THE AMERICAN BARN DOOR KITE

Oregon Kitemaker's Retreat

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Rod Beamguard

4104 NW 112th Way
Vancouver, WA 98685-3578

(360) 574-8050 home
(360) 750-9833 office
kytfevr@wa-net.com

PLANFORM – BARN DOOR KITE

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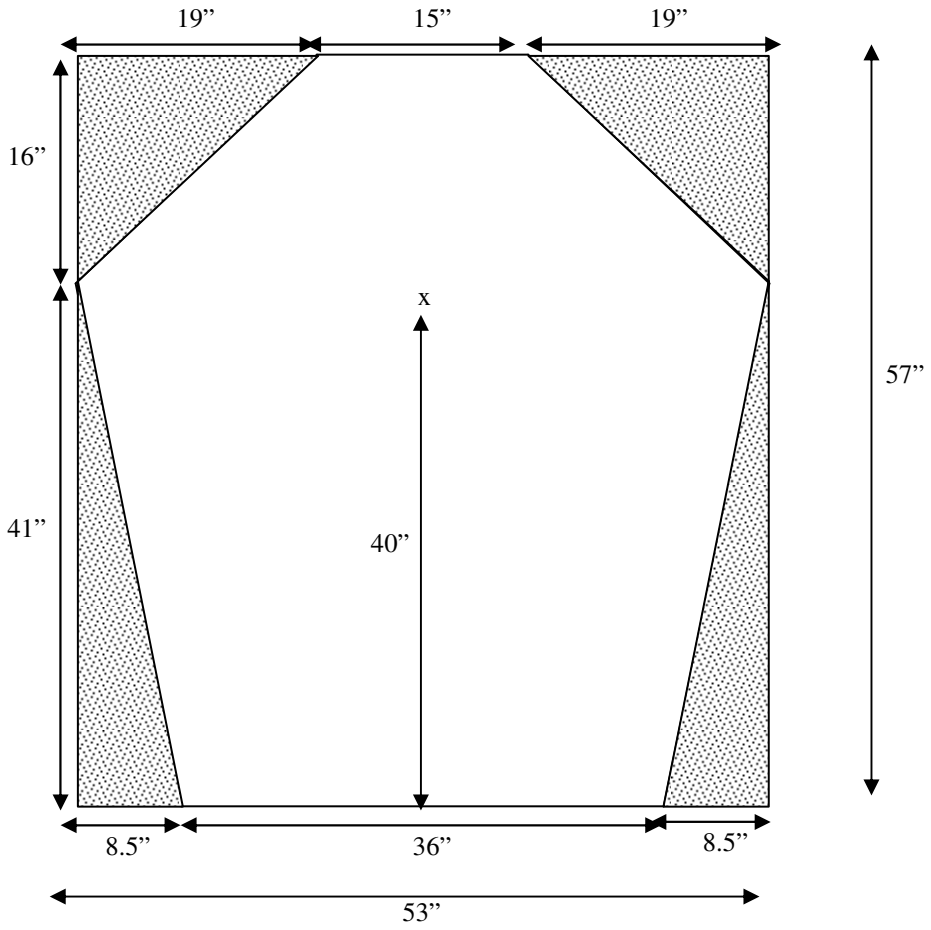
The dimensions of this kite have been chosen to minimize the number of spar sections needed while making the maximum use of 60" wide fabric. **Do not make your skin larger than these dimensions.** If the finished skin does not comply with the measurements given below, then many of the parts in the rest of the kit will not fit when you complete your kite at OKR.



1. Use 60" wide ¾ oz ripstop fabric from which you will cut a piece 53" wide by 57" long. If you piece together two or more pieces, the finished skin must be a rectangle 53" x 57".

2. At the top left corner, measure 19" in across the top and mark it. Then measure 16" down the side and mark it. Draw a line between these two points and cut along the line.

3. Repeat with the top right corner.

4. At the bottom left corner, measure 8.5" in along the bottom and mark it. Then measure 41" up the side and mark that point. This point should coincide with the 16" mark made earlier. Draw a line between these two points and cut off the triangular corner.

