

# ***The Homeless Emergency Shelter***

***Designed and Constructed  
by  
Paul Elkins  
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***Thank you for purchasing plans for the Homeless Emergency Shelter.***

***When I published a video of this shelter a while ago I had no idea it would gain so much notoriety.***

***I had many requests for build plans, but before making them I wanted to test out how long the Coroplast sheets would last when left fully exposed to outdoor elements. Nearly four years have passed and I can still give it a good punch without any damage. So I figured it was time.***

***I live in the Pacific Northwest, where the temperature is moderate. It snows some, rains quite a bit and lately the summers are dry and hot, but, If you live in a hot, dry climate I would caution leaving the shelter exposed to direct sunlight for too long.***

***I originally touted this shelter was made with four sheets, but five sheets will get you the Visor, overhead shelf and water/trash can holder.***

***Here in America you can purchase a 10 pack of white 4x8 4mm thick fluted plastic from Home Depot. Just today I purchased a 10 pack through their online store. It will be delivered to my nearest Home Depot in a week or two. Total cost was under \$120. That's a smoking deal. This is more than enough material for two structures.***

***Another alternative is plastic supply stores and sign shops. This material is mainly used for outdoor campaign signs, so you might be able to pick up a few sheets at your local sign shop.***

***I discovered later that Walmart carries dark gray 2" wide UV protected Duct tape. There are now other places that carry UV protected tape. You'll just have to shop around.***

***You can also opt to use silicone caulking to seal up each zip tie hole and the flute ends on the roof and wall bottoms that make contact with the ground. I learned that soil and little critters crawl up the flutes after time, so it's best to seal them.***

***The 8" long cable zip ties you can find at your local hardware store or big box home improvement store in the electrical section.***

***I use a retractable utility (razor) knife to cut the material, and wire snips to clip the zip tie ends.***

***I changed how you join the roof panels together. I now recommend just taping the two sheets together. It works.***

***I show how to make a 'V' groove when making a smooth exterior right angle bend, used on the selves, but be careful when making these cuts. You do not want to go through both layers, just the one. Practice on some scrap pieces first.***

***I later cut a 10" x 10" flap on the rear wall for cross ventilation. I placed it on the opposite side of where I sit against the wall. I include a few photos of this improvement.***

***On some aspects the design can definitely be improved.***

***You might add a double rear wall with a sliding pocket window, similar to what's on the door.***

***You can also add a visor on the rear wall to keep rain and direct sunlight from entering the window.***

***I show a picture of my Nomad Bicycle Camper, which has a similar configuration, where I added small side windows in the arc. Feel free to experiment.***

***You can add grommets in each interior corner for tent spikes enabling the structure to be secured to the ground.***

***The hardware I used can be substituted for something more to your liking. To do it again I'd use a trailer storage hatch lock instead of an exterior hasp lock. This way you can still lock it up when you leave and no one can lock you inside while you're sleeping.***

***If after looking over these plans you find yourself scratching your head in confusion, feel free to Email me at:***  
***[paulwelkins@yahoo.com](mailto:paulwelkins@yahoo.com)***

***Good luck and if you like, Email me pictures when you're done.***

# Getting started

*You will need five sheets of 4mm thick 4 feet by 8 feet fluted plastic.*

*On my original shelter I used yellow sheets but they come in a variety of colors.*

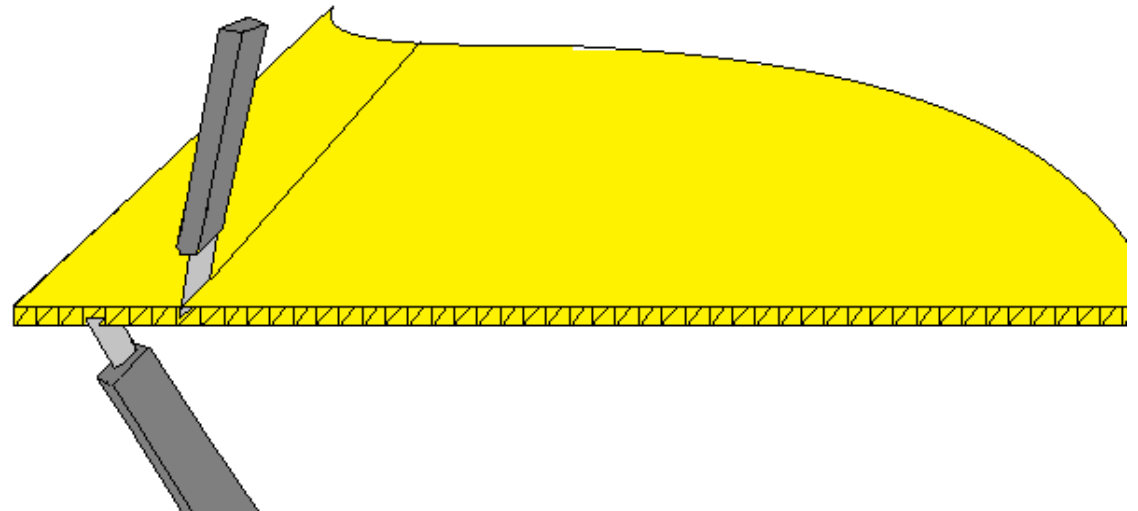
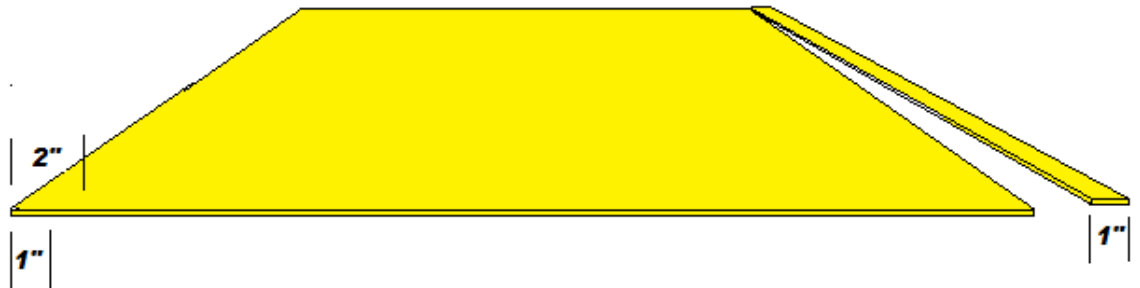
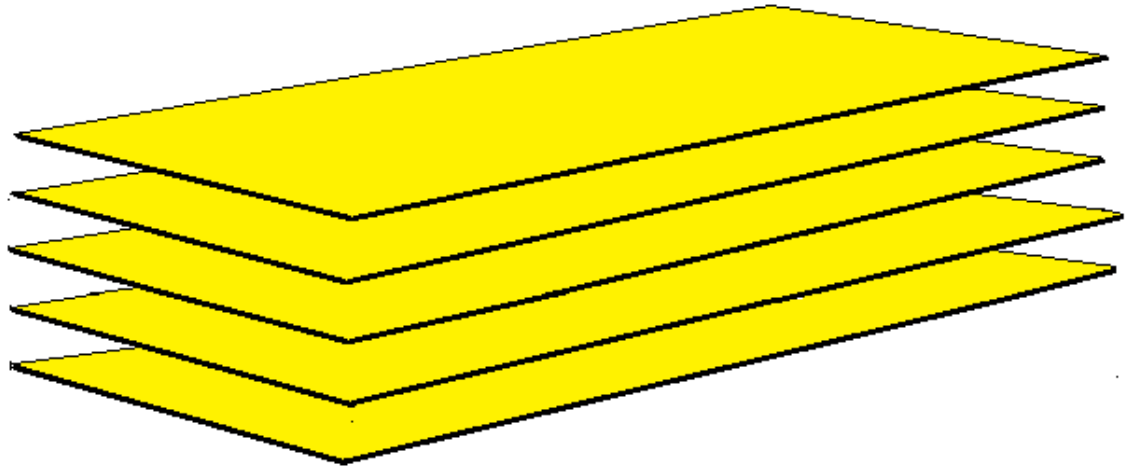
*150 zip ties, 8" long. These can be found at the big box home improvement stores.*

*2" wide duct tape or silicone to cover the zip tie holes and wall and ceiling flute ends.*

*To create the roof you will need 2 sheets, but first take one of those sheets and cut an 8 foot long 1" strip off of one side as shown on the right.*

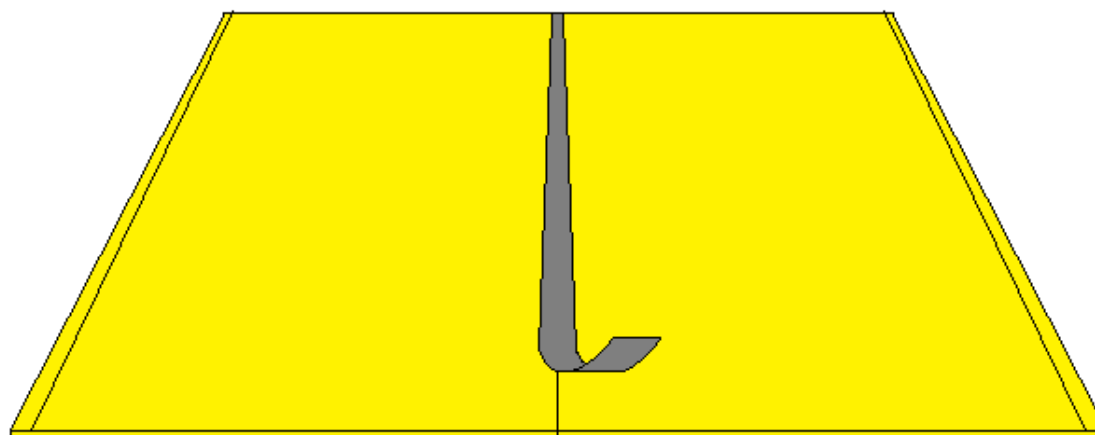
*To create the three layer lip that will hold the side-walls in place, take each of the two sheets and make marks on the measurements as illustrated. (One side only)*  
*One mark goes on top while the other goes on the back side.*

*With your razor or utility knife cut on these marks running your knife down the channel, but only going through one layer of the double wall panel.*  
*Be careful not to cut all the way to the other side.*



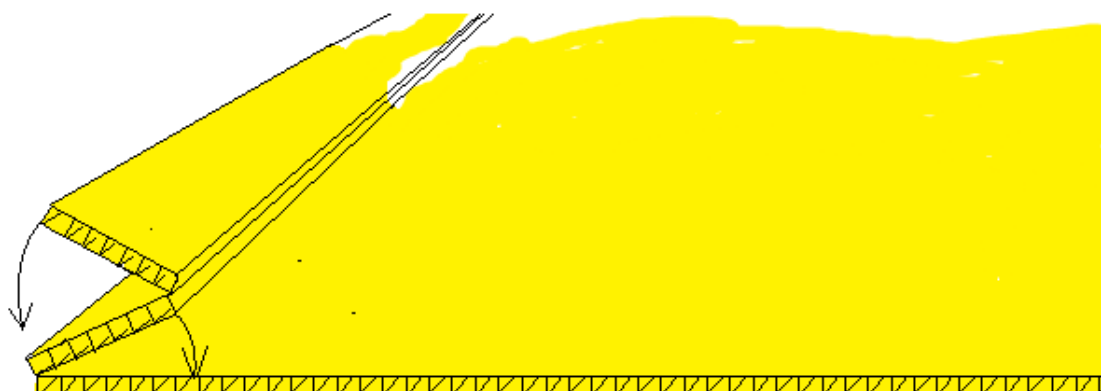
## ***The roof panels***

***After making the cuts on both panels, rotate one panel so the panels mirror one another. Butt together the sides that were not cut. Tape them together running tape down both sides of the panels.***

