Firecrest Kites Construction Notes

These notes are designed to assist in the construction of the Firecrest series of kites. WARNING: I am left-handed so suggestions I make here may not be quite right for a right-hander. I would suggest a test on each of the stages before proceeding with the whole job.

General

The kite should be stitched together with quite long stitches using polyester or nylon thread. Ideally, the thread should be between no. 40 and no. 80 thread. If using a thick thread, make the stitches longer than if using thin thread. (e.g. if using no. 40, use 6 stitches/inch and if using no. 80 or standard Gutermann thread, use 8-10 stitches/inch). Run several test pieces to get the correct thread tension, particularly if using thick thread. Work as accurately as you can on all stitching, otherwise minor errors can add up to cause a major variation on the kite. Ensure that you are attentive to the start and end of a row of stitching. It is essential that you backstitch at both ends.

Template Preparation

The templates are laid out to fit onto hardboard 6ft by 2ft. If you do not have this available, cut the templates into individual ribs/skins and stick to a suitable material. Begin by sticking the individual sheets of paper together. Stick the paper to your chosen template material using spray adhesive. The templates should be cut out of 3mm hardboard, plywood or cardboard. I find that hardboard is the cheapest material available. Cut them accurately and smooth rough edges. I use a band saw but a jigsaw would be satisfactory.

Fabric cutting

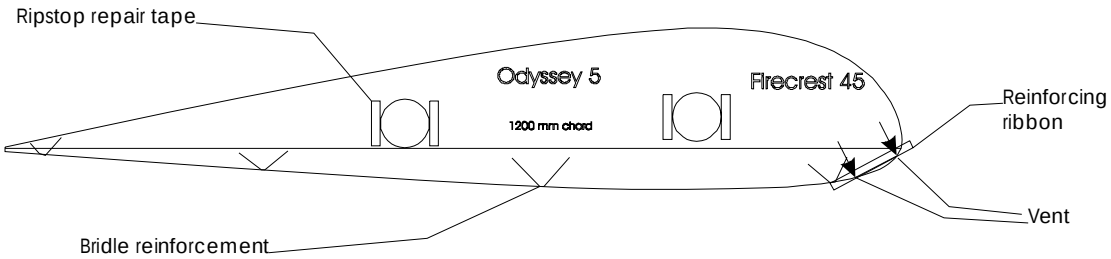
The templates do not have a seam allowance. Draw around them using a soft pencil or a fine tip waterproof pen. Transfer all markings, such as the positions of the bridle reinforcement cord, onto the ribs. Cut the fabric using a hot soldering iron and a 20mm fibre washer (or anything else that will withstand the heat of the soldering iron) to provide your seam allowance. You can also use a Teflon washer. The exact seam allowance is not critical. Anything between 6mm and 10mm is OK, as long as you are consistent. Place the washer against the template and then place the point of the soldering iron through the hole and cut around the template. In the absence of a soldering iron, use a pen and a washer to mark the cutting line and then cut out with sharp scissors.

Ribs

Rib preparation involves reinforcing the vent holes, adding bridle attachments and hemming the leading edge/vent openings. The ribs have various markings on them, such as the position of the bridle attachment reinforcement and the position of the leading-edge vent opening. The length of each of the ribs is also marked on them to aid identification. Most markings are on the seam allowance.

Cross-port Vent Hole Reinforcement

Cut strips of ripstop repair tape 12mm wide x 60mm long (cut 4 long strips of ripstop tape each 12mm wide and 1500mm long, then cut 60mm long strips off those). Stick one piece to each side of each hole, oriented vertically, close to the edge of the hole. Each piece should be fixed into place with a zigzag stitch close to the edge nearest the hole. This helps to minimize the risk of the ribs tearing in a power dive.



Bridle Attachment Reinforcement

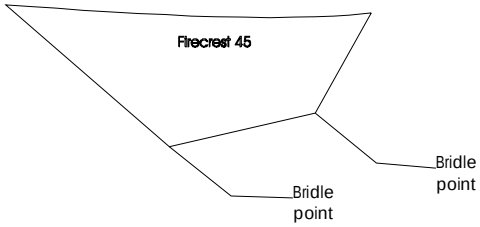
Stitch 1.2mm cord of at least 25kg breaking strength to the bridle attachment points on alternate ribs (i.e. only those which will have bridles attached). The cord should be stitched to the top surface of the rib with it laid out as shown. Stitch the cord to the lines drawn. Stitch in a straight line, stitching through the cord. If possible, file a shallow groove in the centre of the underside of a straight presser foot to ensure the cord stays in place whilst stitching. (Note: If you are right-handed, you may need to lay the ribs out with the leading edge to the left, before stitching on the bridle reinforcement… but I am not sure!)

Leading Edge Reinforcement

If making a buggy kite, the leading edges of alternate ribs starting at 2 require hemming between the top and bottom of the vent. You can add extra stiffness and strength to this point by stitching 10mm ribbon on top of the hem (sample included). For the 4.5m kite, the bridles are on opposite ribs to the hemmed leading edges. Examine the drawings carefully to be sure you get the correct ribs hemmed.