5. Repeat step 3 with the lower right corner.

6. Do any appliqué work that you would like to do or otherwise decorate your kite skin. Remember that you will be using the outer ½" of each edge in a hem. The "x" at the top of the arrow marked 40" *approximates* the spot where you will eventually place a patch and burn holes in the fabric for the bridle line to pass through. You might take this into consideration when decorating or doing appliqué. You will also lose space for patches at each corner.

Tails/bag for the kite

If tails are needed at all I have always liked using longer tails than are really required. It looks better in the sky. And this kite does fly better with tails!

For this kite, I recommend two (one for each bottom corner) fringe-cut tails 3" wide by about 5 times the height of the kite, about 24' in this case. Place a snap swivel at the end of the tail to be joined to the kite. You may also just do a continuous tail about 48' long and attach each end of this line to the kite to form a loop.

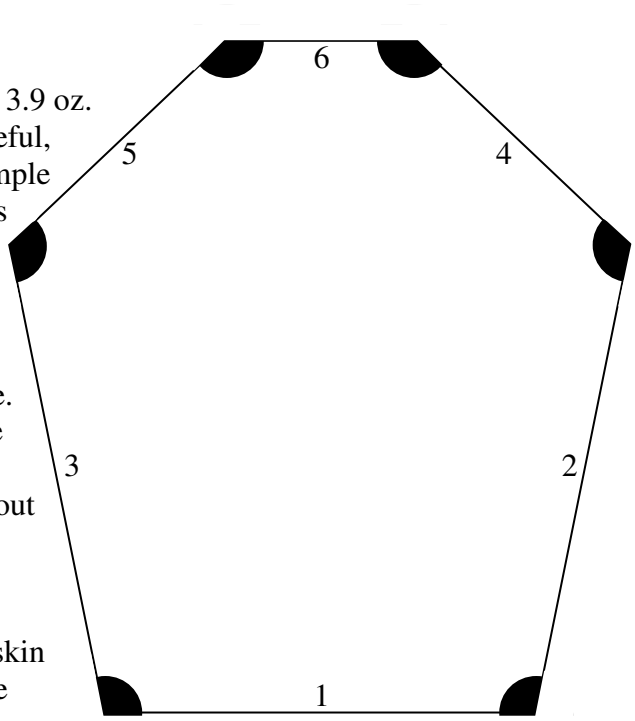
For a carrying bag, a bag made from a piece of fabric 54" long by 10" wide should be sufficient. Increase the 10" if you like a little more room in your bags. I'm a backpacker and don't like to waste space so I use 9" and still have room!

If you have any questions, e-mail me at kytfevr@wa-net.com or call me at (360) 735-1609, my private, unpublished office line that always gets answered if I am in the office, regardless of the time of day. Be aware that my office will be closed from December 20 to January 7. It may be easier to use e-mail (I will call if you give me your number) since I will check my e-mail wherever I happen to be.

Materials:

kite skin (cut to final dimensions)
circles (2), 6" diam., 3.9 oz. Dacron
edge binding, 3/4 oz. nylon 2" x 210"
pockets (4), 1-1/4" x 4-1/2", 3.9 oz. Dacron
spar sleeves (2), 1-1/4" x 2", 3.9 oz. Dacron
spars (6), A20 filament wound epoxy tubing
fabric square, 2" x 2" of 3/4 oz. white nylon with adhesive backing
lacing (2), 1/4" x 6"
vinyl end caps (4)
internal ferrules (3)
arrow nocks (2)
line, 34'4" x 100# Dacron
aluminum ring, 1/2" diameter
snap swivels (2)
line, 18" x 250# Dacron

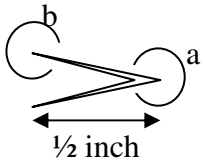
1. Reinforce the corners using the 6" circles of 3.9 oz. Dacron. If you do this correctly and are careful, you can do three corners with one circle (simple geometry: the sum of the number of degrees in the interior angles of a polygon = 180 x [# of edges – 2] = 720 or 2 circles). Slide a circle under one corner with the "bad" side of the circle against the kite skin. Place the point of the corner on the center of the circle. Draw a mark on the edge of the circle where the edge of the skin meets the edges of the circle. Carefully cut this pie shaped wedge out of the circle.



   Place the pie-shaped wedge in position with the bad side against the bad side of the kite skin and the point of the wedge at the point of the corner. Sew from edge to edge along the curve of the wedge using your favorite stitch.