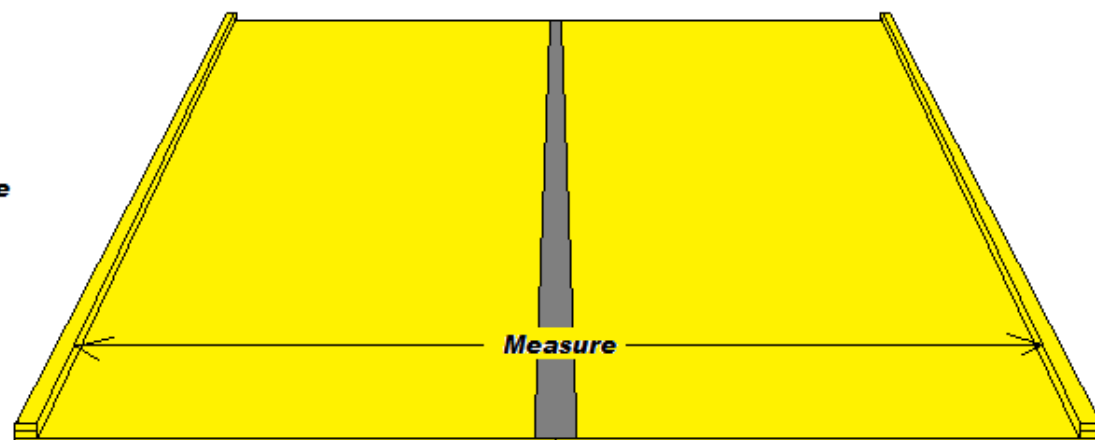


***Rotate the panels to where the lip you will make (shown on the right) will end up on top of the panels.***

***Where you made your previous two cuts, bend the slender pieces over onto one another creating a three layer lip.***

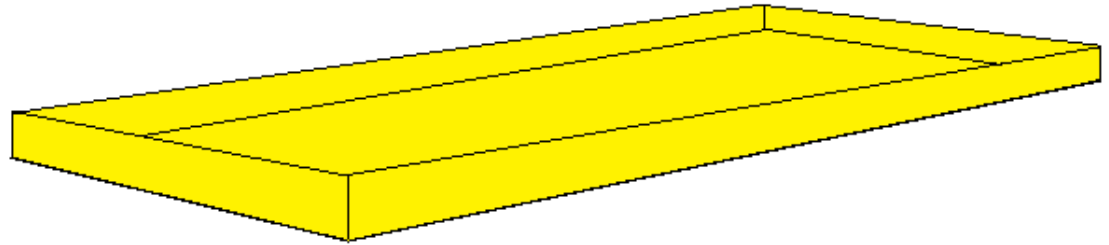


***From the inside lip edges, measure the distance between the two.***





## ***Floor tray***

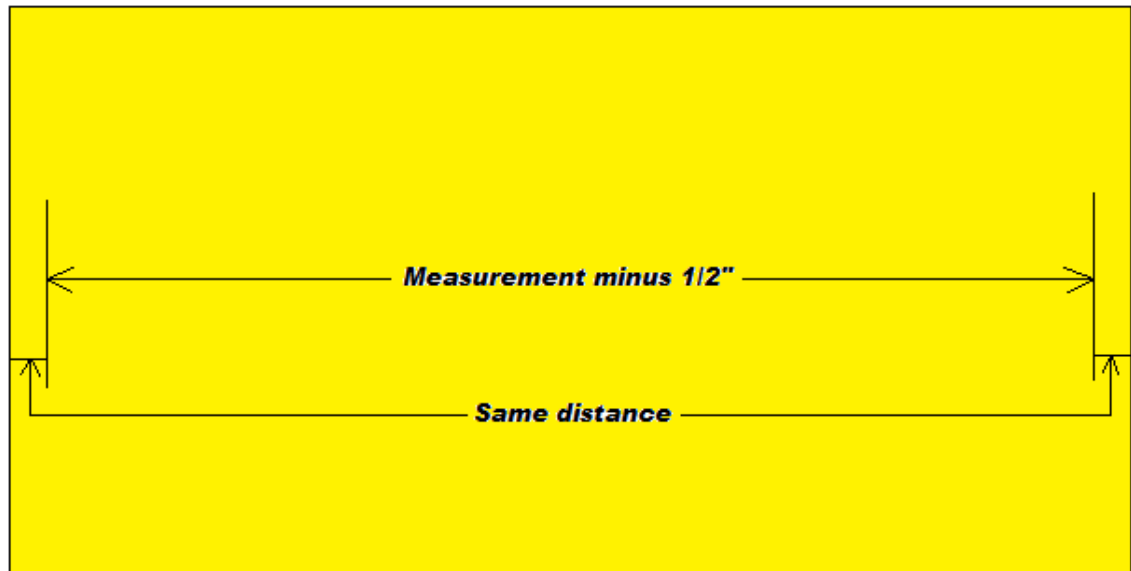


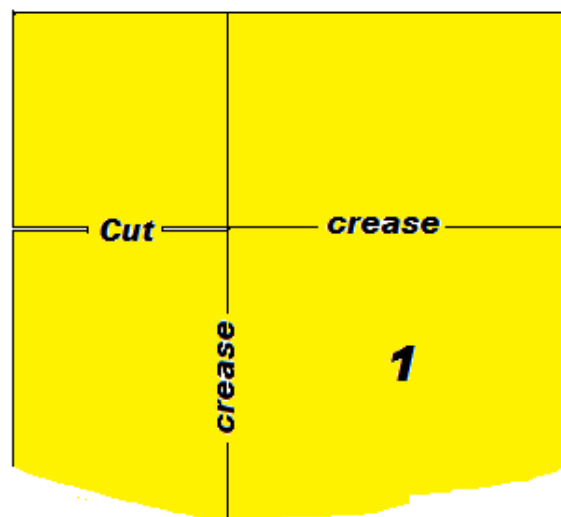
*The one sheet floor tray is created by bending up short sidewalls to create a tray. This tray will sit inside the bottoms of the ceiling and end walls so water will not enter the structure.*

*Fluted plastic comes in random lengths which is why I don't give specific measurements to create the floor tray.*

*To create the floor tray, take the measurement from the proceeding page, subtract a half inch (thickness of the walls) and lay this out on the sheet. The measurement will be several inches shorter than the sheet. Split the difference on each end of the sheet. These will be the end fold lines for the tray sidewalls.*

*To get the long sidewall measurements take the measurement you get from the end sidewalls (A) and use that same measurement for the height of the long sidewalls (B).*

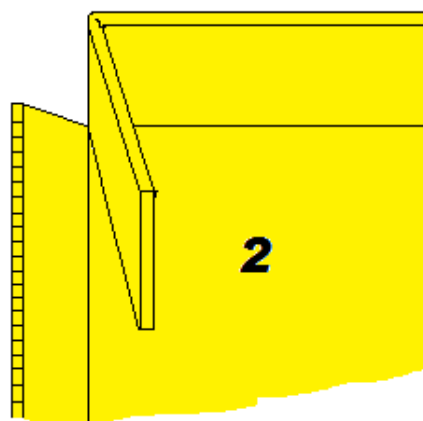




*Lightly crease your lines using a blunt tool making sure not to pierce the material. Cut as shown on the illustration.*

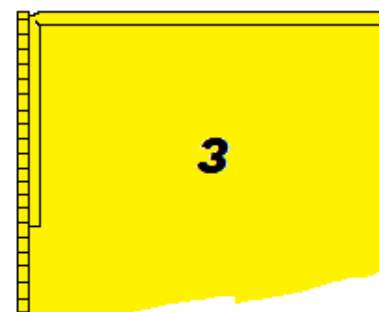
## **Floor Tray Corner Fold (used on original shelter)**

*Option #1*

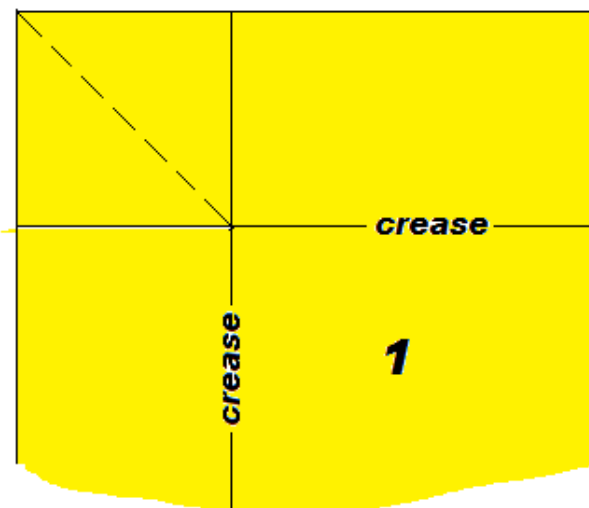


*Bend all sides up. Fold the flap to the inside of the tray.*

**Top view**



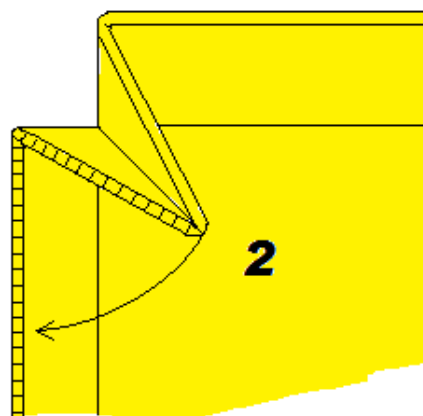
*It should look like this when you're done.*



*Crease your lines. On the dotted line shown, crease on the back side of the tray.*

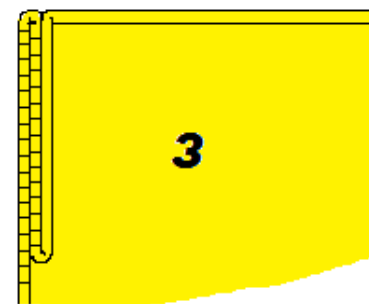
## **Floor Tray Corner Fold (water tight)**

*Option #2*



*Bend all sides up. Fold the traingle end to one side.*

**Top view**



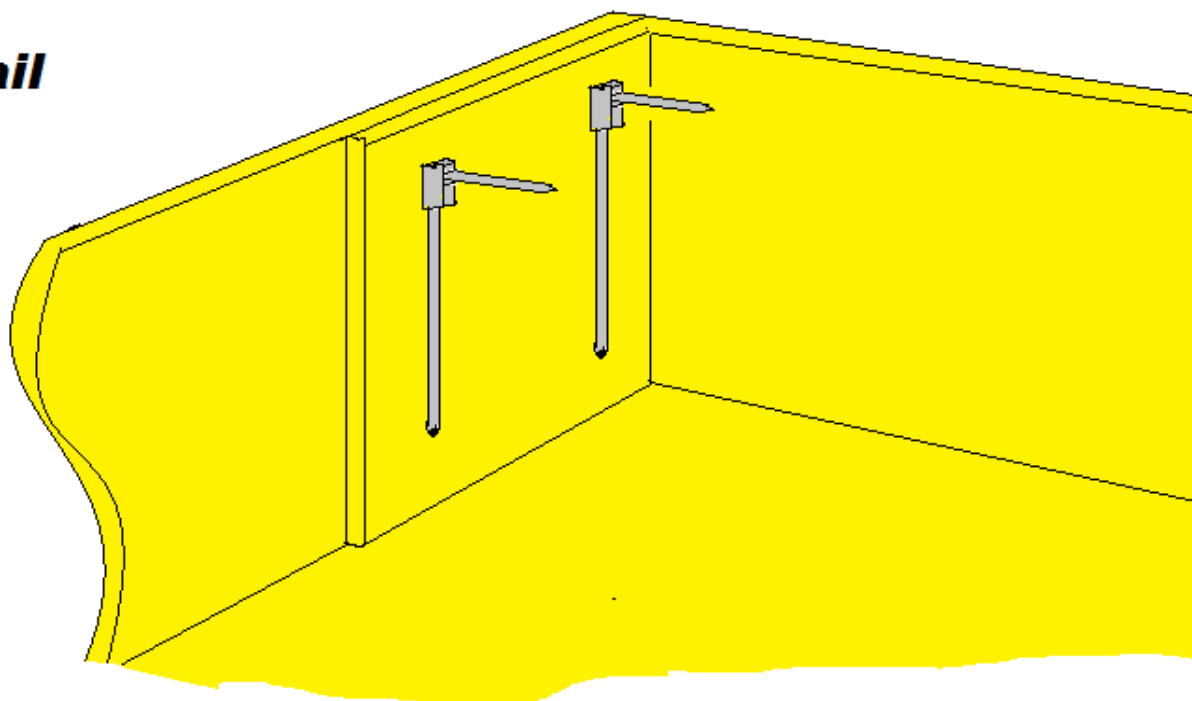
*It should look like this when you're done.*

## **Floor tray corner detail**

### **option #1**

*Drill a hole near each corner using a 3/16" drill bit.*

*Starting from the inside of the floor tray, thread an 8" long zip tie through the top and bottom holes. Secure the zip tie and cut off the excess tail.*

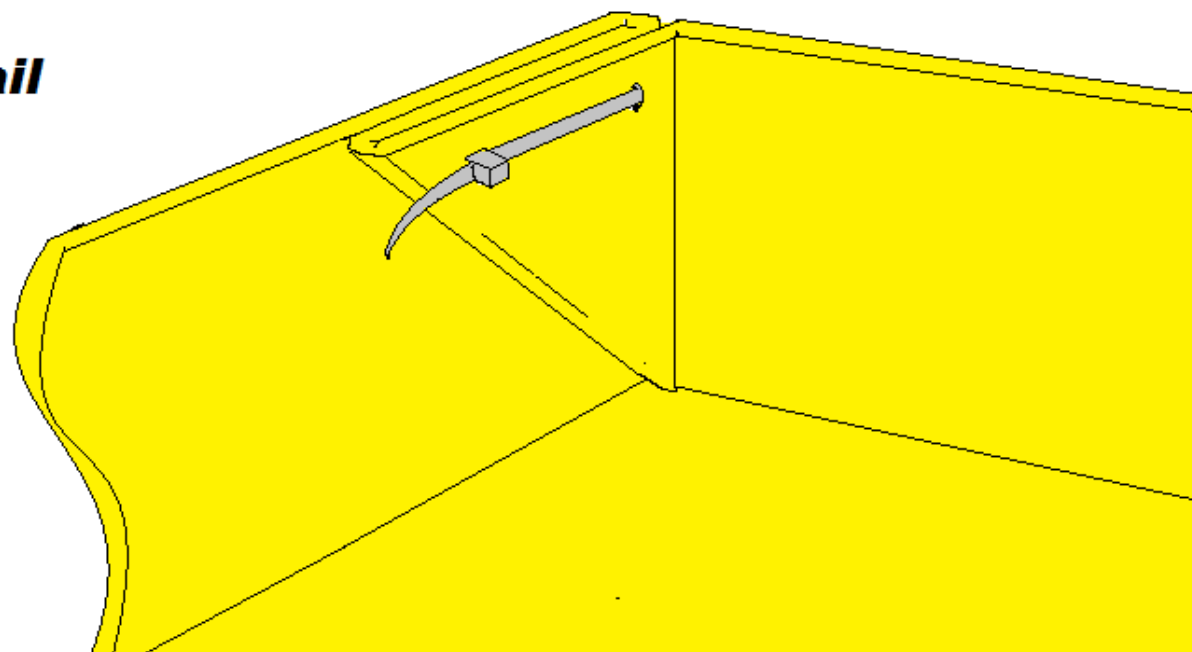


## **Floor tray corner detail**

### **option #2**

*Using a 3/16" drill bit, drill two holes near the top of the triangle flap.*

*Starting from the inside of the floor tray, thread an 8" long zip tie through the two holes. Secure the zip tie and cut off the excess tail.*





