

# BUILDING PORTABLE FOOTLIGHTS

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## INTRODUCTION

The genesis of this project came because I was part of a group of commedia players that was invited to perform at a party at Pennsic over several years. We did not have a way of lighting the stage in a sufficiently bright manner that was also safe and easily transportable. I wanted some way of providing light to a stage area where the light is projected on the actors but not the audience. It needed to be portable and battery powered. Since I already had several LED lanterns to light my tent, I chose to build something that would accommodate the lamps I had. In addition, I wanted something that was large enough that people at the party would be able to see and not trip over. It would also “define” the boundaries of the “stage.”

**These rigs are designed for use with LED (or florescent) lanterns, NOT OPEN FLAME or even old gas/propane camp lanterns.**

**In addition, there is nothing “period” about these units. The objective is functionality, not authenticity.**

The dimensions of the reflector units were dictated by the size of my LED lanterns. I wanted something where the base of the lantern fit entirely inside the reflector unit, so it would be stable; I didn't want the lamp to tip out if knocked. It also had to accommodate the shade that was part of the lamp. I chose to have the back of the unit form a 90 degree angle because it made the calculations of sizes and angles of the pieces easier. The base is a right triangle. The "roof" is an equilateral triangle (equal lengths on all sides and 60 degree angles on the corners) and is oriented at 45 degrees with respect to the base. In the end, I also tried to work with whole numbers so the reflector unit ended up 20" across the front, 9" deep, and 20" high in the front at 6.5" in the back.

I made my first unit from foamboard, which had several things going for it. It was inexpensive, light weight, smooth, and easy to cut. However, I found it also warped and not very sturdy; the corners tended to get banged up. However, it worked great as a prototype and as a pattern for cutting out more units from more rigid material. 1/8" thick paneling used for wainscoting was perfect; it is rigid, pretty easy to cut with a power saw, and generally water resistant (at least that's what the display at Lowes said...)

## MATERIALS (MAKES 2 FOOTLIGHT UNITS)

- **Sheet of whiteboard wainscoting**



4'x2'8" (48"x32"):

[http://www.lowes.com/pd\\_61082-46498-31023248\\_0\\_?productId=3042205](http://www.lowes.com/pd_61082-46498-31023248_0_?productId=3042205)

4'x8' sheet (this is equal to 3 of the smaller sheet so would make 6 units):

[http://www.lowes.com/pd\\_16605-46498-300\\_0\\_?productId=3015239](http://www.lowes.com/pd_16605-46498-300_0_?productId=3015239)

- **Heavy duty wide aluminium foil**



- **Spray adhesive**



- **Contact cement**

I chose the "gel" formula contact cement but use the original formula if you want.



- **Fabric**

I used canvas painter tarp but anything that will absorb the contact cement should work.

- **Velcro**  
1" self adhesive squares



- **LED camp Lantern**



## TOOLS:

- Measuring tape
- Long straight edge (like a yard stick)
- Square with 45 degree angle (speed or combination square)
- Clamps
- Jigsaw



- Tack cloth
- Utility or x-acto knife
- Metal spoon (for burnishing the foil edges)
- Roller/brayer (one could use a rolling pin, I guess)