   Repeat this procedure with the other five corners.

2. Now let's prepare the edge binding. In your Ziploc bag is a roll of 2" wide 0.75 oz nylon. Cut the roll into 6 pieces measuring 20", 29", 29", 39", 46", and 46". Make a double fold edge binding as follows:
   a. First, fold in half lengthwise to make each strip 1" wide.
   b. Then spread each strip open and fold each outer edge to the fold line running down the middle of the strip.
   c. Lastly, refold the original fold and crease thoroughly. You should now have edge binding whose cross section looks like the drawing at the right and is 1/2" wide.



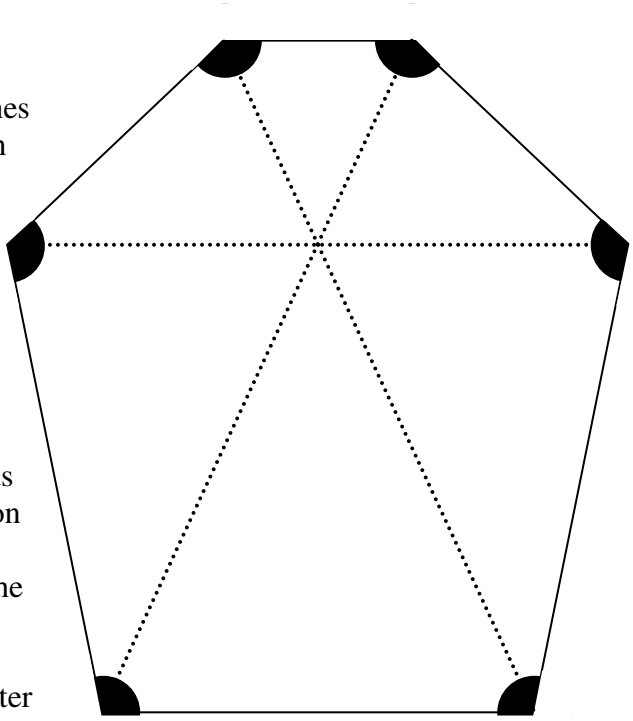
3. Sew on the binding in the order (1,2,3…) shown in the kite plan on the previous page. The shortest piece is No. 6, the two longest strips of the same length are nos. 2 and 3, the other two strips of the same length are Nos. 4 and 5, and the one remaining piece is No. 1.

   I would suggest sewing each piece on using a straight stitch just a bit more than 3/8" from the edge of the binding. If the end will be covered by another piece of edge binding, use scissors to cut off any excess extending beyond the edge of the kite skin. If the end will not be covered by another strip, hot cut the part that extends beyond the edge of the skin. In hot cutting, make sure to seal the edge closed.

   After all edging is in place and the hot cutting is completed, go back around the edge of the kite with another row of stitching centered between the first line of straight stitch and the edge of the kite. Use your favorite stitch. I like decorative stitches for this purpose.

4. Now is the time to do pockets for the spars.

   Lay out the kite skin face down and draw lines on the reinforcing patches so that they match with the dotted lines shown in the figure at the right. Do not draw lines on the backside of the kite skin.

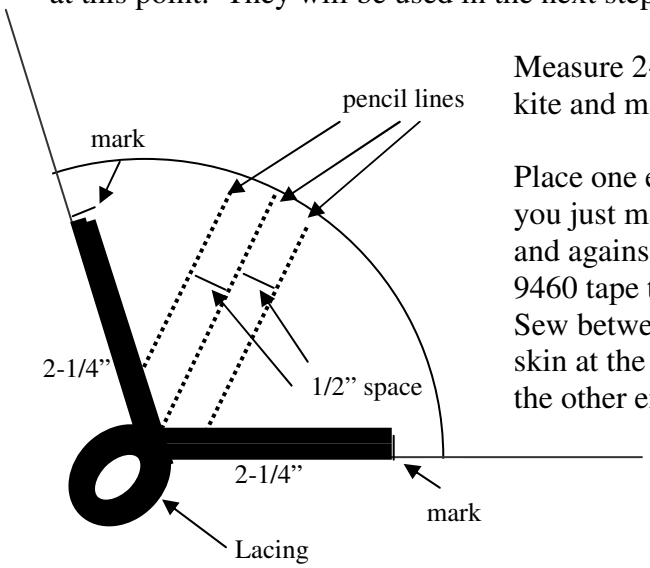


   Using the four strips of 3.9 oz. Dacron that are 1-1/4" x 4-1/2", fold over to form a pocket as shown at the immediate right. You should notice that the angled ends are different. Two are angled in one direction and two in the other direction. Use one of each to make pairs of pockets, one pair for the top corners and one for the spreader.

