TARP Class - Instructions and Diagrams

1. Simple instructions on how to prepare your Sewing Machine to sew.

1. Get your sewing machine manual for precise directions for any of these steps.
2. Fill the bobbin. Place the thread on spool pin, put bobbin into winder, attach thread to bobbin, close winder, use pedal to wind until full.
3. Thread the machine. Top, front bottom, arm, front by needle, needle.
4. Insert the bobbin. Thread runs counter-clockwise in most machines.
5. Draw up the bobbin thread. Hold the end of the thread, close the panel over the bobbin. Hold the end of the thread through the needle, manually spin the needle down through one stitch and it will pull up the bobbin thread. Use something to slide the bobbin thread all the way up through the stitch plate and push the end of the thread to the rear of the machine, with the needle thread going the same way.
6. You are now ready to begin sewing. Find a scrap of the material you wish to sew, sew 10 or 20 stitches to check machine tension. If the thread pulls through to the top, the needle tension is too high. Adjust it down. If the thread pulls through to the bottom, the needle tension is not high enough, adjust it up.

2. Materials to use for Tarps

Tarp Material:

There are two major materials that are used for tarps, polyurethane (PU) coated nylon, and Silicon impregnated nylon. Recently Silicon impregnated Polyester has become available, but it is still expensive and rare.

For the Tarp Class, we went with the lighter and more foolproof of the two main options, and chose SilNylon. It is slightly more expensive than PU coated nylon but has no coating that can wear out or flake off.

The silicon is impregnated under high pressure into the fabric and becomes an integral part of the fabric. It simultaneously makes it impermeable to air and water, and strengthens the nylon significantly. A similar weight of nylon that has not been silicon impregnated is about 20-30% weaker. For reference, silicon nylon starts misting at 3000mm hydrostatic head. This isn't quite as good as a sheet of gore tex, but is more than enough to stand up to wind driven rain.

Nylon stretches under load, and over time, which is why SilPoly is being tried out now. That said, it is safe and well tested. It is used in loads of different applications, and we purchased our material from a company that supplies the hot air balloon community.

Tie out Material:

There are four kinds of common tie outs materials used on tarps. 3 are sewn on, one is mechanically placed.

1. Grommets: These are what you see on a blue tarp. They are cheap and strong, but will rip out under strain, especially under abrupt shearing forces. These require a grommet tool to place.
2. Nylon Webbing: These are found on many commercial tarps. This material is usually used because people abuse the tie outs on their tarps. It is heavy, stiff, and hard to stuff in a sack. BUT, it does minimize warranty returns.
3. Tarp Material: You can sew a ½ wide tieout by taking 2 inches of material and folding it quadruple. It is immensely strong, and has identical break strength to the tarp. Some people swear by this, but it is less common in the last 10 years.
4. Grosgrain ribbon: This is the ribbon that you saw used on your daughter's hair ties. It is lightweight and very strong. The only issue is that it can unravel, so you must heat seal the ends of the ribbon when you cut it. I am using tarps that I made 7 years ago with this, and though it is dirty it has no

visible signs of wearing out. This is the ideal choice for a tarp made of silnylon. Use the synthetic ribbon, NO COTTON - as it shrinks and wears strangely.

Thread:

NO COTTON THREAD! It shrinks and is weaker than synthetic thread. I use 100% polyester Gutterman brand thread. You can use any 100%poly, or 100% nylon, or poly / nylon blend.

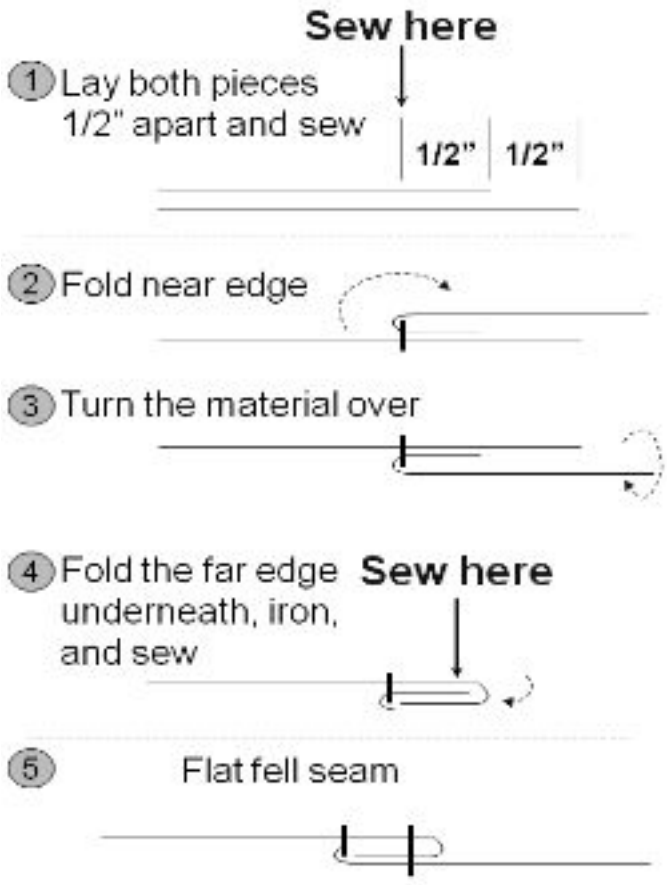
Sewing Machine Needle:

I will admit it. I am a cretin who uses a denim needle for everything I sew. I keep breaking needles because I am a bit clumsy, so I use a heavier needle. It hasn't been a problem as long as I keep my stitches per inch a reasonable number. See "Sewing a Seam" for more on this. If you put your stitches too close together with a big needle, it can act like perforations in paper. Silnylon is so strong that it resists this, but I have run into it once when I embraced the more is better ethos.