## ***Alternative Wood Walls***



***Making the front face using 1/4" paneling is an idea I played with early on, but in the end I opted for all fluted plastic for reasons of recycleability and mass production.***

***But for your purposes you might want to consider this option.***

***The plywood wall is fastened to the structure in the same manner as a fluted plastic wall.***

***You could paint or stain the wood and add a gloss sealer. You can screw on dodads to the door or front wall.***

***And besides looking better, using thicker material would make it more difficult for someone to break in.***

## ***Drawing out your sidewalls***

*This is how I drew out the sidewall profile of my original shelter. You may get a variation of the arc shape from one side to the other, but if this bothers you (I think it adds caricature) you can take one side of the arc and use it for both templates as shown on the proceeding pages.*

*And by using a strip of arched fluted plastic rather than mapping it out with straight lines and a semi circle, you get an arc that the material naturally wants to take.*

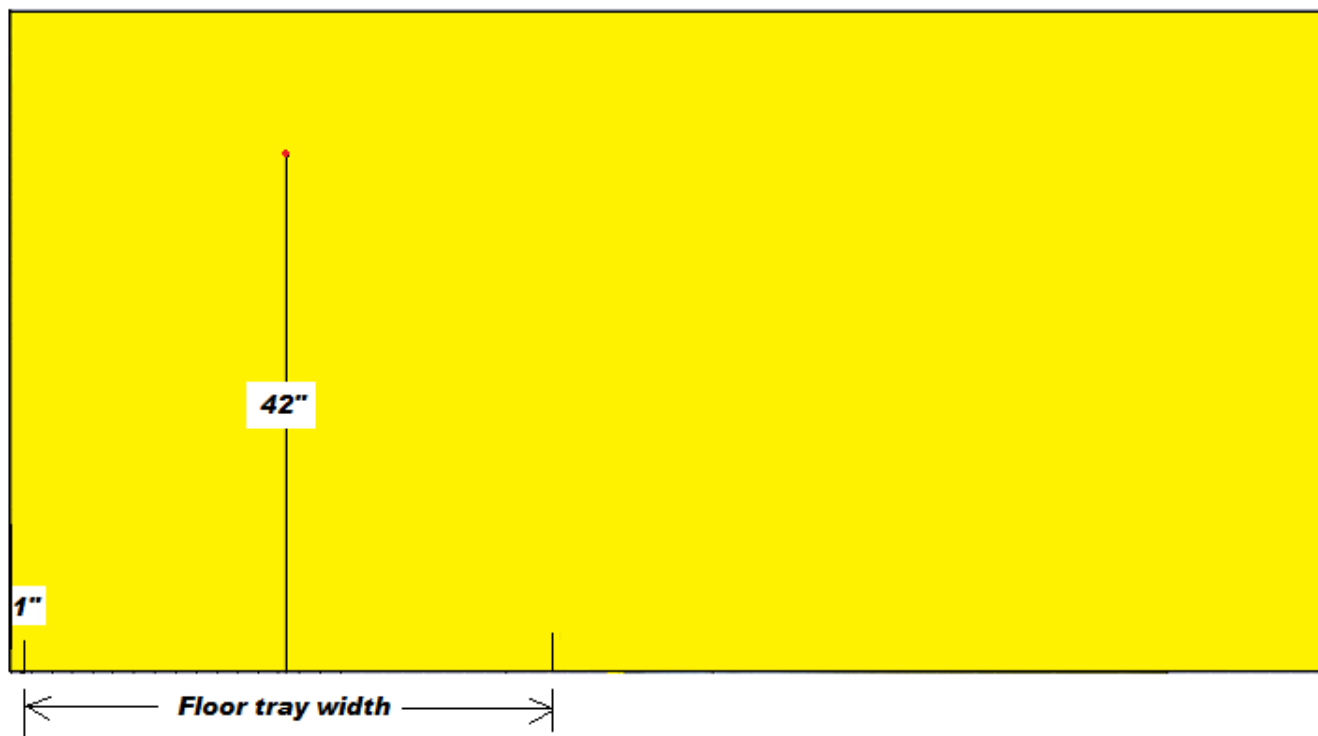


*This strip represents the actual length of the arched panels. First you want to find the mid point on the strip. Make a mark on the top edge. Tape a nail to each end as shown.*

*Take a sheet and lay it on a flat surface such as plywood or carpet floor where you can pound a nail into.*

*Measure the outside width of your floor tray.*

*Take this measurement and transfer it to the bottom corner of the panel, but inset 1" as shown. Find the half way mark between the measurement and, using a square, lightly draw a line up to about 42" long.*



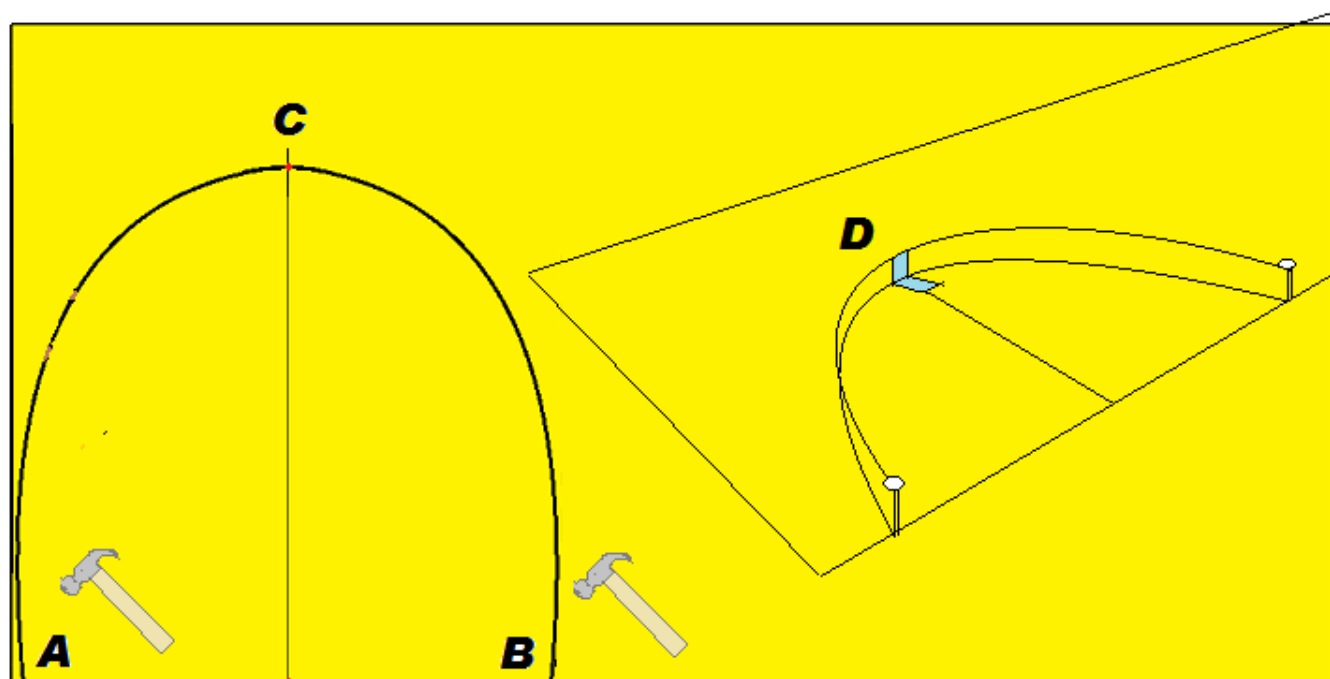
**A** At the base of the sheet, nail down one end of the strip one inch inset from the outer edge as shown.

**B** Bow the other end and nail it down to the base of the sheet.

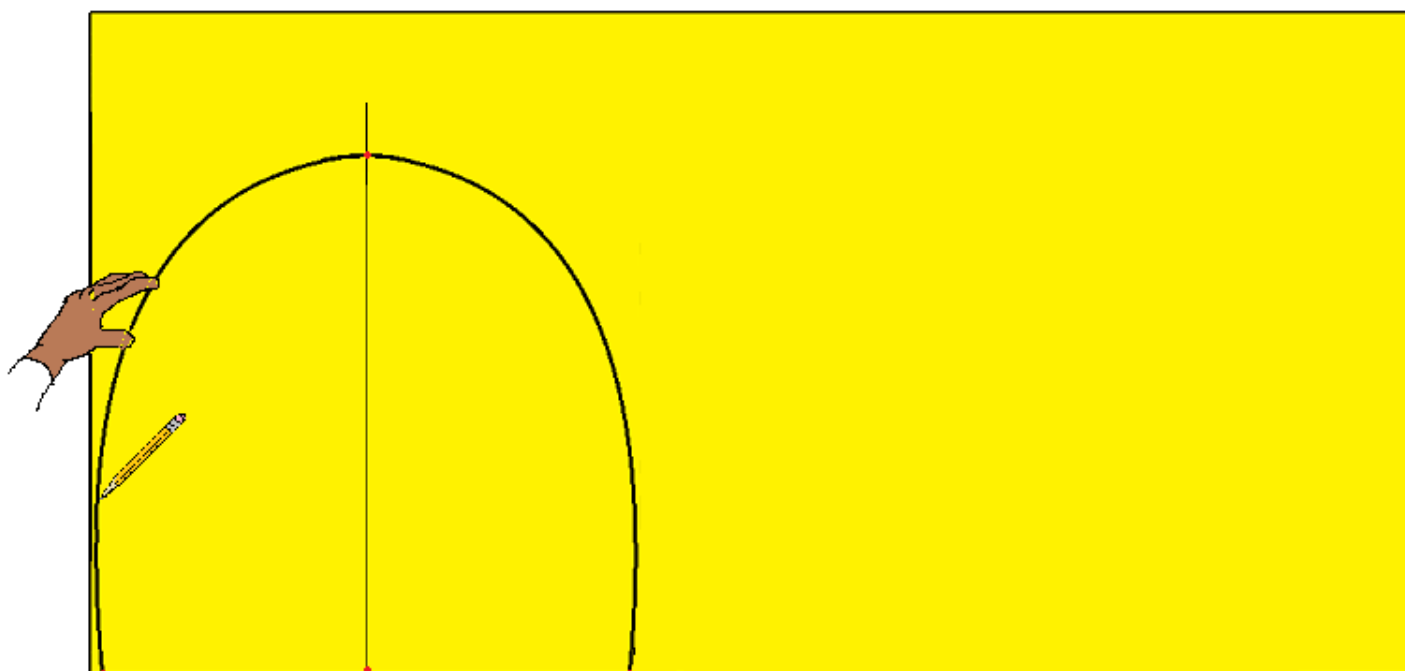
**C** Align the strip center mark to the vertical line.

If you are not happy with the arc height you can adjust it up or down an inch or two to your liking.

**D** Add tape to the plastic strip to keep it in place.



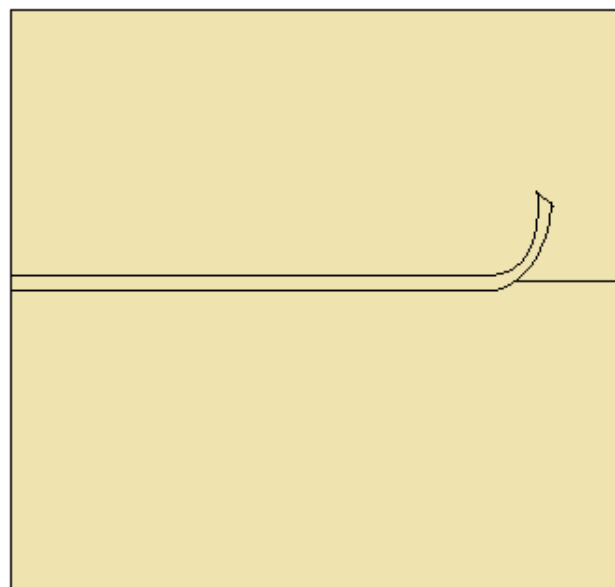
Gently hold down one side of the strip and, with a pencil or felt pen, trace along the inside of the arc. Hold the other side down and repeat.