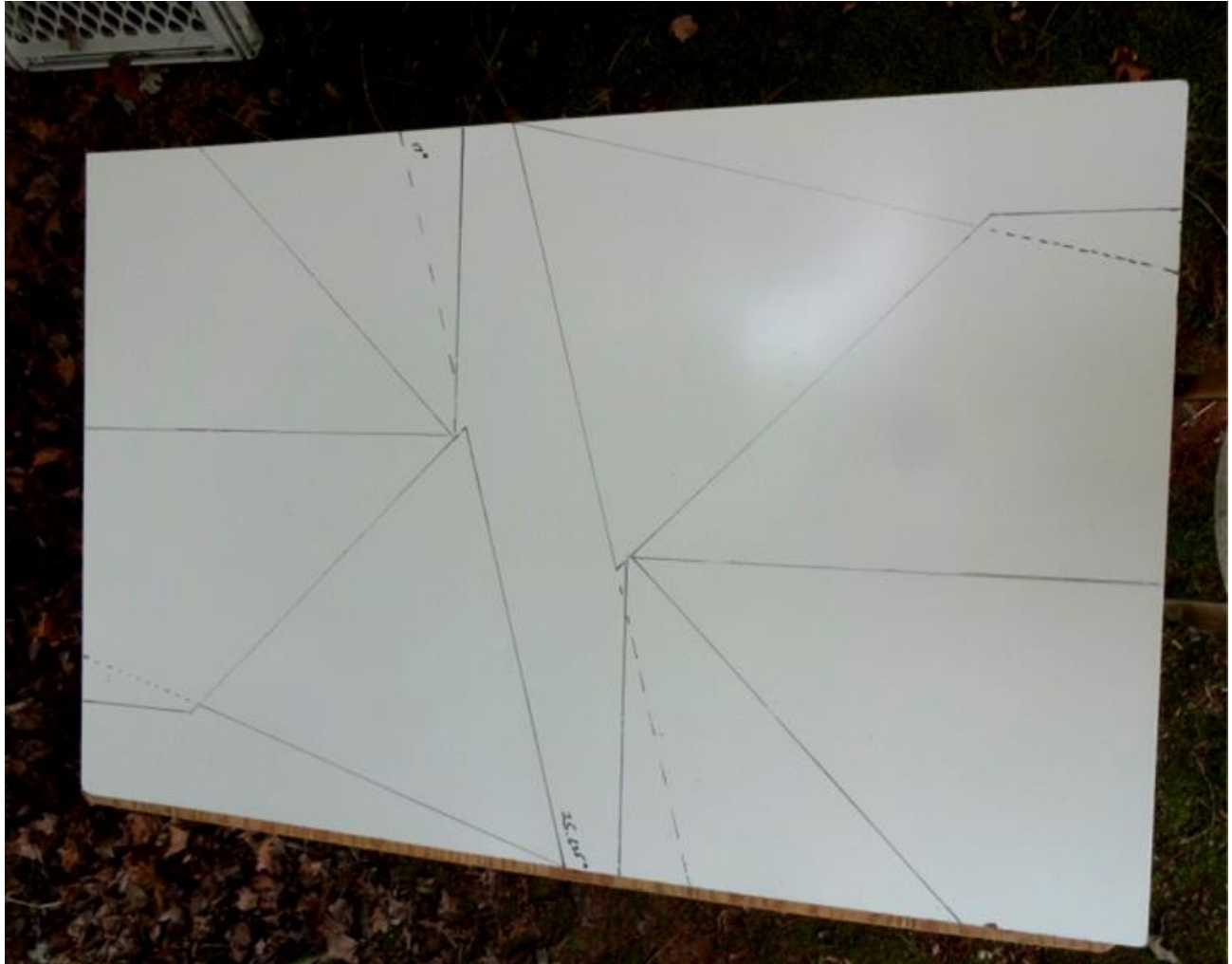
- Palm sander
- Medium grit sandpaper

- disposable chip brushes (I used 2" brushes to apply the contact cement)