   For the top two corners, center the pocket over the line you have drawn and stitch down as shown by the white dashes at the left.

   For the two corners at the sides (the ends of the spreader), do not center the pocket on the line you have drawn. Use the line as a guide only. Place the pocket as close to the corner as possible. The folded end will be about 1/4" above the line at the edge of the kite. The open end will be about 1/4" above the line.

5. On each bottom corner, attach a 6” length of lacing to form a loop at the tip of the corner. See the diagram below. Be sure to do both corners the same. Ignore the other pencil lines at this point. They will be used in the next step.



Measure 2-1/4” from the corner along each edge of the kite and make a mark.

Place one end of a piece of lacing at one of the marks you just made. Lay the lacing flat on the edge binding and against the edge of the kite skin. It may help to use 9460 tape to hold the lacing in place while you sew. Sew between the end of the lacing and the edge of the skin at the corner. Give the lacing a half twist and place the other end at the other mark you made. Lay the lacing down to the corner and sew down. The result should look like the drawing at the left.

6. Now is the time to add a sleeve to the bottom corners to help guide the spars. Draw two more lines parallel to and 1/2” from the line you have already drawn on each of the bottom reinforcing patches.

   Place the 2” edge of the 1-1/4” x 2” sleeve along one of the lines. Run a line of stitching 1/8” from the edge of the sleeve. Repeating with the other 2” edge should give you a raised sleeve through which your spar will pass.

7. SPARS, SPARS, SPARS, AND MORE SPARS.

   Before starting on spar assembly, make sure all the spars are the same length. If they are not, cut whatever is necessary from each rod to make it so. You should not have to cut the shortest rod.

   Spreader: Now we do some test fitting. Without using any glue, join two A20 rods with a ferrule and place a vinyl end cap on one end of the rod. Insert the end with the vinyl end cap into a pocket at one side of the kite. Pull the fabric tight from the opposite corner of the kite and push the spar towards the opposite corner so the spar bows about 1” out of a straight line in the center of the kite. Place a mark on the spreader to mark the point at which the free end of the spar crosses the end of the pocket on which you are pulling.

   Measure the distance from the mark you just made to the closest end of the spar. It should be about 12-13”. Divide this measurement by two. Write this number down in the margin of this page. This is the amount that you will cut off one end of each rod.

(This step continues on the next page.)

Take the rods apart and remove the end cap and the ferrule. Mark this distance you have written in the margin of this page on one end of each A20 rod. If you have done this correctly, these marks should be the same distance from the ends of the rods. If they are not, either make adjustments or see me.

Use a saw to cut the short 6-7" ends off. Be careful not to cut too much off. It is always easier to cut or sand a little more off than to try to add length back to the rod. (If you don't have a use for these scraps, I do. If you leave them on the table they may find a place in a future design.)

Using the two long sections, glue a vinyl end cap on one end of each rod. Glue a ferrule into the other end of one of the rods. Set aside to dry.

Verticals: Find 2 equal lengths of A20. On one end of each rod, glue a vinyl end cap. On the other end, glue an internal ferrule. Be sure to mark the middle of the ferrule and insert the ferrule into the A20 only to this mark. Set aside to dry.

Find the last 2 A20 rods of equal length. On one end of each rod, glue an arrow nock. (Caution: The arrow nocks will split **if you try to force** the end of the spar into the nock. You should sand down the spar so it fits easily into the nock.) Set aside to dry.

After these are thoroughly dry, you may want to test fit the verticals and cut off a small amount of the bottom section so not as much extra rod sticks through the spar sleeve at the bottom corners of the kite. You can always adjust this later after the kite is complete.