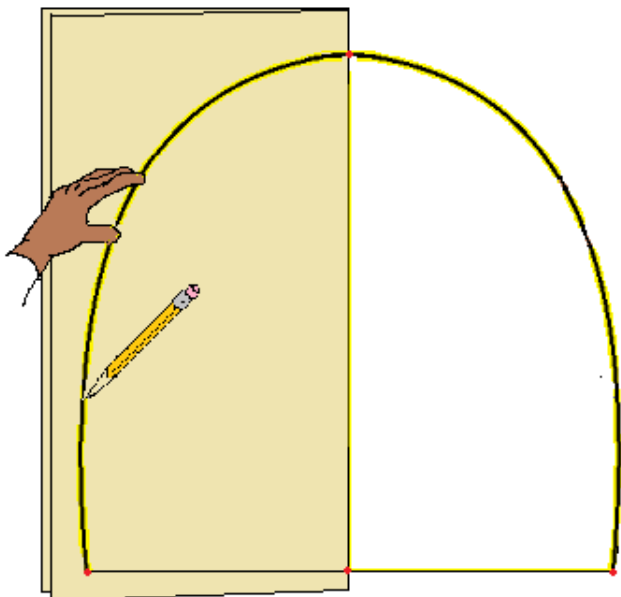
## Alternative Arc

*Here is a way to make a symmetrical arc pattern using paper sheets.*

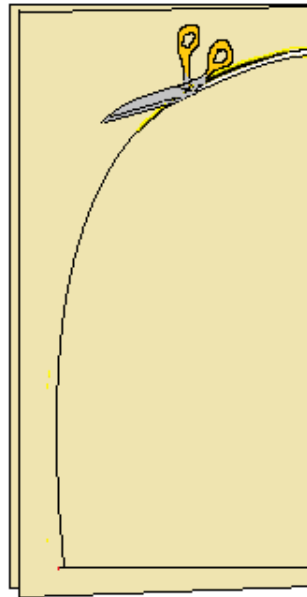
*For this technique do not add the nails to the plastic strip ends.*



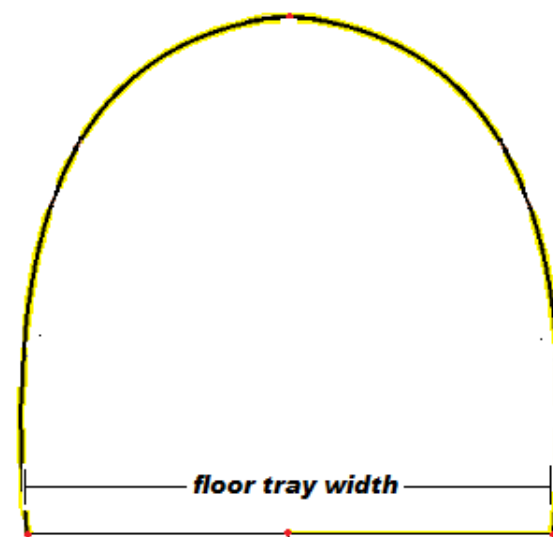
*Tape together newspaper or butcher paper to form a square no smaller than 42" square. Fold in half.*



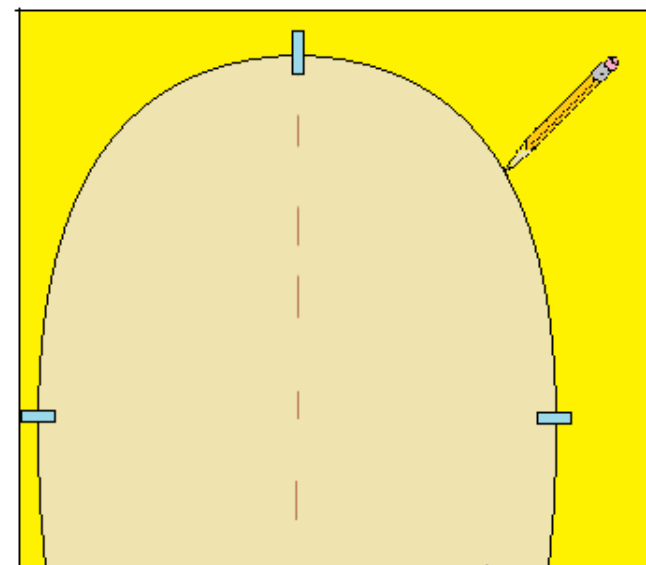
*Lay the arc center points on the paper fold. Trace the outline along the inside of the arc.*



*Cut out with scissors and unfold.*



*Bend the plastic strip. Run tape between the two ends where the tape length equals the width of the floor tray. Make a mark on the tape at the center.*



*Tape this down on the sheet, trace with a pencil or felt pen and cut out.*

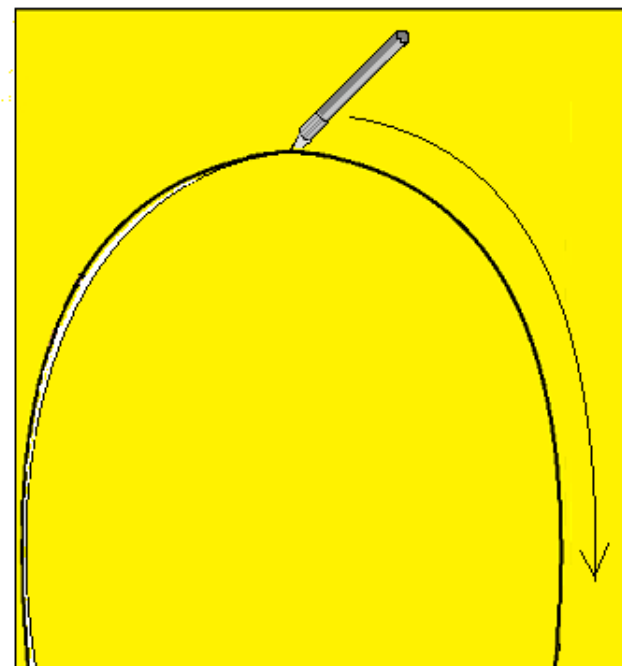
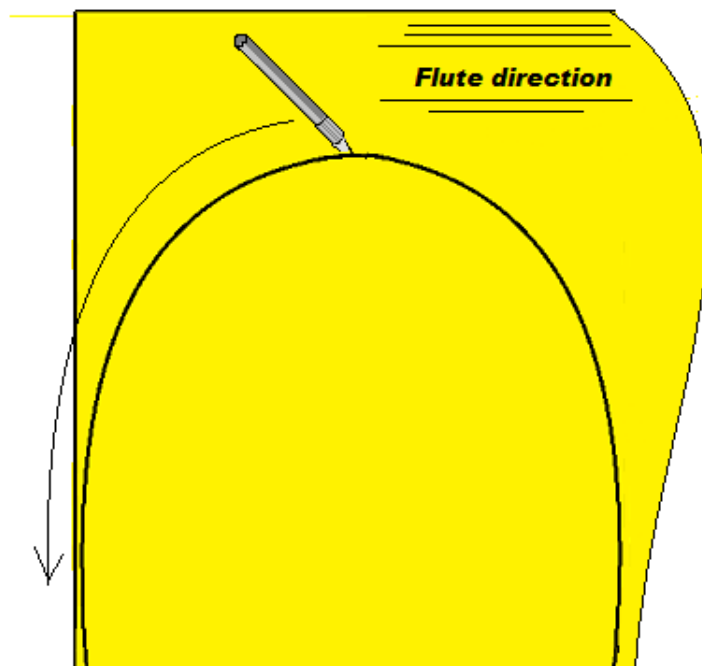
# Cutting

*Cutting fluted plastic can be tricky.*

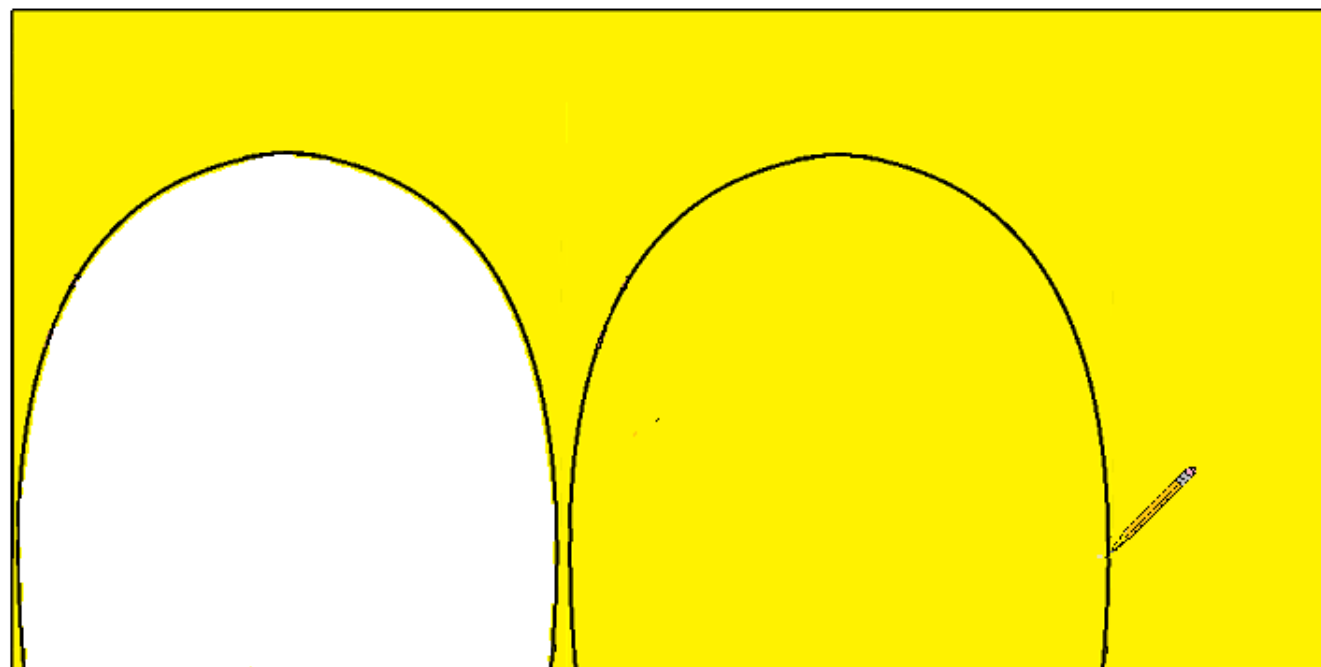
*The flutes want to steer your blade down a channel.*

*When cutting your walls out, start from the top and cut down to one side.*

*Start at the top and cut down the other side.*



*Use the cut-out as a tracing pattern for the other wall.*





## **Front Wall and Door**



**Cam lock hasp**

***The front wall and door have two layers joined together with 8" long zip ties. The door opening on the inside layer is a half inch smaller around the perimeter creating a door stop. The two layers also create a pocket for the sliding plexiglass round window. I installed an exterior lock hasp, but people have commented that a mischeivious person could lock you inside.***

***A cam lock hasp used on RV exterior hatches would eliminate this possibility. It's light duty but it will keep the honest people honest.***



***This image shows the small interior deadbolt that holds the door shut.***

***If you look closely you can see the outline of the round plexiglass window through the bottom of the door.***

***I later cut out this larger window to get a better view of the outdoors. A simple pivot point using a small bolt allows the window to be opened and closed for ventilation.***