This step is not required if making a kite-surf kite.

Tip ribs

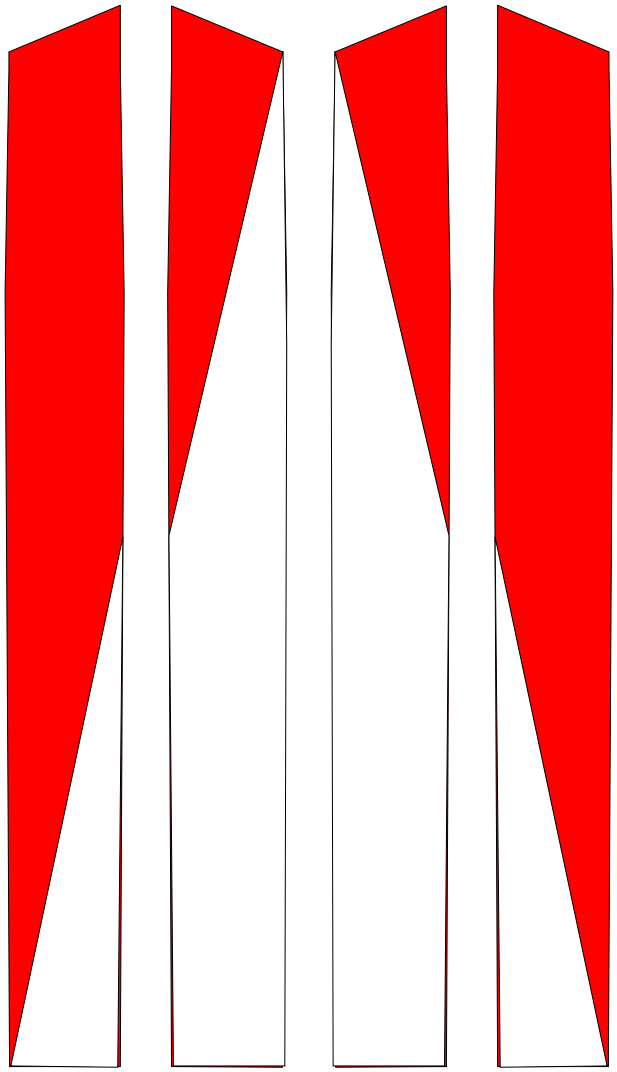


The flares at the sides of the kite should be edged with 20mm wide ribbon or centre-fold tape on the three outside edges (bottom edges, as shown in the drawing). In addition, the two bridle points should have tapes or Dacron cord stitched on for bridle attachment. You should then stitch the flares to the tip ribs. Be sure to make a left and right set. If you do not have suitable ribbon or tape, simply hem the edges of the flares and stitch some Dacron cord along the edges to prevent the fabric from stretching (the supplied pieces have hem allowance but if binding with ribbon, trim the hem allowance off first).

Top Skins

Preparation of the top skins involves assembling the centre panels and hemming the leading edges (if making a buggy kite).

The centre four skins should be prepared first. Each of those is in two pieces that must be stitched together to produce the triangle in the centre of the kite. See below. The seam should be turned towards the dark fabric.



BUGGY KITE ONLY: The leading edge of the top skins should be hemmed, preferably with 10mm ribbon stitched on top of the hem for additional strength and stiffness. The ribbon should end up inside the kite for a better look. If you look at a Predator, you will see that the seams of the top skins and the ribs are turned inside. i.e. the ribs and skins are stitched together in a single seam. Examining a Flexifoil will reveal that the top skins are stitched together first and the ribs are then stitched on top of the seam folded over to one side. In this case, the stitching goes onto several layers of fabric, giving additional strength. Both approaches are equally valid. I prefer to stitch the skins and ribs in a single seam. In this way, the stitching is not exposed to the abrasive effects of sand, but the Flexifoil method is probably easier, at the expense of more stitching. If you should decide to make the top skins into a single piece, it is probably better to hem the leading edges after joining the skins together.

Stitch top skins to ribs

Before starting to stitch the top skins to the ribs, you should arrange the parts into the correct sequence. This will mean that you will be able to proceed more quickly with the stitching since you will be able to pick up the pieces without hunting for the correct one. I normally begin stitching at the right end of the kite, looking from the front. If you are right handed, you may want to begin from the other end. By starting from this end, you will find it easier to stitch the bottom skins to the kite. You will not have to force such large quantities of fabric through the throat of the machine in the final stages. Experience will tell you which end is correct one to start from for you.

Pin two adjacent skins together, with the outside surfaces together. Then pin the rib to the two skins. I would suggest that you only pin the first few centimetres of the rib, otherwise you can find that the stitching does not go quite right. Begin stitching from the leading edge. Work very carefully in the first few centimetres of stitching as the curve of the leading edge is hardest to do. You will need to adjust the fabric every two or three stitches at the start. You will also need to feed the fabric through by pulling it, as the weight of the fabric will prevent the machine from pulling it through itself, and could result in the fabric slipping off the stitch line. Whilst stitching, align the stitch lines very carefully and pinch the fabric together firmly whilst feeding it to prevent it from slipping.