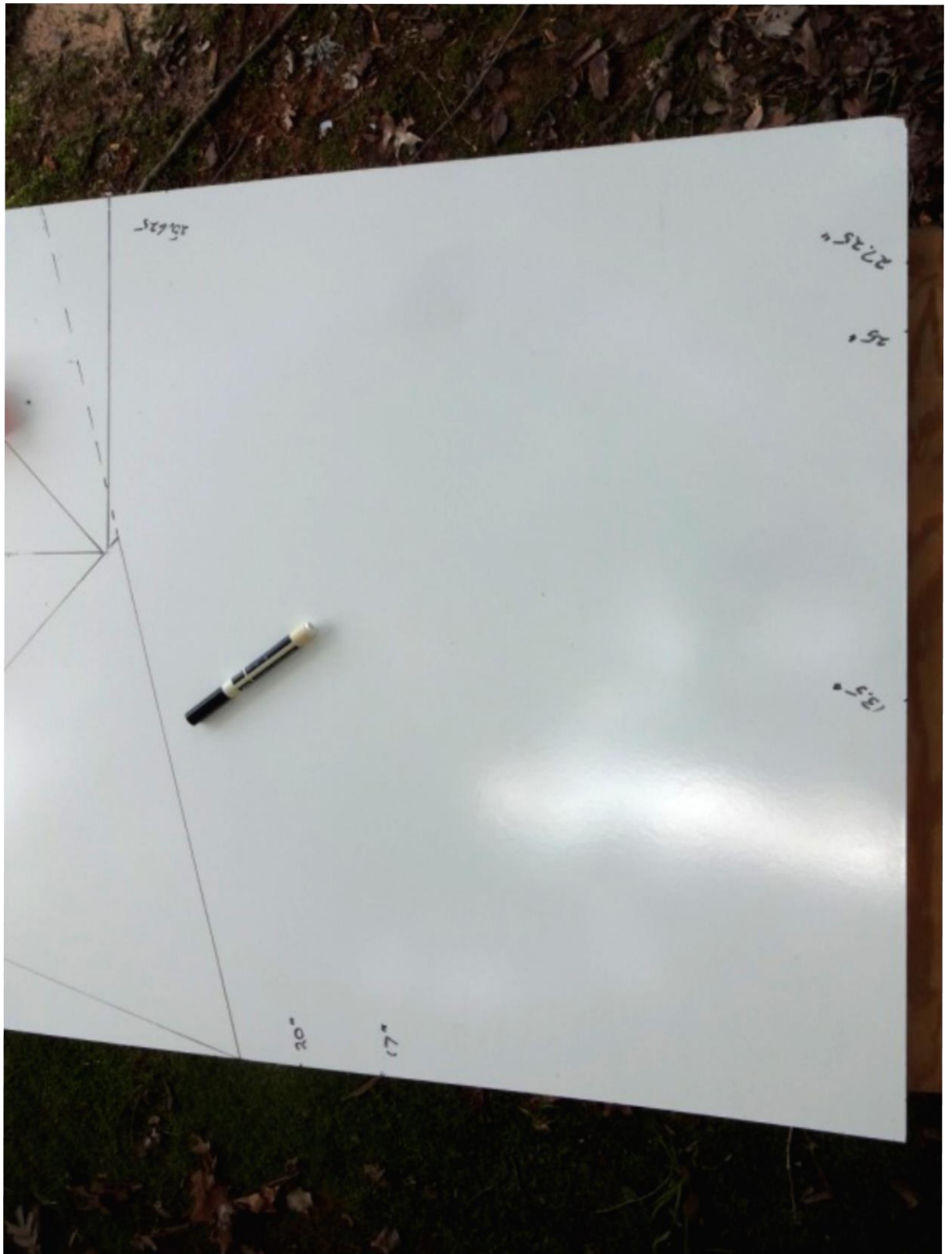
# PROCESS

## 1. Draw pattern on whiteboard

Two footlights can be made from each 32x48" board. I used a dry erase marker to draw out the pattern lines on the board (makes it easy to erase mis-draws but you also have to be careful that you don't rub off the correct stuff). This is what it looks like when you are done drawing:



- a. Viewing the board from one end, mark the following spots on the edges:
  - i. Left side, measuring from bottom edge: 20", 17", and 6.5"
  - ii. Bottom side, measuring from left edge: 13.5", 25", 27.25"
  - iii. Right side, measuring from bottom edge: 6.5" and  $25 \frac{5}{8}"$





- b. On the left side, starting @ the 20" mark, draw a line 13.5" long parallel to the bottom edge and another line starting @ the 13.5" mark, draw a line 20" long parallel to the left edge (because of the lens distortion in the photo, the lines don't look square but they are):