***This image shows the window all the way open.***



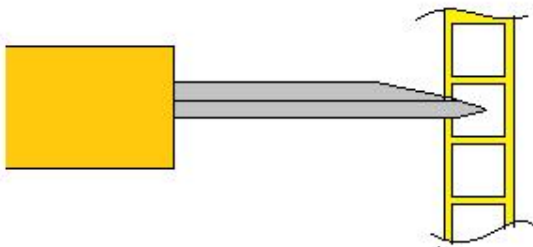


## Outer wall layer

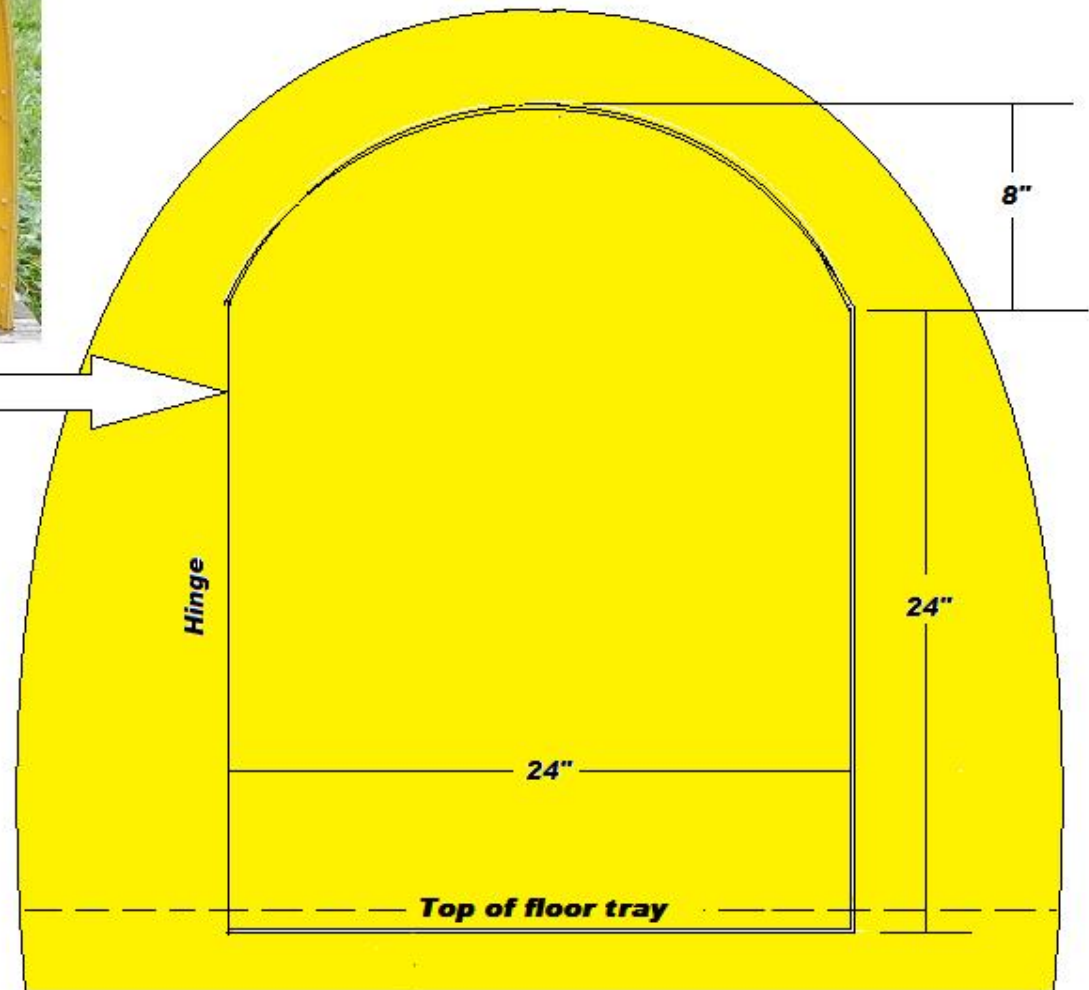
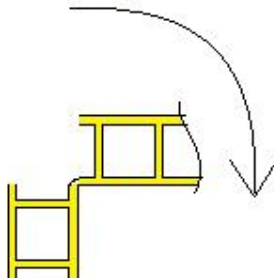
*The door wall is made in two layers. Take one of your walls, measure and trace out your door. Cut out around the door but only cut the inside skin on the left leg as shown on the illustration in the lower left.*

*The bottom of the door should be a 1/2" lower than the height of the floor tray lip.*

**By cutting only the inside skin on the left leg**



**you create a hinge for the door.**

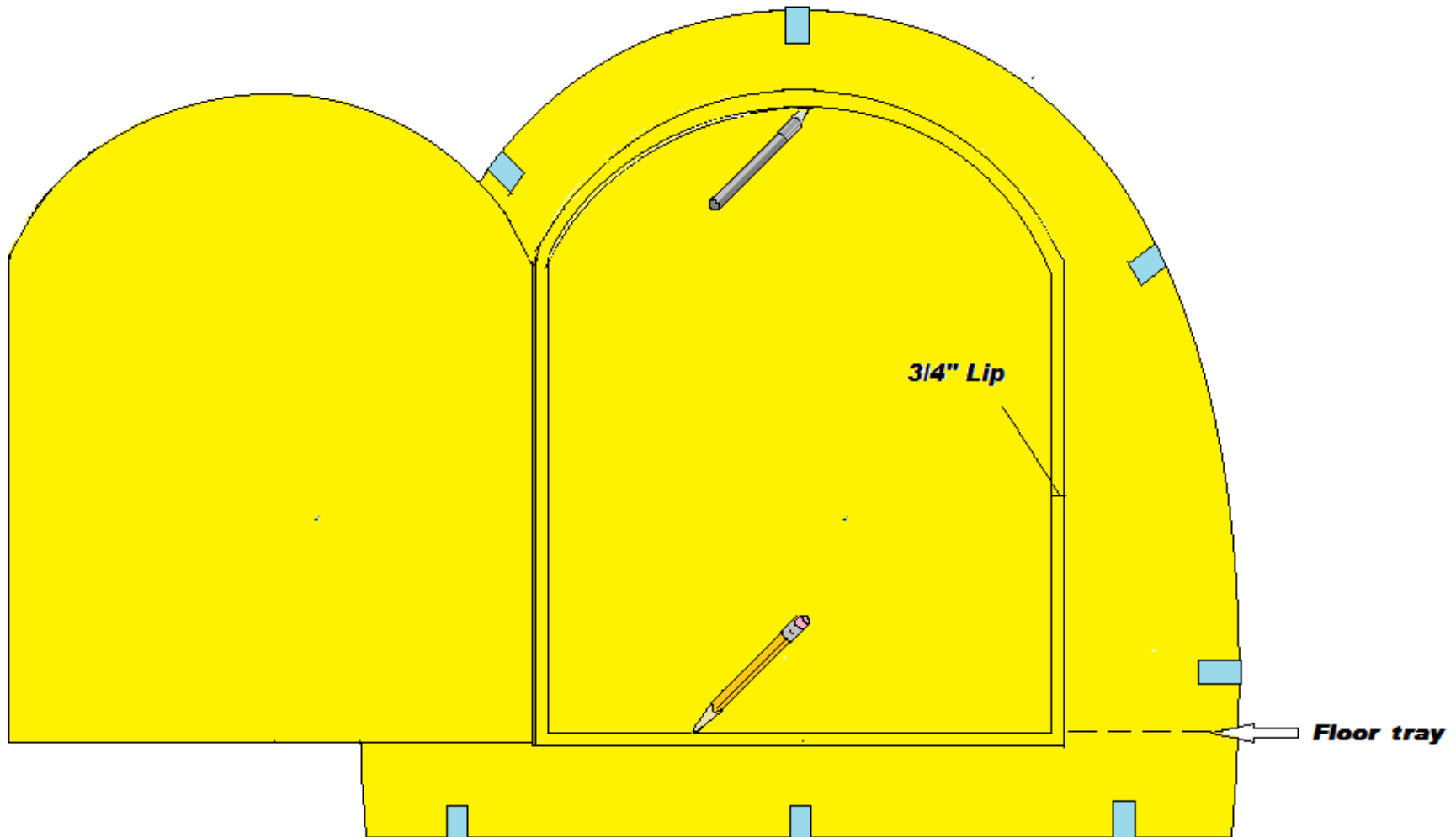


***Tape the inside wall layer to the outside door layer.  
The two wall flutes should be running perpendicular to  
each other making for a stronger door.***

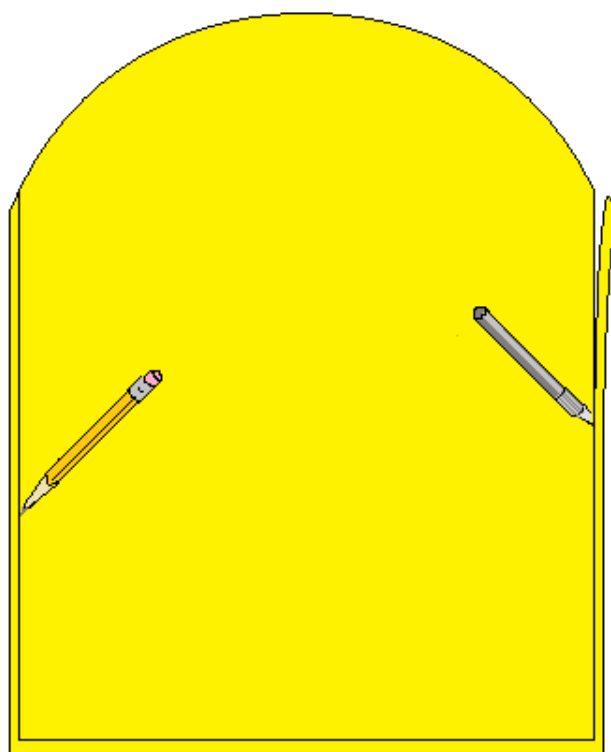
## ***Adding second layer***

***Open the door and trace around the opening leaving a  
3/4 inch inset. This lip will serve as the door stop. Make  
the bottom the same height as the floor tray.***

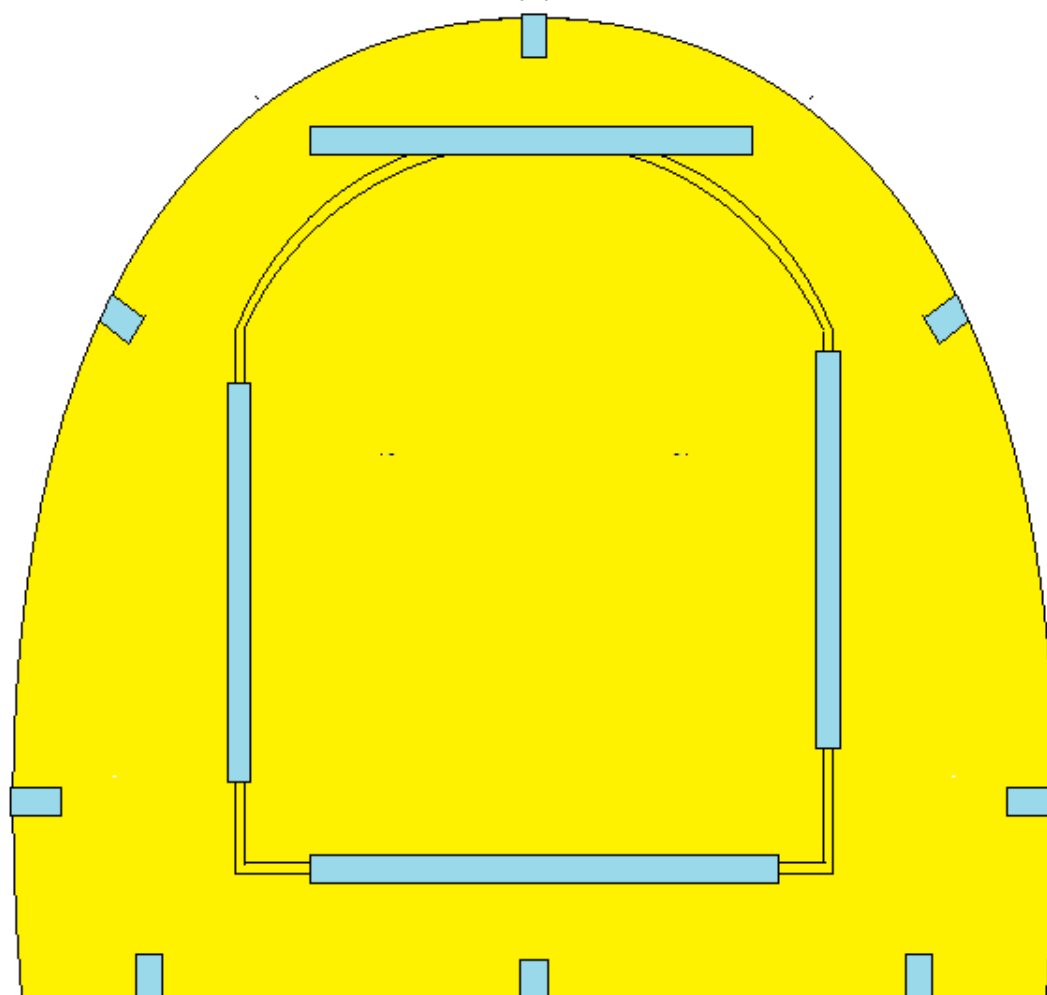
***Save the door cut out. It will be used for the second  
layer on the door.***