When stitching the skins to the ribs, ensure that when stitching the long side of the skin, you start at the lower vent mark on the rib (the one nearest the bridle attachment) and when stitching the short edge, start at the higher vent mark.

Ensure that the ribs all end to within about 25mm of the trailing edge of the top skins. If you find variations greater than this, you should unstitch the offending rib and do it again. The trailing edges of the skins should all end within a few millimetres (around 5mm) of each other, otherwise the fabric has slipped while stitching and you should redo the seam.

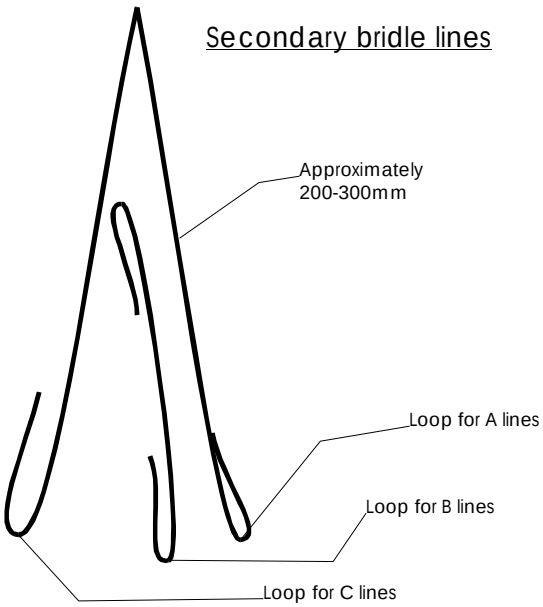
Bottom skins

The bottom skins should be marked and cut out before stitching. The bottom skin is basically a rectangle 1200mm deep and 3822mm wide, plus seam allowance, with the ends curved slightly. The outer 6 ribs are white. Cut a rectangle 1200mm x 822mm + approx. 15mm wide seam allowance. Ensure the skin is marked accurately with the corners right angles, before marking the tip curves. Mark the rib stitching lines 147mm apart and the hem line on the leading edge. The diagram labelled “BOTTOM SURFACE CUTTING GUIDE” shows the measurements to mark the leading edge curve of the outer 6 ribs. The centre triangle is white. Make it 1200mm high and 588mm wide at the bottom, plus seam allowance (approx 15mm).

KITE SURF KITES ONLY: Prepare the leading edge tubes (4 in total). Stitch these to the bottom skins at the positions shown on the plans.

BUGGY KITE ONLY: The leading edge of the bottom skin should be hemmed and, preferably, reinforced with 7-10mm ribbon for additional strength and stiffness.

Starting at the right hand end of the kite, looking at the front, stitch the bottom skin onto the ribs. The seams of the tip ribs must turn inwards. When stitching the final rib, fold the bottom skin back over the top of the kite and bring the top and bottom skins together. Pin carefully and stitch, ensuring the stitching does not catch any of the kite inside the cell. After completing the seam, turn the last rib the right way out.



Trailing edge

Trim the trailing edge of the bottom skin to the edge of the top skins and hem the trailing edge, preferably turning the cut edges inwards, or bind the seam with polyester or nylon bias tape.

Bridling

The table of bridle lengths does not include allowance for the knots and loops. Allow 100mm for knotting (the excess can be trimmed off and melted with a lighter flame once the bridling is complete). Mark the correct length on each line with a permanent marker. Bridle lines are labelled A, B and C. A

is closest to the leading edge, C furthest back. The fourth set is the control lines.

Cut the lines to within a few millimetres of the dimensions given. Make up the lines in pairs, starting at number 2. Attach the bridles to the kite by stitching the bridle line through the bottom skin of the kite with a stout needle and around the bridle reinforcement. Each set of lines (A, B and C) should be gathered together and attached to a single point. The loops of the secondary bridling should be stitched rather than knotted as this will result in a stronger and neater finish. Make the loops for the A and B set first. Initially, you should knot the loop for the C set, until the bridling is finally tuned. The length of the secondary bridle lines is not critical.

(I have provided sets of secondary bridling ready-made. They are the black pieces of cord with pre-stitched loops. The long pieces with knots at the end are for the control lines. They are sleeved to give extra thickness when attaching the brake lines).

Tuning

The bridle line lengths supplied will give you a kite that will fly but is likely to need fine-tuning. This is accomplished by lengthening or shortening the A lines. If the kite rises up fast but then over-flies and collapses, lengthen the A lines by about 5mm. This will result in a shortening of the C lines by 5mm. If the kite is slow to inflate and prone to stall, shorten the A Lines slightly. You may also notice a crease along the bottom skin of the kite between the A and B lines. If this occurs, lengthen both the A and C lines by about 10mm to start with and repeat the tuning process. Once the tuning is complete, stitch the C Line loops closed.

Supplementary Notes

If you have any problems or anything is unclear, please send an email and I will try to help. If you can send a photo of the problem area, it will help in telling what to do.