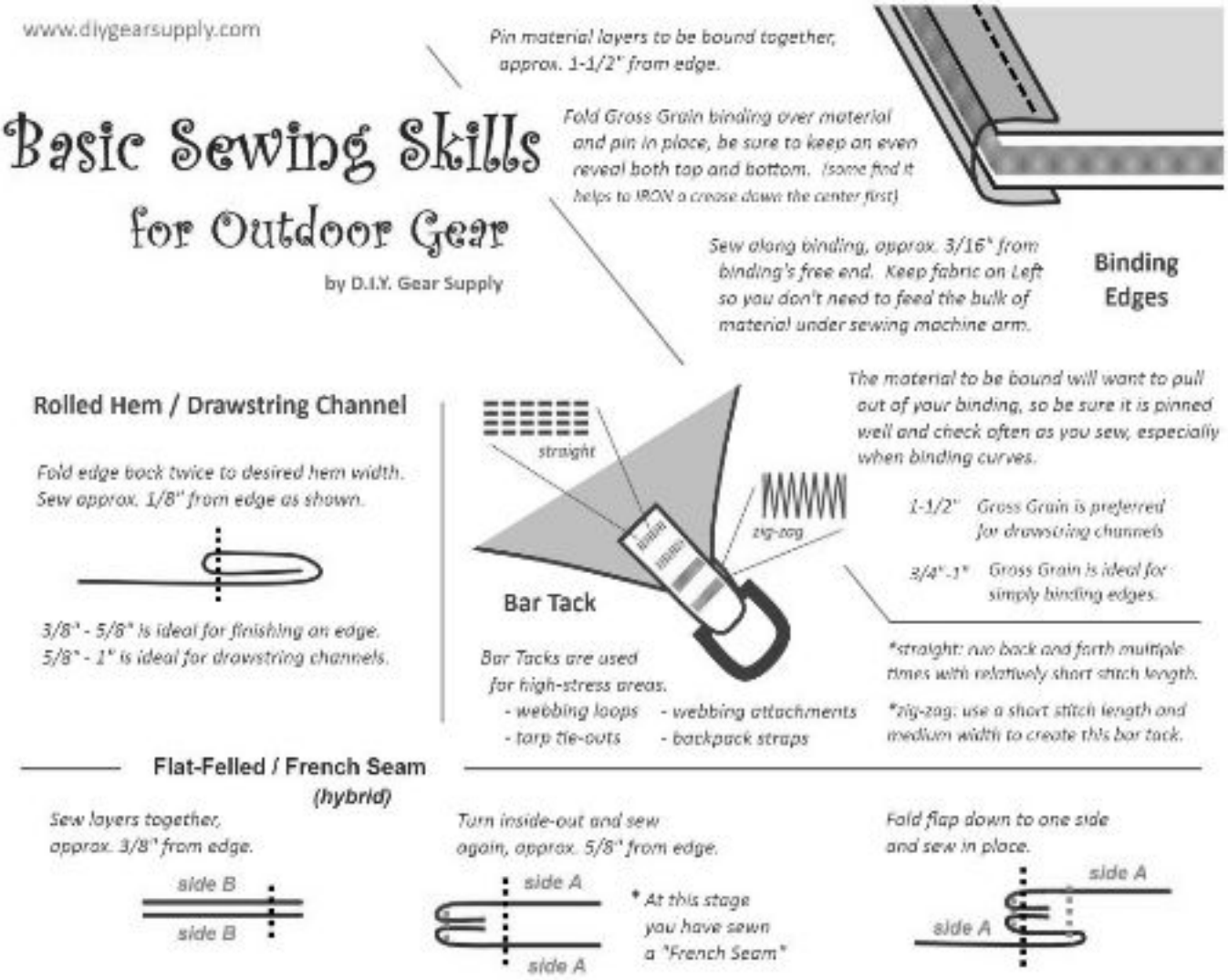
3. Types of Seams for Tarps

Tarps use a couple of different seams for the centerline, or wherever needed.

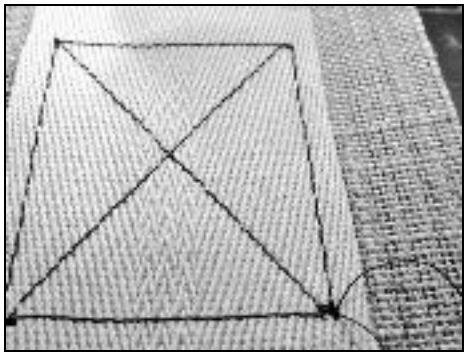
1. **Flat Seam** - Very strong, lies flat, slightly more difficult to sew. You can also pin this in place and forgo the first seam in this diagram, if you are precise.



