the kite element selected to be in the very top put a tail, mostly for visual effect but also to add top stability.
- The top three elements might also benefit from having a two point bridle.
- Pull the flying string through the vertical hole in the Train Knee.
- If all elements are identical the distance between the elements can be 90 - 100 cm.
- Put stoppers on the line on the upside and downside of each element.

Appendix

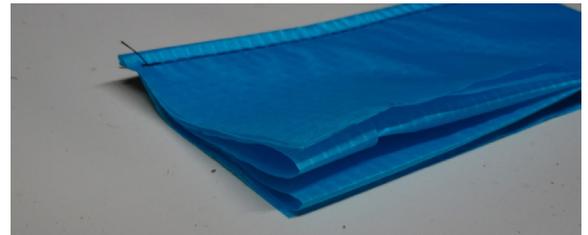
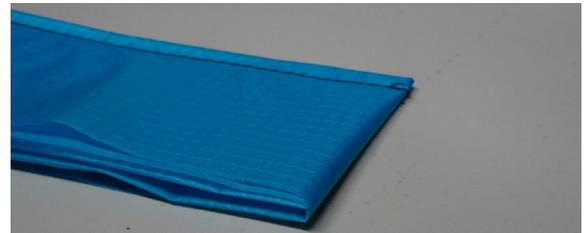
Tassels (three pieces)

1. Cut a piece of ripstop 60 x 14 cm or 30 x 28 cm.
2. Fold the ripstop double to a piece of 60 x 7 cm or 30 x 14 cm.
3. Then fold it double again to a piece of 30 x 7 cm.



A 30 x 28 cm piece double folded two times.

4. Fold it double again till a piece of 15 x 7 cm.
5. Sew a seam along 15 cm folded edge to keep the piece together.
6. Cut open the short (7 cm) folded edge and the two 15 cm folded edges opposite the edge with the seam.



7. Draw lines that divide the 15 cm long piece into three 5 cm wide pieces.



8. With a sharp knife cut 3-4 mm wide strips through all the eight layers of ripstop, starting from the seam. At the piece dividing lines, cut through also the upper part.