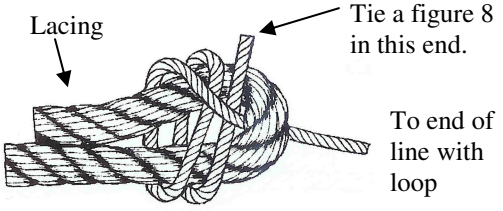
8. Prepare the bowline. In your Ziploc bag is a long length of 100# Dacron line. This line will be cut up as we go on from here. There should be enough to do all lines needed if you measure and cut the stated length. Don't cut off more or less than the directions indicate.

   Cut off a 60" long piece. Lightly melt the ends if you prefer (I melt all ends when I cut them). Make marks on the line 7" from each end. At each end tie a loop with the mark at the center of the loop. I use an overhand knot and slide the knot as close to the cut end as possible so you don't waste line and have the largest loop possible to work with. If you have beeswax, rub it into the line of the loop. This helps prevent slipping when in use.

   You will tie a Prusik knot in the loop at each end and slide the knots onto the spreader. (See the drawing at the right.) We will have a group session on how to tie a Prusik knot if you don't already know. Put the spreader in place on the kite.

9. Now for the tension lines. From the length of line in the Ziploc, cut two lengths 26" long. 9" from one end make a mark and tie a loop as you did for the bowline. Again, use beeswax on the loop if you have it available.

   Use a secure knot to tie the other end to the loop in the lacing at the lower corner of the kite. I use a double sheet bend since it does not extend beyond the loop and joins two lines of different diameters securely. See the picture at the right.



   In the loop, tie a Prusik knot and slip it onto a spar with an arrow nock and slide the nock through the sleeve. Insert the open end of the lower rod onto the ferrule in the upper rod. Insert the vinyl end cap into the pocket at the top of the kite. Place the tension line through the nock and slide the Prusik knot up the spar to tighten the fabric.

   Repeat this process with the other vertical spar. The two installed spars should form an "X" and at this point the kite skin should be taught throughout.

10. Near the top of each vertical spar, you need to mark the location where you will use a hot iron to make holes for the bridle lines to pass through. Locate points that will not be on the vinyl end caps but will be on each side of the spar. Remember that the bridle line will pass through the face of the kite, both layers of the pocket fabric, around the spar, and back through the second set of holes to the front of the kite. The spreader pockets do not need holes. **DO NOT MELT ANY HOLES YET! JUST MARK THEIR LOCATION**.

    At the lower ends of the vertical spars, you also need to mark the location for holes in the center of the sleeves guiding the vertical spars. Place the holes in the middle of each sleeve, one hole on each side of the rod. **DO NOT MELT ANY HOLES YET! JUST MARK THEIR LOCATION**.

11. Determine the location of the reinforcing patch for the bridle in the center of the kite face by noting where the two vertical spars cross (5 in the drawing below). Make dots above and below the junction.

    Remove all spars. Remove the paper backing from the square white patch (2" x 2") and position the patch over the dots so the dots are on a diagonal of the patch. Sew around the edge of the patch with a zigzag stitch.

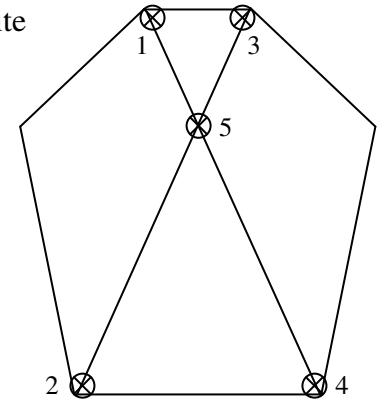
12. Remember that at the top two spar pockets and the bottom two spar sleeves you will need to melt holes from both the front and back of the kite. On the face of the kite, the holes should be closer together than on the back side of the kite. You will also melt two holes

(This step continues on the next page.)

at the points marked is step 11 in the white 2" x 2" Dacron patch at this point. Make sure that the holes are large enough to thread the bridle lines through. ***NOW*** go use the hot iron to ***carefully*** melt holes at all ten points you have marked in the preceding steps. It helps to use a darning needle with a large eye, a crochet hook, or a piece of 28 gauge wire bent in half to pull the bridle line through the holes like a needle threader.

Reinsert the spars into the pockets on the kite. The spreader should be placed between the kite skin and the crossed vertical spars.