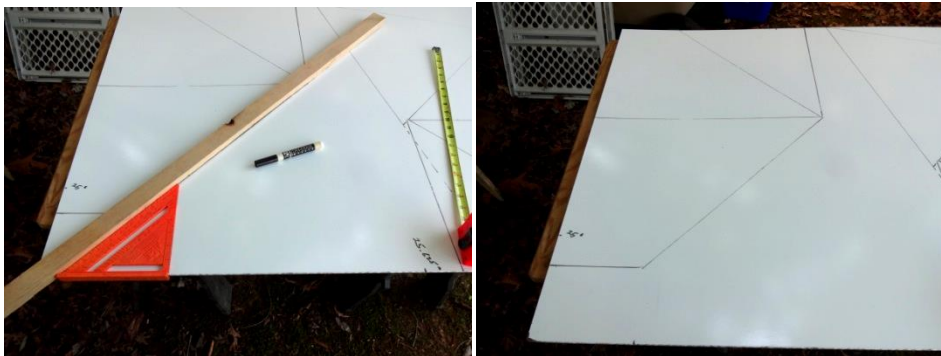
- c. Now draw a line from the corner where those two lines met to the 6.5" mark on the left side (note that I am actually using a square to make sure I get a 45° angle):



- d. From the bottom edge, starting @ the 27.25" mark, draw a 6.5" perpendicular line:



- e. Now draw a line from the end of the previous line to the corner in step c above (it should be a 45° angle):



I know it is not actually in the photo but you should extend this line a couple of inches past the corner in step c. This will be useful when you get down to step g.

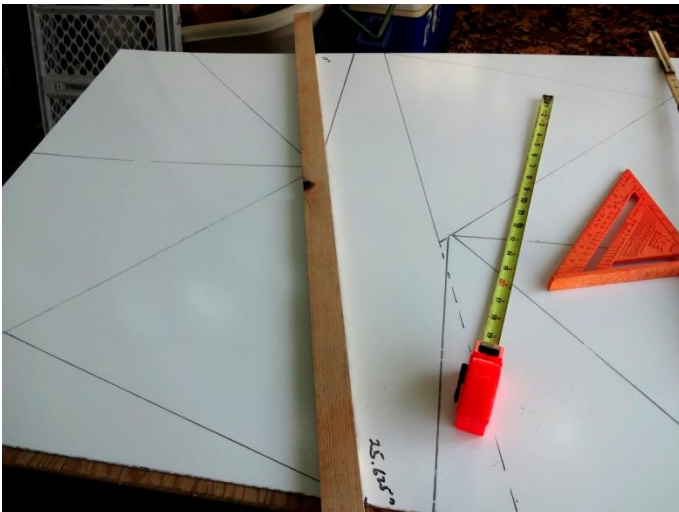
- f. Using a long straightedge, draw a line from the 25" mark on the bottom edge to the 25 5/8" mark on the right edge:



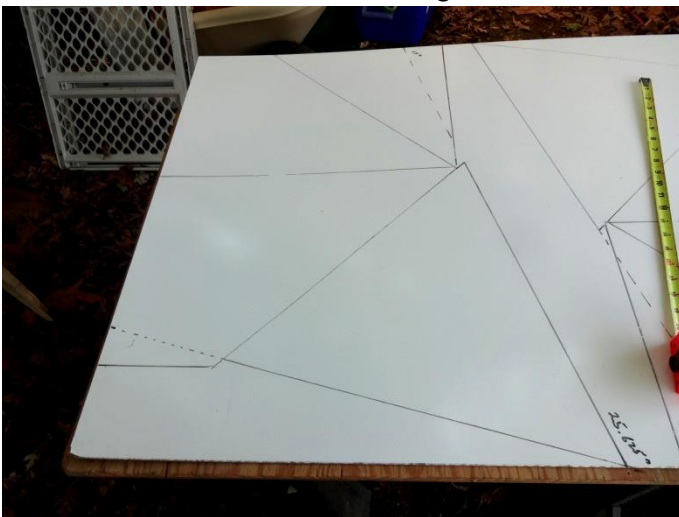
(turn the part of the line that is between the bottom edge and the 45° line into a dashed line (or you can just erase it); the significance is **THIS IS NOT A CUTTING LINE**):