## ***Double wall door***

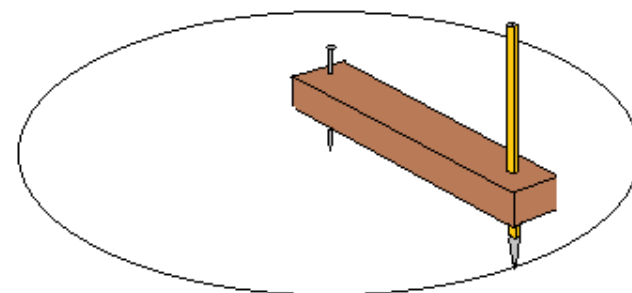
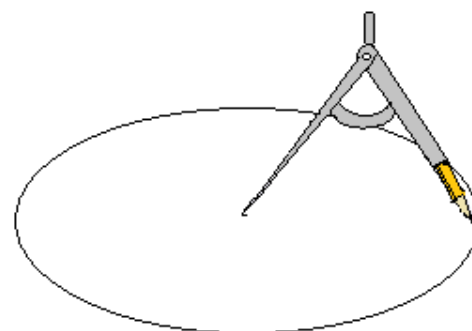
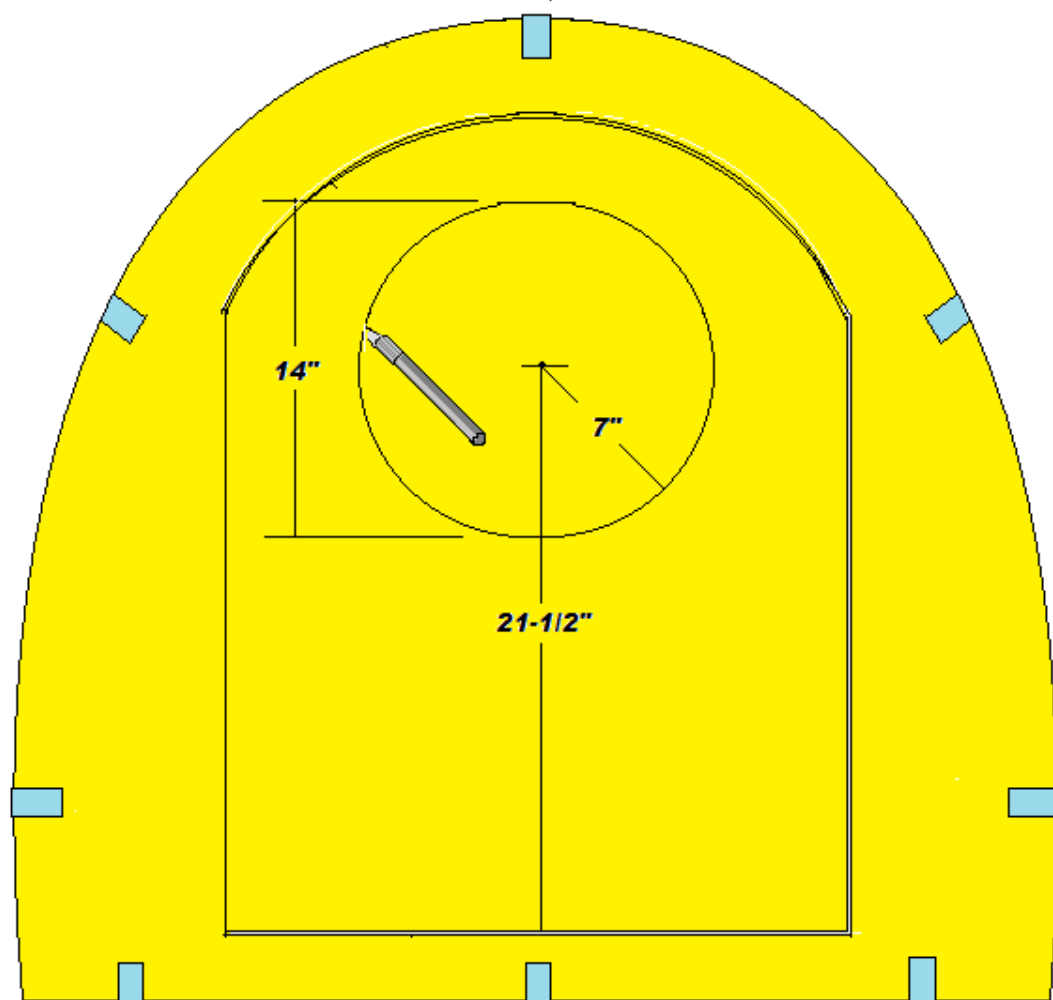


***Take the cut-out and trim off 1/4" from both sides and a 1/2" from the bottom.***



***Close the door and flip the wall upside down, where the inside wall layer is facing up.  
Position the cut-out on the outside layer door with equal spacing on all sides.  
Tape the cut-out to the interior wall layer.***

## ***Locating door window***



***Flip the wall over so the outside layer is facing you.***

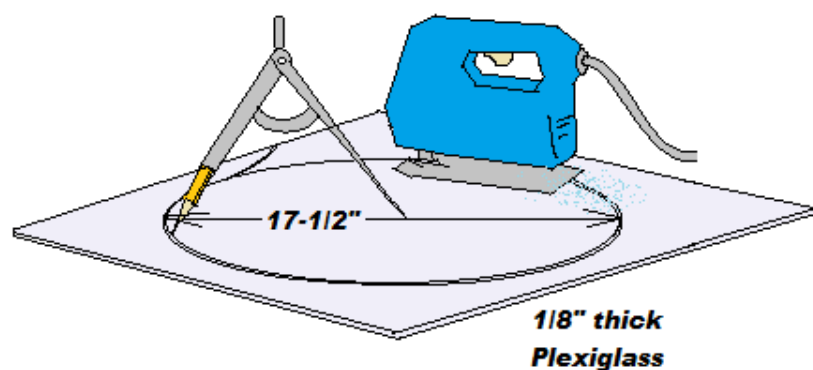
***Measure and draw out the window opening using a compass or the board, pencil and nail technique as illustrated.***

***With your razor knife, carefully cut out the hole going through both layers.***

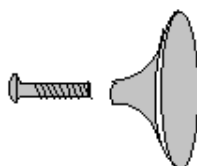
# Making and Installing the door window

The door window is made of 1/8" plexiglass.  
You will need a piece no smaller than 18" square.  
With a compass, draw out a 17-1/2" diameter circle.

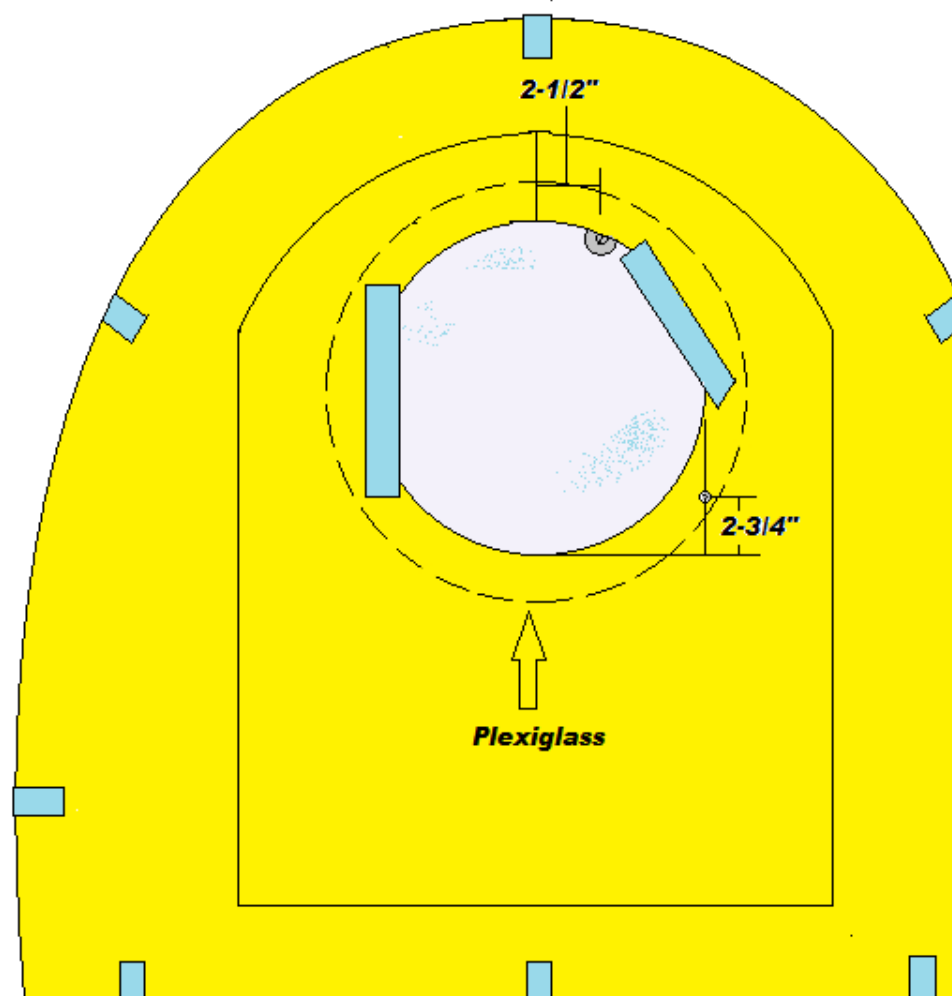
To cut the circle use a band saw, jig-saw or a hand coping saw.



The handle is a drawer knob with a machine screw.

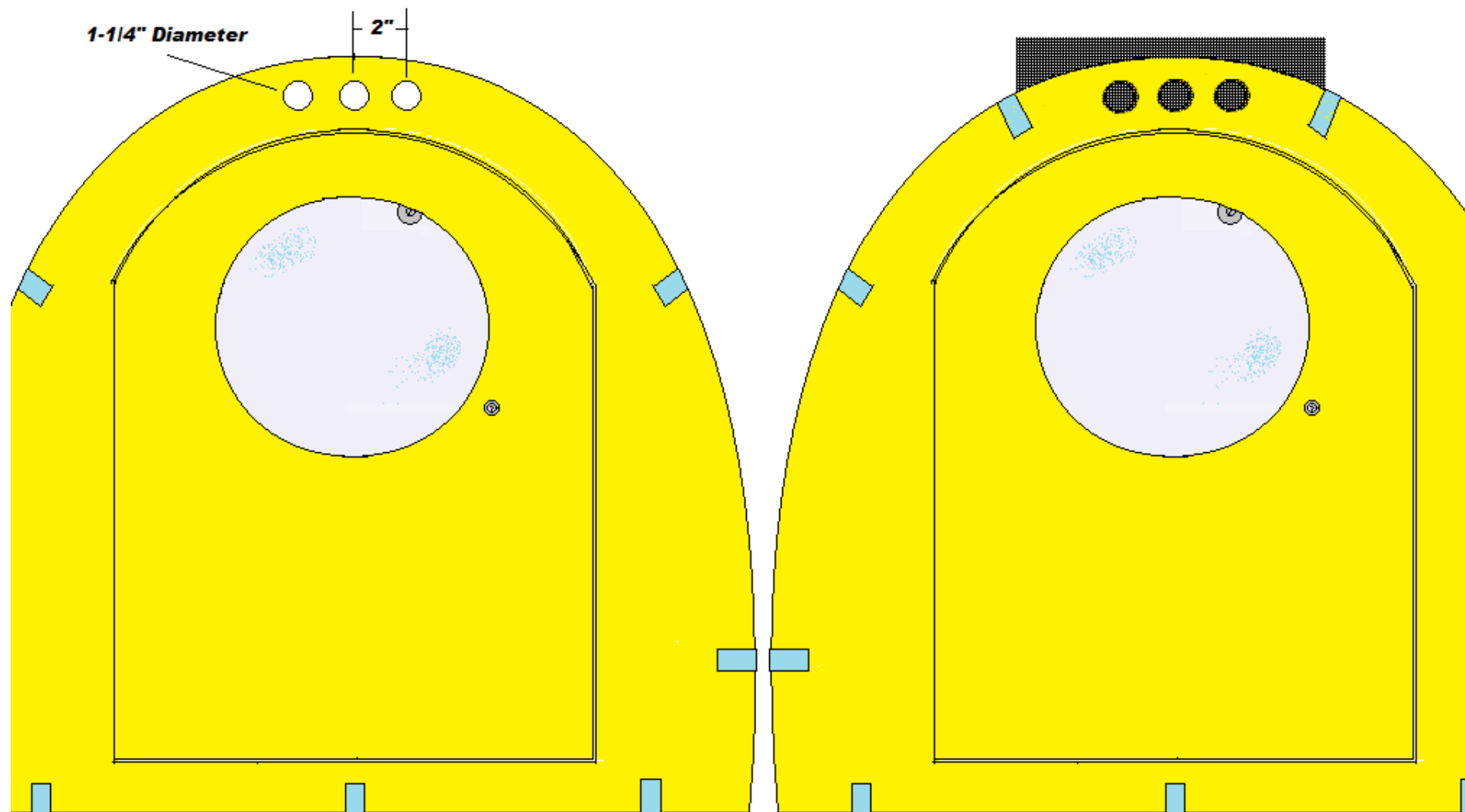


The pan head pivot bolt is 1/4" x 1" long.  
To secure it use two washers and a lock nut.



Once you've cut out your plexiglass, slip it between the two layers and center it.  
Tape the plexiglass to the panel. Locate and drill the handle and pivot bolt hole.  
Install the handle (facing in) and pivot bolt.