2. **Hybrid Flat Seam** - The diagram below shows a hybrid flat seam, which is very easy to sew.



3. **Edge Bound Seam** - A variation on the edge binding in the picture above. Place the edges of the fabric together, sew them once, then bind the edge as shown. Alternately, sew and bind them in one seam. Edge bound seams are not as strong as flat seams, but can be used for bags, or tricky shapes.
4. **Rolled Hem** - This is used on all tarps to create strong edges that will accept tie outs.
5. **Bar Tack** - used for tie outs, in place of a square sewn tack see diagram above.
6. **Square Tack** - Also called a box tack. I use this. Sew in a rectangle over the tie out, then criss cross in an X over the center of the rectangle. Strong and light, and the only way for machines with no zig zag.



4. Sewing seams - pinning/stapling etc.

Long seams require either ultimate confidence and patience so that you can freehand them, or careful preparation. I have both sewn them freehand and carefully prepared them beforehand. Silicon Nylon (Sil) is very slippery and merits your respect, whichever way you choose to approach your long seams.

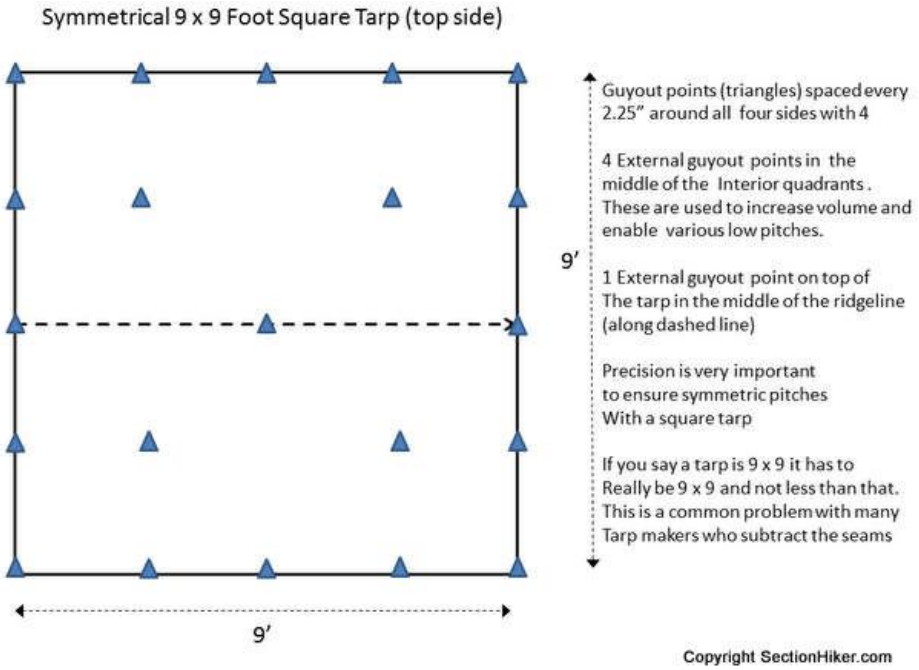
1. **Securing seams**
    a. Make sure that your pattern is cut into the material accurately.
    b. Match the edges of your fabric as you intend to sew them. This is a good time to choose the face side and inside of your project. You want to sew your tarp so that the seam faces inward, or is equal on both sides.
    c. Make sure that you have seam allowances for the type of seam that you are sewing taken into account. Usually this is ¼ of an inch or so. Sometimes more, sometimes less. Thicker fabrics like canvas can require more due to their bulk.
    d. Check your layout and make sure that the ends are aligned, rather than just having the seam aligned. Sil is slippery and easily moves out of place as you adjust it.
    e. If you are satisfied with your layout, begin pinning the seam in place so that when sewing you will not have it slide from where you intend.
        i. I use a stapler, rather than pins. This requires me to roll the sil up so that I can get the stapler over it to the seam, which can be quite difficult. However, I am not super coordinated and this is easier than pinning for me. Those of you who are coordinated will have an easier time of it.
    f. Proceed with your pinning up of the seam, making sure that the sil is not drifting from the way that you want to sew it.
    g. Once you are complete, go back over the seam and adjust it to remove any areas where the fabric is uneven. The goal is for the fabric to be smoothly put together.

2. **Sewing the Seam**
    a. Choose what type of stitch you would like to use. I use a straight stitch, because that is all that my favorite but very old machine will do. Sailmakers and outdoor manufactures often prefer a zigzag stitch, as it handles thread that is different material than the cloth better. If you choose to go with a straight stitch, you may need to run two rows of stitches for strength.
    b. Make sure you know how to manually advance the needle, so that you can more easily make turns - as in part 3 - and so that you can start the seam manually, if you prefer.
    c. Check your stitch length to make sure that you don't have too many stitches per inch. IE: You want enough stitches to make it strong, but if they are too close together it can encourage the sil to separate along the stitches - like perforations. 6-10 stitches per inch should be enough most times, for a balance of strength vs weight.
    d. Set the original piece to the side, and sew a test seam on some extra material, like you did with the tension test. Always double check before starting in on an expensive long piece of material.
    e. If you have pinned the seam, you should now gather the fabric up on either side of the seam so that you can easily work with it in your machine. This means rolling the sides into manageable rolls of fabric on either side of the seam, with the seam being fully visible.
        i. You can choose to work with the loose fabric if it is more comfortable for you, but it can be confusing with such a large piece of material.
    f. When sewing sil, I like to hold the material somewhat taut. That means that I put a hand behind the needle, and one well in front of it and gently pull the material with the same speed as the sewing machine. Don't sew your finger by losing track of the hand in front of the needle. :)
    g. Sew the seam. DO NOT RUSH, and DO NOT HESITATE. Like welding metal or any task, you need to try and keep it moving steadily. Rushing or hesitating can alter the stitch length.