- g. Using your straight-edge, draw a line from the 25 5/8" mark on the **right** edge to the 17" mark on the **left** edge:



Note: like the previous step, make the line from the left edge to the intersection with the line from step b a dashed line since it is not a cutting line.





h. **Repeat process for second footlight assembly**

Drawing finished, ready to start cutting:



I used pieces of tape to keep the pieces from one set distinct from the other.

2. **Cut out pieces using a jigsaw**

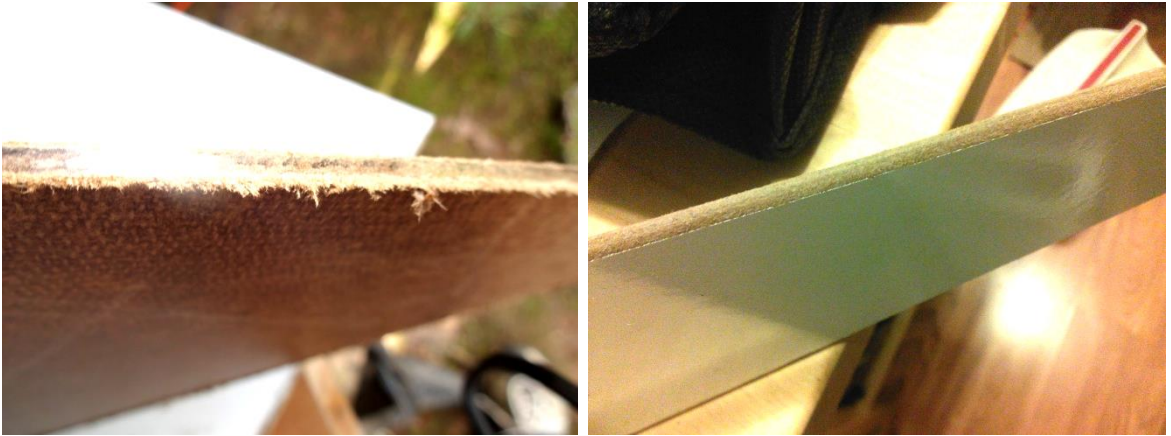
You can use a hand saw but it is a lot faster using a power jigsaw. Use a moderate to fine-toothed blade; the cuts will be cleaner. Photos of the progress of cutting out:



3. **Sand edges of pieces**

- a. Use medium (100-150 grit) sandpaper to sand off the rough edges and burrs from sawing and smooth and round the edges of the boards.

Before and after sanding:



- b. Wipe down all pieces with a tack cloth



4. Glue foil to white side

You may want to work on a surface that you can cut against without damaging it (like this piece of plywood I use)

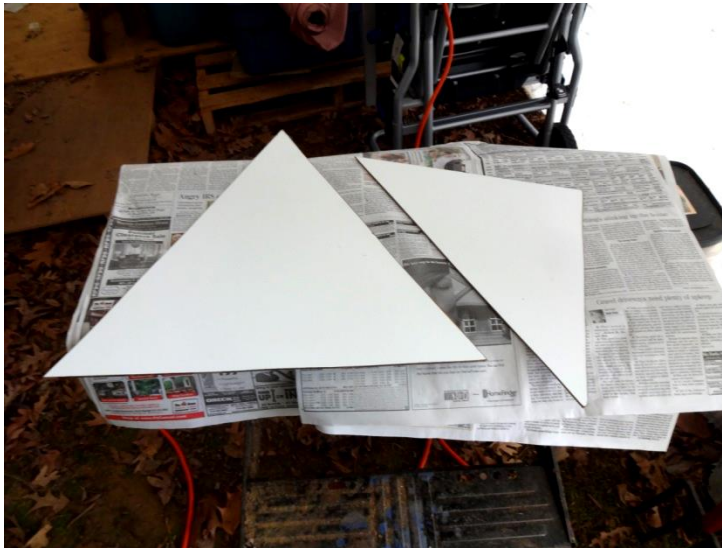


- a. Tape down foil to the work surface. Get it as smooth and tight as possible. **Make sure the SHINY side is down.**