## ***Front wall vent holes***



***Draw out the location for the vent holes.  
You may add several more holes if you live in a humid climate.  
Cut the holes out with a hole saw or carefully cut out by hand.***

***Add a piece of bug screen between the two layers and  
tape in place.***



## Assembling the door

**Lay the wall on a flat surface with the outside facing up.**

**Drill or punch holes in the pattern as shown spacing the zip tie holes 1-1/2" apart.**

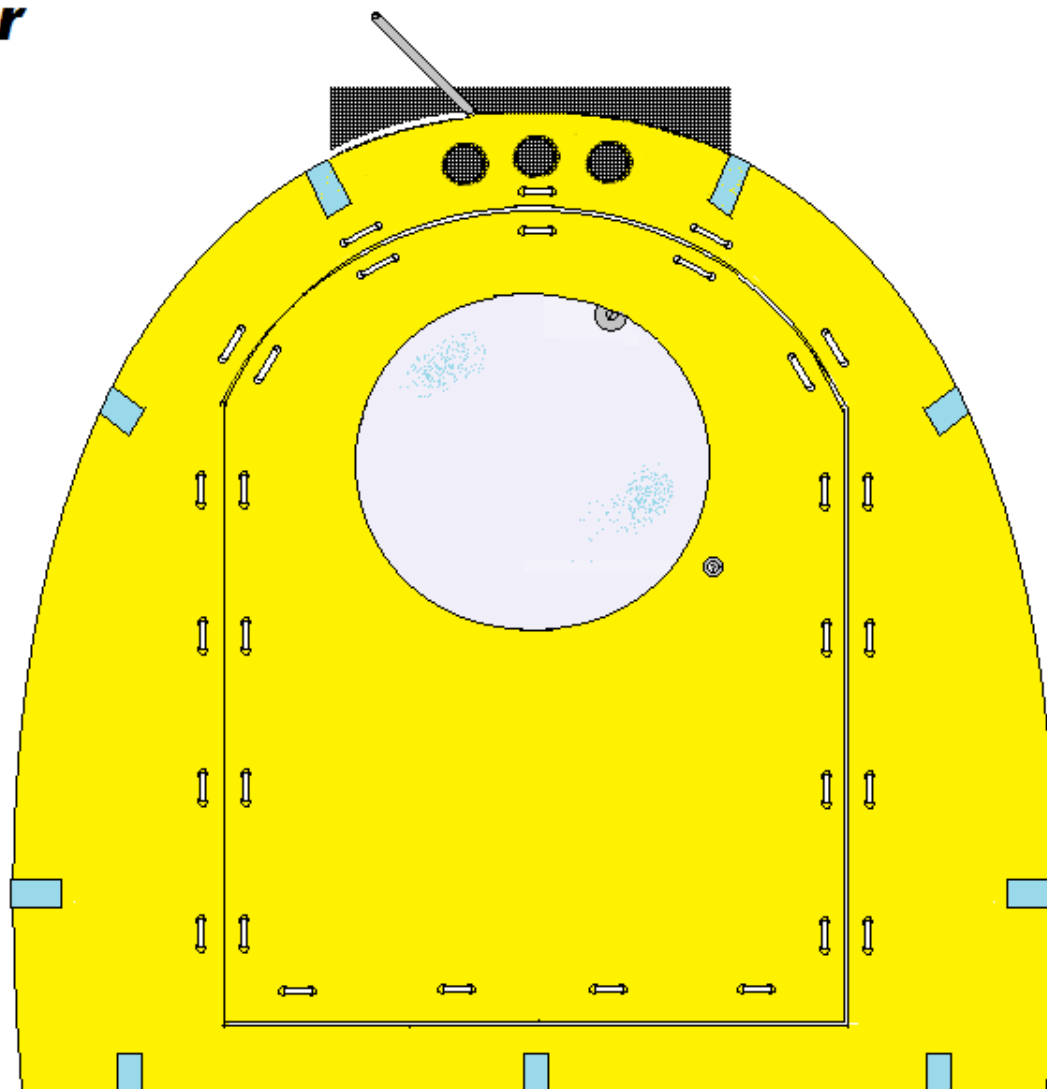
**Note:**

**If you drill holes, make sure you don't go through wood. The particles will get lodged into the flutes when extracting the drill bit.**

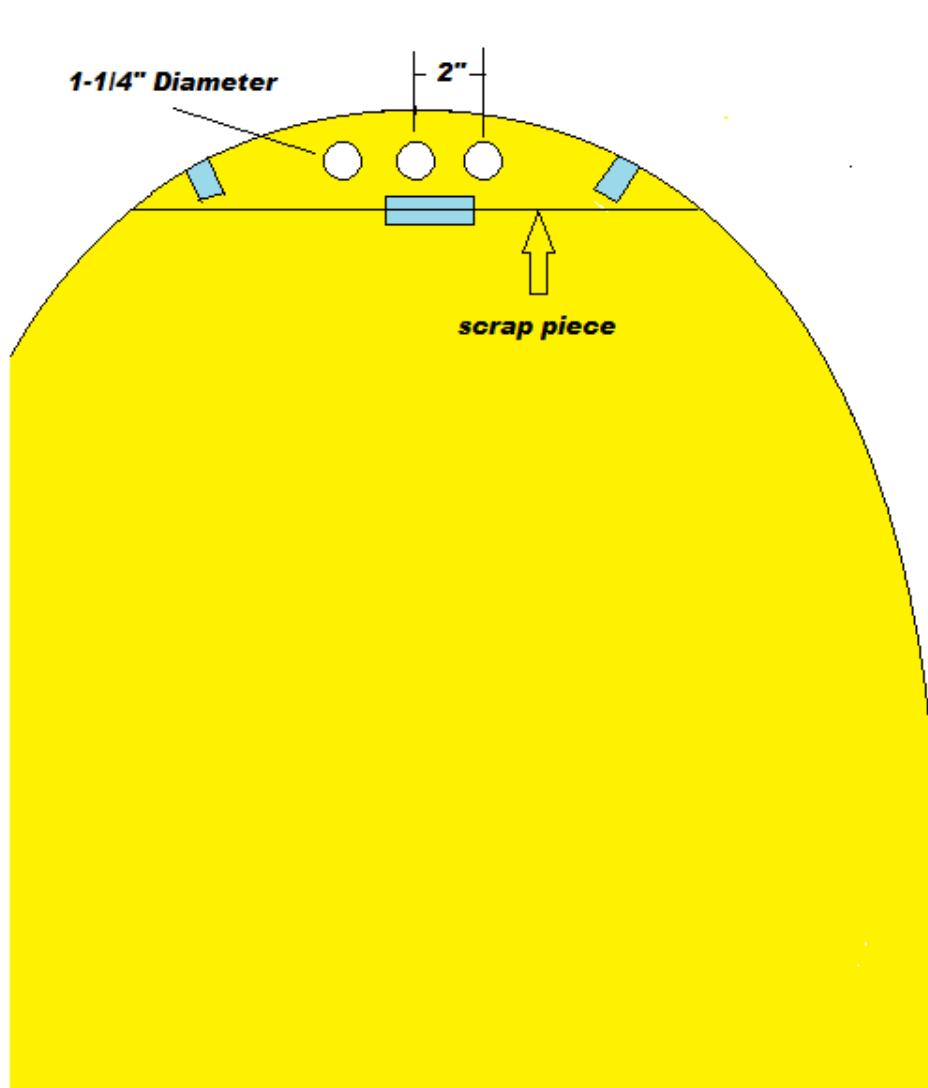
**Stand the wall on end and, starting from the inside, thread your 8" long zip ties through the holes and tie them off. Clip the ends.**

**When complete, remove the tape around the door and wall.**

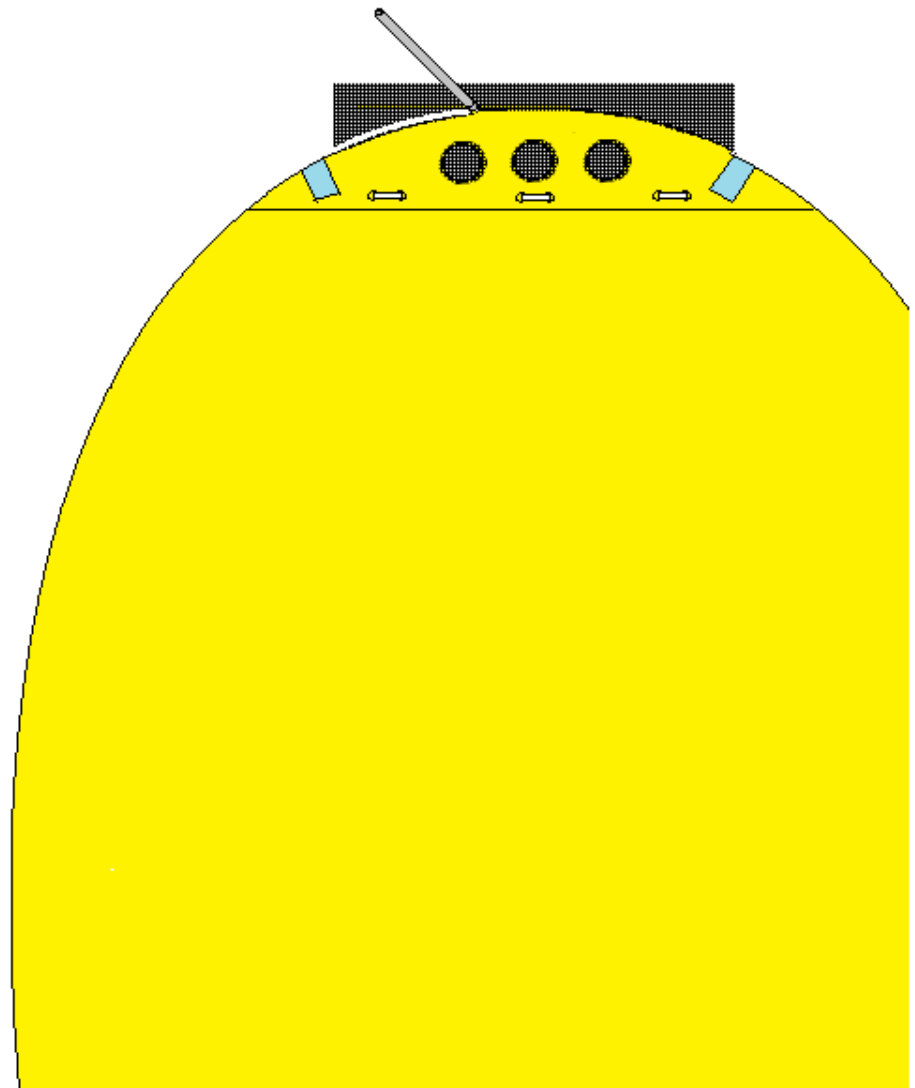
**Cut off the excess bug screen with a razor knife.**



## ***Back wall vent holes***



***For the back wall vent holes you will add a piece of scrap to the top and tape it in place before drilling out the vent holes.***



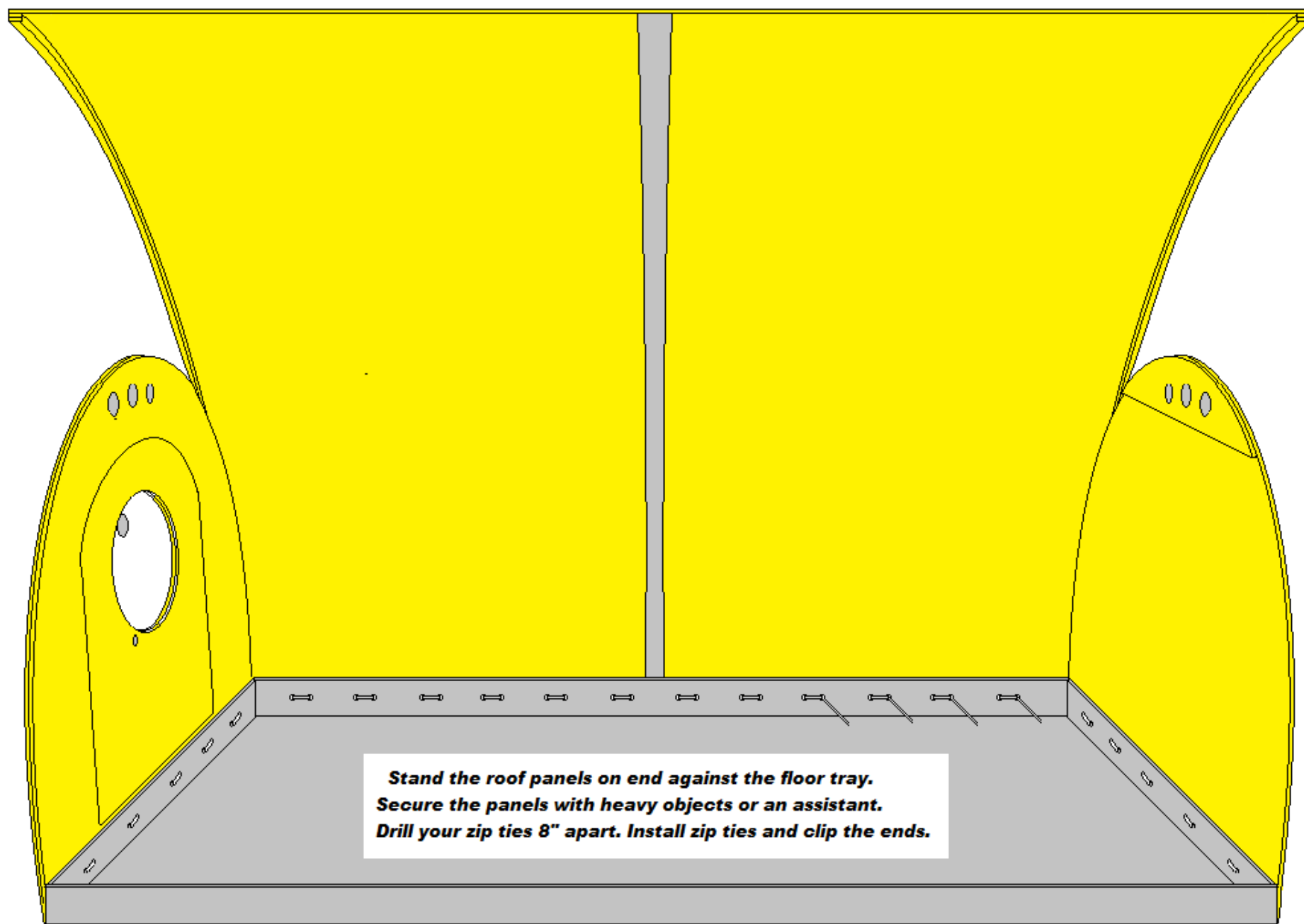
***Sandwich bug screen between the two pieces and add three zip ties along the bottom to secure the pieces. Cut off the excess screen with a razor knife and remove the tape.***