13. Here comes the most difficult part. The American barn door kite originally had a 5-leg bridle. That is what we will use. The bridle points are shown in the drawing at the right. Single lines will go from 1 to 2 and 3 to 4 with the attachment to a bridle ring somewhere in the middle. A single line will go from 5 directly to the ring. No. 5 is the hardest to set correctly.



Cut two pieces of line each 117" long, one each for the lines from 1 to 2 and 3 to 4. Make pencil marks on each line 4" from each end and a more permanent mark 42" from the ends that will be placed at 1 and 3.

At hole 1, run the end of one line closest to the 42" mark through hole 1 from the front of the kite to the backside and then through the other hole back to the front of the kite. Tie a loop using a secure knot so that the mark you made 4" from the end of the line is centered on the spar at the back of the kite. A bowline works well but I prefer an overhand knot to form a loop. The overhand knot takes a bit more patience to tie and must be partly done before running the line through the holes. We will probably do a group demo on how to do this. Run the other end of the line through the hole at 2 and tie in the same way.

Repeat with the other line for holes 3 and 4.

Larks head both lines onto the aluminum ring so the other mark you made at 42" on each line is in the center of the knot.

And now for the center bridle leg (No. 5). Cut a length of line 60" long. This will leave about 6" of line left over which we will use shortly. Make a mark 3" from one end of the line and another mark 18" from the other end.

Thread the end of the line with the 3" mark through a hole in the center reinforcing patch from the front of the kite to the back, around all three spars (but not the bow line), and through the other hole back to the front of the kite. As you did with the other bridle lines, tie a secure knot so that the 3" mark is behind the spars.

(This step continues on the next page.)

Locate the other mark you made at 18" from the other end. Tie an overhand knot 1" long so that the mark is at the end of the loop.

Make sure the spreader is bowed. Run the loose end of the line through the aluminum ring and back to the loop you just tied. Run the line through the loop, pull the aluminum ring away from the face of the kite until all 5 bridle lines are taut. Tie the loose end of bridle 5 to the loop in the line. I use a half hitch slip knot that will be easy to remove and readjust.

14. Do you remember that little bit of line, the 6" that was left over after cutting the center bridle? You can use that to make a place to secure the bridle lines before taking the kite apart for storage. Doing this will keep the lines from tangling when you roll the kite up and put it in the bag.

    At one of the top corners of the kite, thread one end of this piece under one of the loops where the bridle line passes around the spar on the backside of the kite. Tie the two ends together with an overhand knot. You don't really need a loop any longer than 2". Trim off any extra line.

15. Take the 18" length of 250# Dacron line and tie overhand knot the ends to form a loop. Larks head this loop to the aluminum ring. This line will be the point of attachment of your flying line to the kite.

    Immediately upon untying or unclipping your flying line from this loop, pass the knot on the loop through the small loop you tied in the last step and secure with an overhand knot. This will keep the bridle lines from becoming tangled between flights.

16. Now add the tails. I use fringe-cut ribbon tails 3" wide and about 5 times the height of the kite. Make one tail for each of the bottom corners. I attach to the kite with a snap swivel by attaching the snap to the line on the back of the kite where the bridle line goes around the spar sleeve at the bottom corners.

You have finished your kite. Fly and enjoy!!!

Adjusting the bridle lines

If all was done well in putting the kite together, the bridle legs 1-4 should be no problem. Obviously you move the ring up or down the line in ¼" increments depending on the strength of the wind.

To set the center leg, be sure the spreader is bowed. Hold the bridle ring so legs 1-4 are fully extended. If leg 5 is either too loose or too tight, adjust by untying the knot and retying. Repeat moving the knot until all five legs are taut at the same time. If you change the amount of bow in the spreader, you will need to reset leg 5. I use a gold metallic pen to mark a reference point on my spreader and then adjust from there for wind conditions.

Disassembling your kite for storage

I make sure the aluminum ring is secured to the loop at the top of one of the spars.

Release the bow line so the spreader can get closer to being straight (As long as both ends of the spreader are in the spar pockets, it will have a bow.).

Remove the two vertical spars. Remember the tension line will still be attached to the spar at the bottom corners of the kite.

Lay all spars parallel to the spreader, spread the tails along the spreader, and roll everything up to place it in the bag you have made.