Test the arrangement of the board piece in your foil. I did two board pieces as a time. **Remember: the white side goes DOWN and brown is UP when testing the arrangement of the pieces on the foil.**

- b. Using the spray adhesive, spray the **White** side of the boards:



- c. Place the prepared pieces, **white/glued side down**, on the foil:



- d. Press firmly starting in the middle of each board. Use brayer to roll over all the boards and make sure the board and foil are fully in contact.
- e. Use the utility knife to cut out the boards from the foil:



- f. Use brayer roller to roll the foil smooth. Before and After:



We are not looking for mirror perfect here; try to get bubbles out by starting in the middle and working toward the edges.

**Warning:** the cut edges of the foil are **SHARP** (yes, I learned the hard way) so **DO NOT RUN** your finger down the edges unless you **WANT** to be cut.



- g. Use the roller to roll the edges down then use the spoon to burnish the edges.



Before and after rolling and burnishing:



5. Glue brown side to fabric

The fabric I used was a piece of cotton canvas dropcloth. It was the right dimensions. You can use any kind of cloth that will take the contact cement without it bleeding through (thus gluing it to the work surface) and will hold up to being the “hinge” for the pieces. You also want to be able to draw on the cloth with a pen and be able to see it.

Note: you will need a work surface that is big enough to hold all the pieces at the same time (28”x40”). Protect the work surface with newspaper or plastic dropcloth, just in case the cement does bleed through.

- a. Stretch the fabric on the work surface and clamp/tape it taut.



- b. Arrange the boards **shiny side up** on the cloth in the arrangement shown



The pieces are not actually touching. You want about the width of a board between the pieces (so that they can move and fold into position).

- c. Draw the outline of each piece on the cloth. You may NOT want to use a sharpie... the color bleed through.



- d. Following the directions on the can of contact cement, paint the cement onto the cloth:



- e. Again, following the directions on the can, paint the **BROWN SIDE** of the boards with the contact cement:



(Note: the above pictures are from my first attempt to glue to fabric using a spray glue that didn't work. So the picture on the right looks a lot more white and lumpy than what the contact cement actually looked like... which I forgot to take a picture of.)

- f. Carefully place each board back onto the cloth in the correct position. **You get ONE chance to position the pieces. The two coats of contact cement will bond to each other on contact so you cannot reposition.**



- g. Ensure good adhesion between the fabric and the pieces using a hammer, block of wood, and towel (to prevent the block from scratching/ripping the foil). The idea is to work your way across the foil covered panels, whacking the block of wood with the hammer:



- h. If possible, let the whole thing sit for a couple of days to cure (get to maximum strength)