3. **Turning the Seam**
    a. From time to time you will need to turn the seam at an angle that doesn't allow you to freely sew the fabric and keep it moving forward.
        i. Stop the machine where you want to turn, and make sure the needle is DOWN in the material.
        ii. Lift the presser foot.
        iii. Rotate the material so that the seam direction that you want to sew is directly in front of the needle. OR if you are feeling advanced, so that it is directly behind the needle and so you can sew in reverse.
        iv. Sew in the new direction.
        v. Rinse, Lather, Repeat as needed.

5. **Sewing tie outs**

Some people like fewer tie outs, some people like more. I fall in the middle. Here is a diagram for MORE tie outs. I personally forgo the tie outs in the field of the tarp and only do the ones on the edges, and one or two in the top seam.



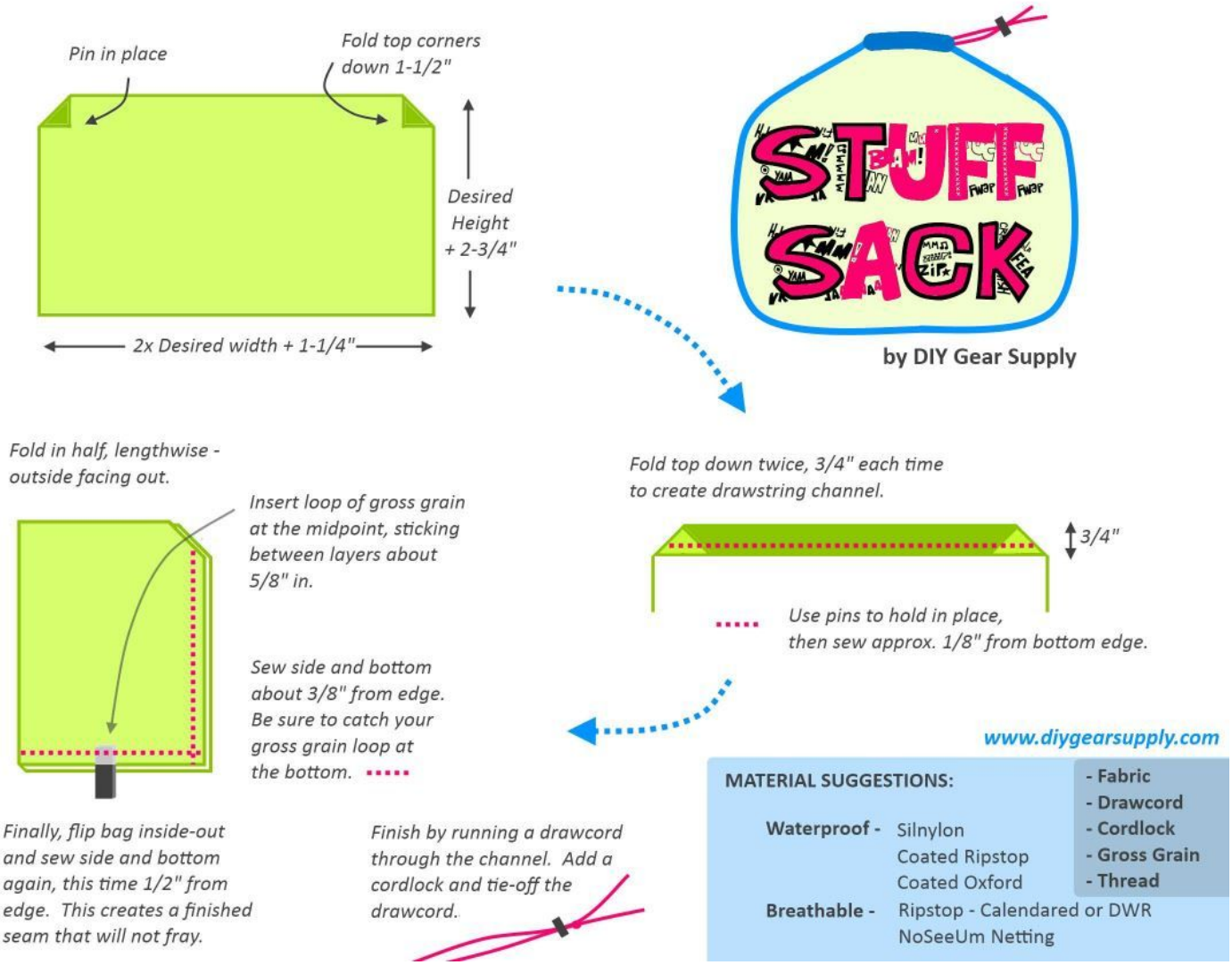
I will do tie outs in two ways.