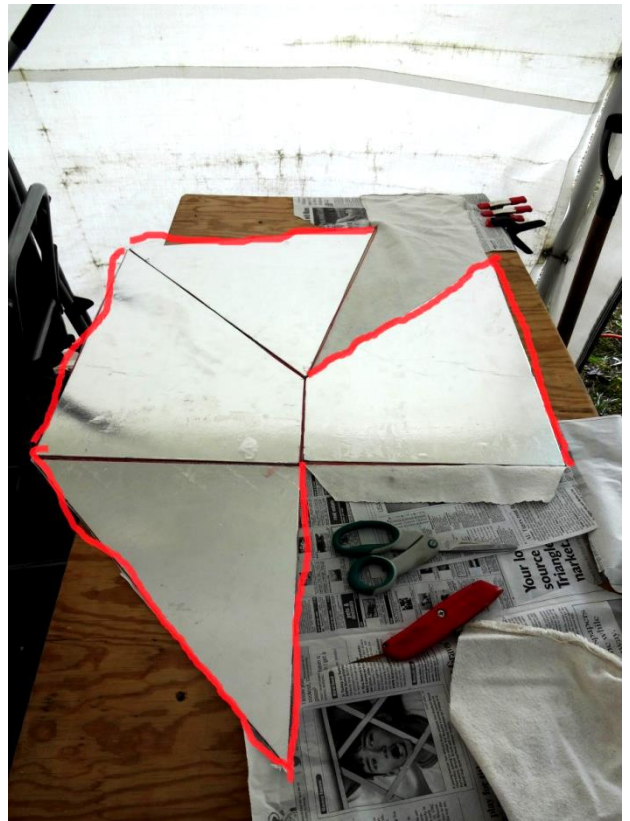
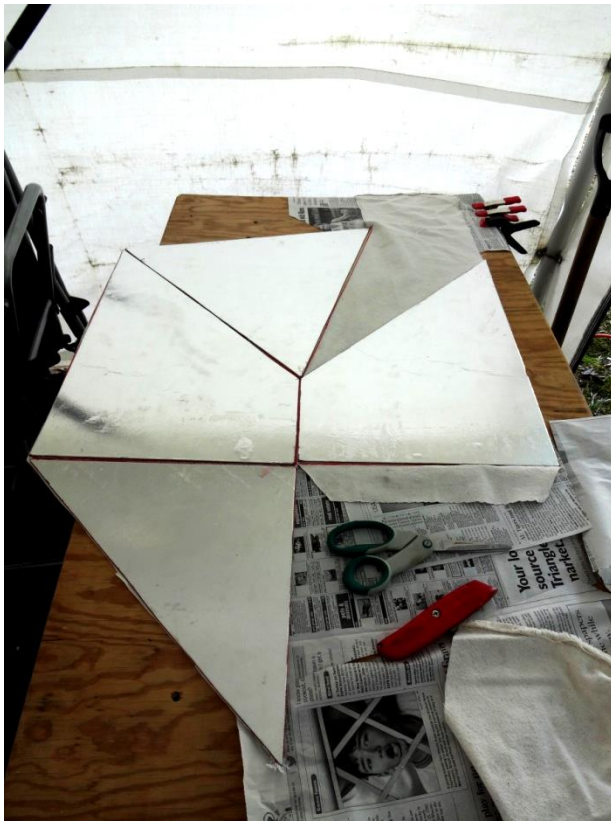
#### 6. Trim fabric

- a. Orient the assembly with the point of the right triangle at the bottom (toward you) and the equilateral triangle up and to the left.
- b. Starting at the point where the right triangle and the two side pieces meet, trim the fabric close to the parts along the following edges (working in a clockwise direction):
  - i. Down the side of the right triangle that is NOT next to another piece
  - ii. Hypotenuse of the right triangle
  - iii. Outside/Long edge of left hand 5 sided piece
  - iv. Outside edge of equilateral triangle  
*(Skipping over to the right hand 5 sided side piece)*
  - v. The diagonal side of the 5-sided piece **that is NOT next to another piece**
  - vi. Outside/Long edge of right hand 5-sided piece

Leave the flap between the equilateral triangle and the right-hand 5-sided piece and on the bottom of the right-hand 5-sided piece. **Also, do not cut any place where two pieces are right next to each other.**