1. In line. IE: you take a piece of ribbon, put it on the side of the tarp in the place that you want the tie out with one end facing inward to the center of the tarp on the outside, and the other directly below it on the inside.

2. Side by side. This looks prettier, but I'm not sure there is a benefit. You place both ends of the ribbon on the same side of the tarp, side by side and sew through both ends. My best friend swears by this, but I go back and forth about which method I like better. This is the method used for sewing tie outs in the field of a tarp.

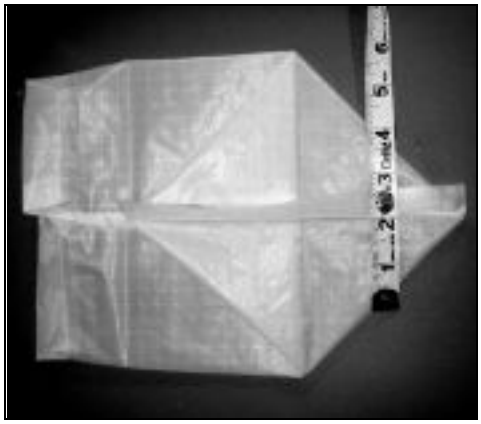
6. Stuff Sack Design

Here is a simple stuff sack design. See below for a way to make this into a square bottomed sack that will stand on its own.

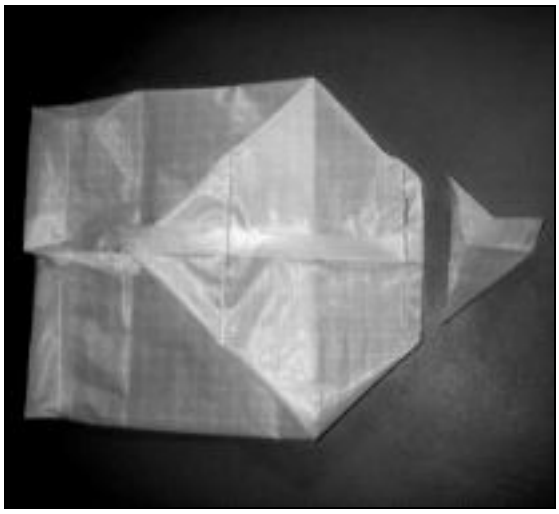


To convert your stuff sack into a square bottomed stuff sack that will stand up when full, do the following.

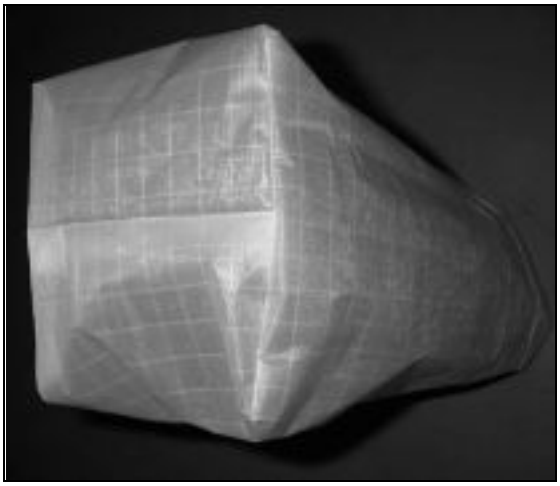
1. With the bag inside out, pull the edges out to create a diamond on the bottom - IE: refold the stuff sack on its side, and inside out, with the corners folded down.



2. Sew along a line, across the diagonal corner of the sack, make sure you are pleased with the results, then cut off the excess.