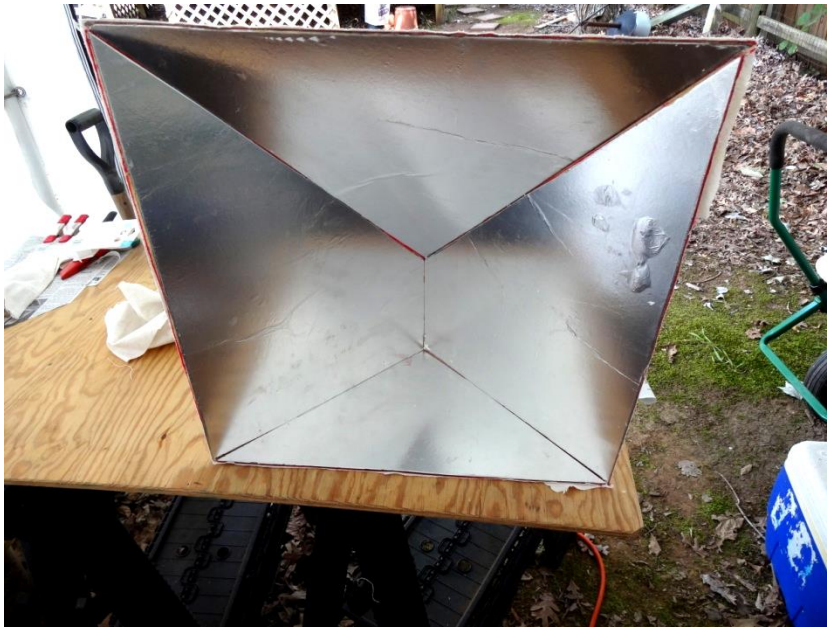
I have drawn red/orange lines on the photo on the right to show which edges to trim:



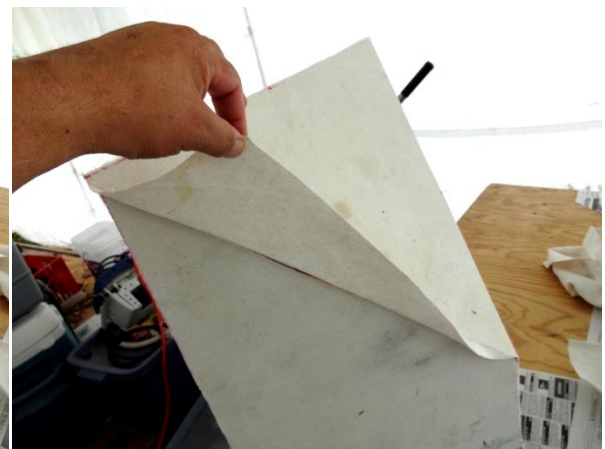
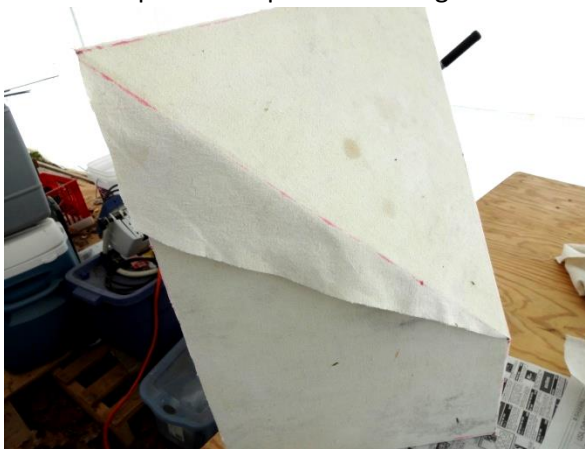
- c. Trim the flap below the right-hand 5-sided piece so there is enough flap to fit under the right triangle when set up.



- d. Fold the unit into the assembled position. The right triangle forms the floor, the two 5-sided pieces are vertical, and the equilateral triangle is the “roof” and is angled. Hint: all the shiny parts are on the inside, facing each other.



e. Trim the flap on the equilateral triangle:



## 7. Attach Velcro

a. Using Velcro squares, attach two pieces to each of the two flaps so the unit will stay set up.







Done!

## CONTACT INFO

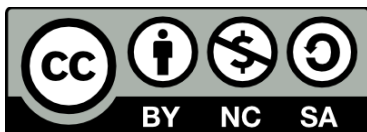
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