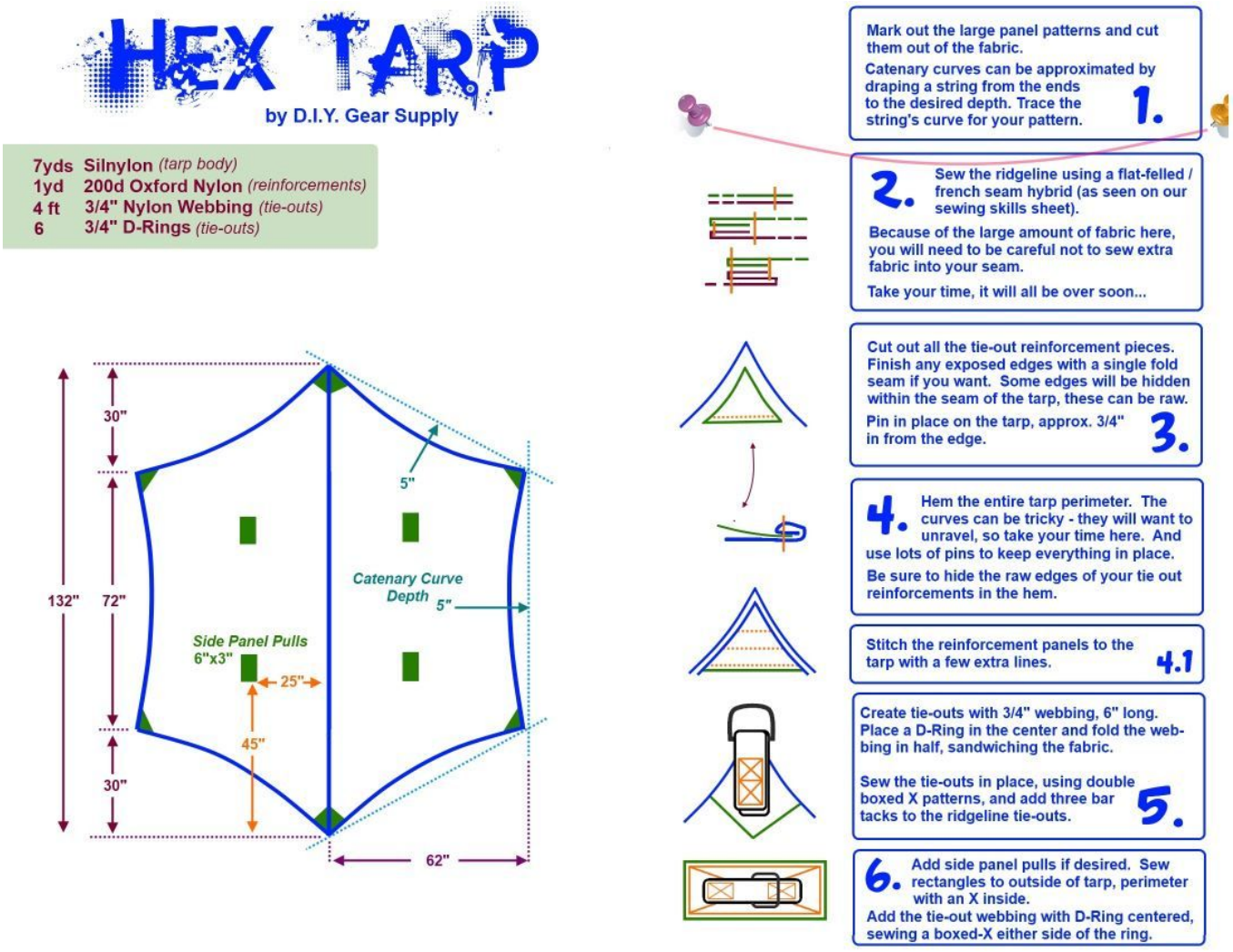


3. Flip it rightside out, et voila - a stuff sack that will stand up on its own and that will be naturally round rather than envelope shaped.

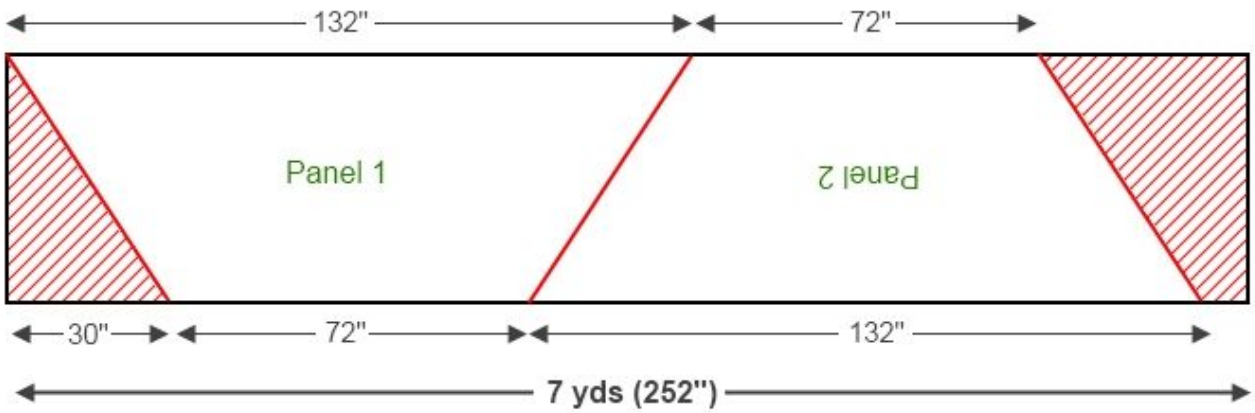


7. Tarp Designs

Another couple of tarp designs for the adventurous. Again, these have a tie out at every corner, and some in the field. I strongly recommend AGAINST using d rings, and have found that nylon webbing and corner reinforcements are not necessary. I recommend you sew the hem as above, then use grosgrain ribbon. It is stronger, lighter, and easier to pack away. Nylon webbing is quite stiff.



How to Cut for the Hex Tarp

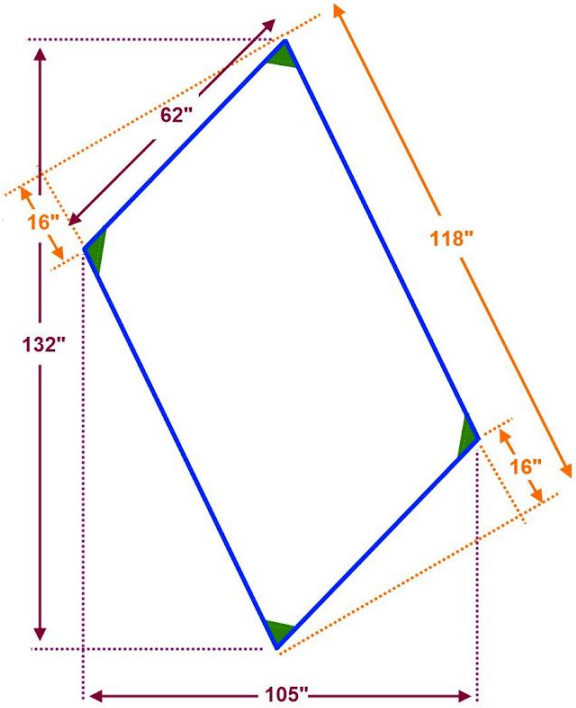


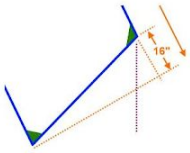
UL ASYM TARP

by D.I.Y. Gear Supply

ULTRA-LIGHT
ULTRA-EASY !

4yds	**Silnylon**	*(tarp body)*
1yd	**200d Oxford Nylon**	*(reinforcements)*
2 ft	**3/4" Nylon Webbing**	*(tie-outs)*
4	**3/4" D-Rings**	*(tie-outs)*



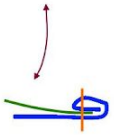


Cut 118" of raw fabric, full width. If weight is not a primary concern, the tarp can be left as a full rectangle 118" long. To lighten even more, cut out the 16" deep triangles from either side. **1.**

Great news... there is no ridgline. Consider yourself half done already! **2.**

Cut out all the tie-out reinforcement pieces. Finish any exposed edges with a single fold seam if you want. Some edges will be hidden within the seam of the tarp, these can be raw.

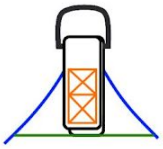
Pin in place on the tarp, approx. 3/4" in from the edge. **3.**



4. Hem the entire tarp perimeter. The curves can be tricky - they will want to unravel, so take your time here. And use lots of pins to keep everything in place.

Be sure to hide the raw edges of your tie out reinforcements in the hem.

Stitch the reinforcement panels to the tarp with a few extra lines. **4.1**



Create tie-outs with 3/4" webbing, 6" long. Place a D-Ring in the center and fold the webbing in half, sandwiching the fabric.

Sew the tie-outs in place, using double boxed X patterns. **5.**

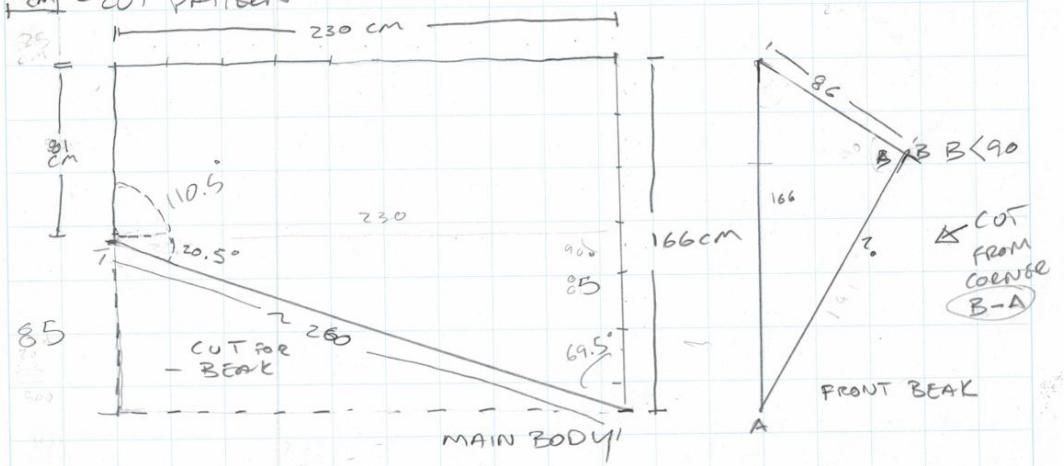
And here is a design from me. It is a mansion for one person, and nice and big for two. I dropped the back beak, as overkill, but otherwise sewed as per this plan. The only design change that I would make is to add another tie out in the center of the side edges. As you can see, the measured dimensions on the cut pattern are accurate but not accurately laid out. I changed the dimensions as I was working them out but didn't change the drawing. I adjusted the front beak a bit, so it would be tight when pitched, and the current pattern has the beak a bit big. Sue me - I am not as exact as I hoped. :)
Shaped tarps are slightly less flexible to use than a 9x9 tarp, but a bit better at resisting high wind and rain. This is the tarp we used up at Rachel Lake last year, and it stood up to 35 mph gusts acceptably. With an additional center tie out it would have done well.
I have published my design document for this on dropbox. It was so I could show Alex how to approach a design problem methodically. https://dl.dropboxusercontent.com/u/67317858/2ManShapedTarp.pdf

PAGE 4 - 6 YARD PATTERN - KEITH BASSETT 9/10/15

PROJECT - IMPROVED SHARPS TARP - 1½ PERSON

7. CONTINUED - SIZING TO THE GROUND

15@ = 25 CM - CUT PATTERN



- WEIGHT ESTIMATE

91.5 x 166 = 30G (1oz)

2.51 UNITS/(YARDAGE) -3 YARDS = 6.0 oz

12.0 oz TOTAL

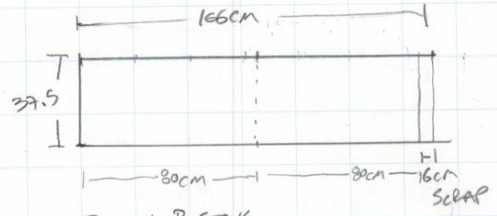
76 GRAM

152G + STITCHING & TABS. = ~5.5oz @ 1.0oz

= 10.0 @ 2.0 oz

.41 x 91.5 = EXCESS

= 37.5 cm x 166



BACK BEAK

FIND ANGLES ON FRONT BEAK & DUPLICATE.

PEAK CATENARY CUT DIMENSIONS 3.5% DROP

115	108	101	93	83	73	60	43	9
0	1	2	3	4	5	6	7	8
112	105.5	97	88	78	67	52	30	—
.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	

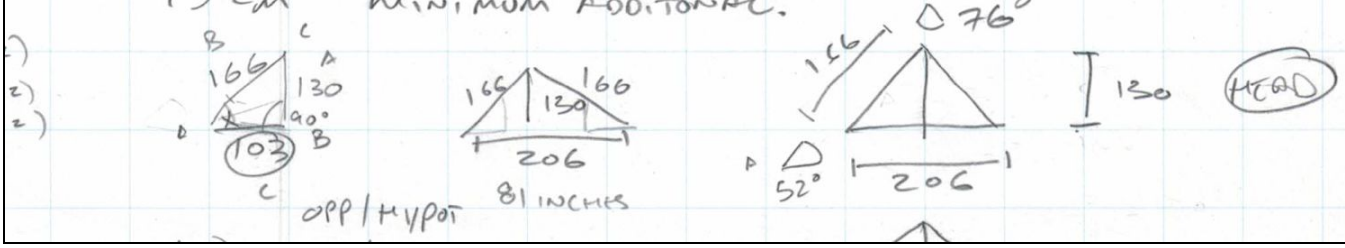
DROPS TO GROUND

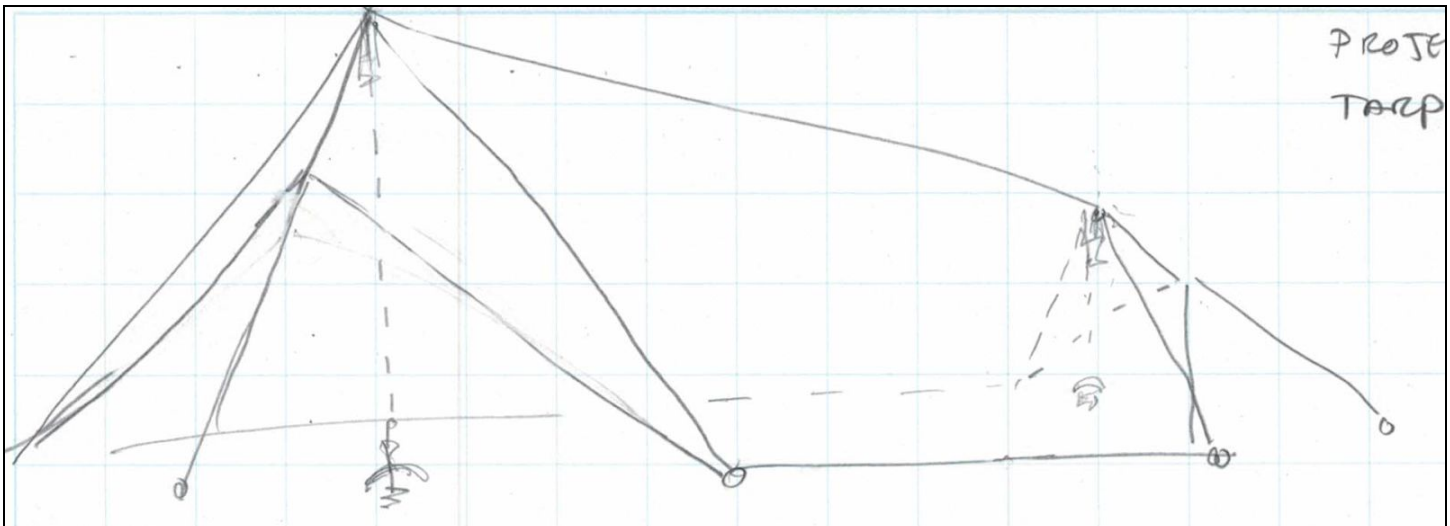
=MUST BE TALL ENOUGH TO SIT UP AT PEAK.

100 CM SIT HEIGHT,

25-30 CM NECESSARY SIT ADDITONAL = IDEAL.

15 CM MINIMUM ADDITONAL.





PROJE

TARP

ROUGH VISUALIZATION, STAKED TO GROUND

6 STAKES - CORNERS, POLES.