## ***Attaching walls to floor tray***

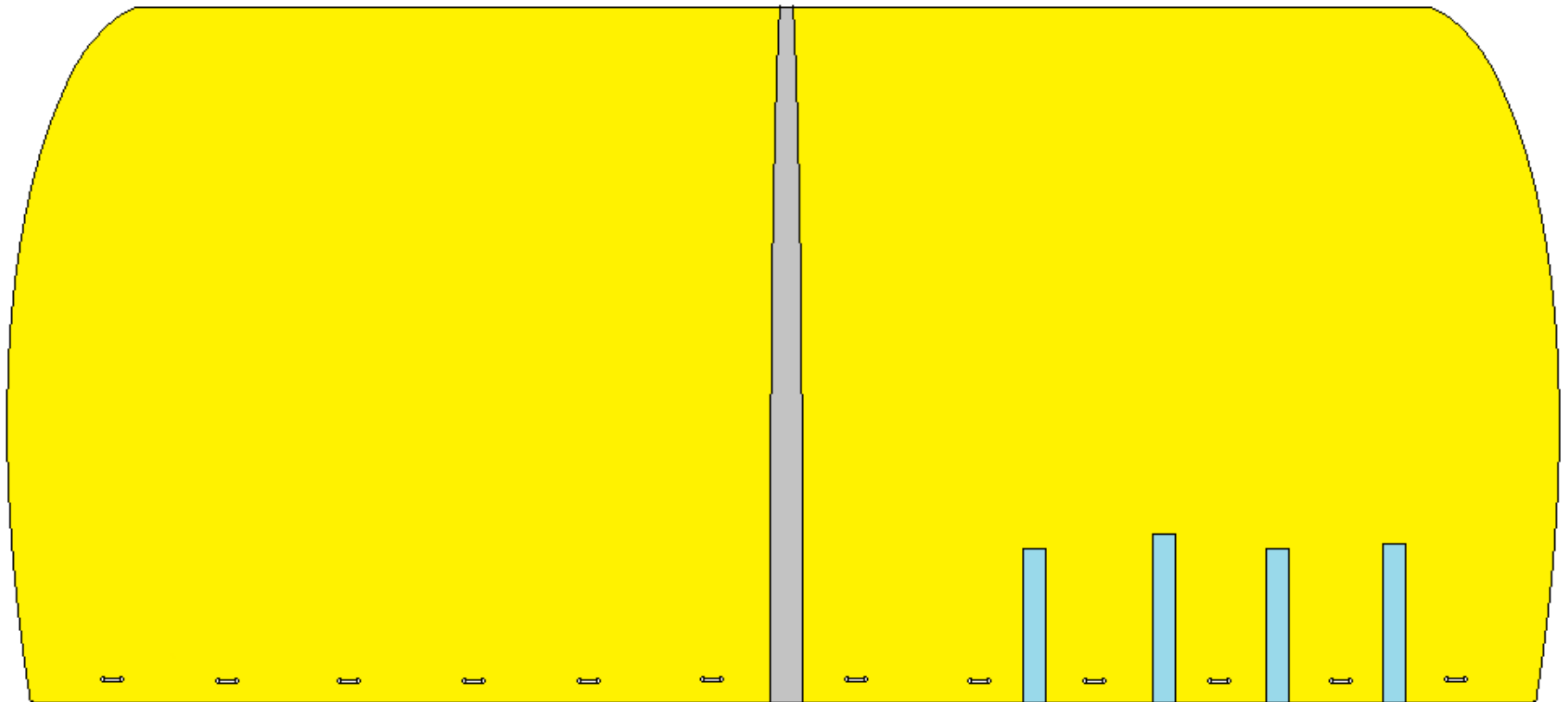


***To attach the walls to the floor tray, drill and install zip ties placed half way up the tray lip and spaced 8 inches apart.  
When done, clip off the ends.***

## ***Attaching roof to floor tray***



## ***Attaching roof to floor tray***



***If you don't have an assistant to help you hold the roof down, place the shelter against a wall and add books or a heavy object to hold down the roof while you drill holes and secure the roof to the tray. You can also add tape to the outside connecting the roof to the floor tray as shown on the right side.***

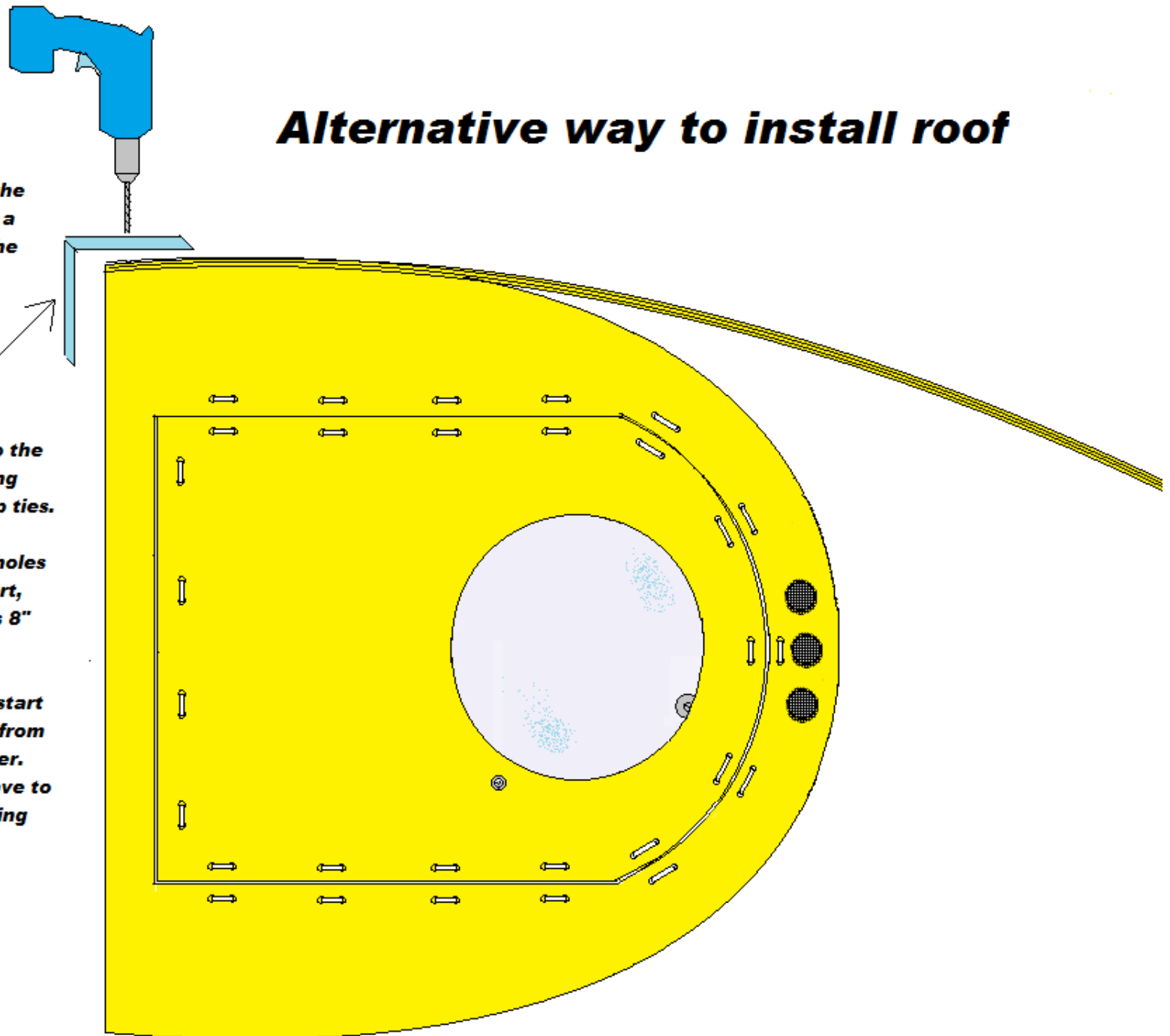
## ***Alternative way to install roof***

***Laying the shelter on the side might prove to be a little easier to install the roof panels.***

***Tape the roof panel to the floor tray before drilling holes and installing zip ties.***

***Again, make the two holes for a zip tie 1-1/2" apart, and locate the zip ties 8" apart.***

***Remember to always start threading the zip ties from the inside of the shelter. This way you won't have to tape over the protruding locking nub.***

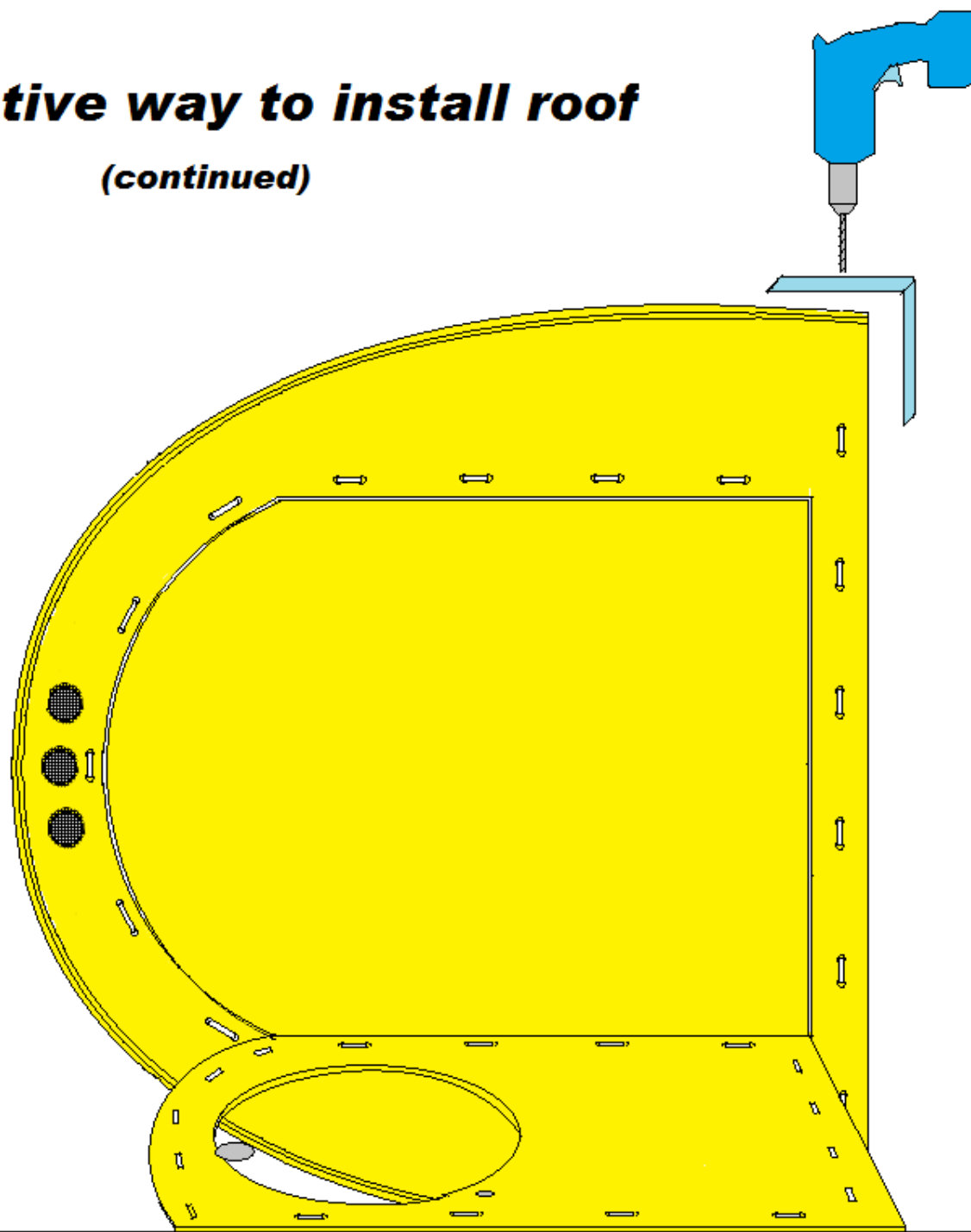




## ***Alternative way to install roof***

***(continued)***

***Once you've secured the first end of the roof, roll the shelter over and, pulling the roof tight to the side walls, secure the other end of the roof to the floor tray with more tape. Drill and zip tie.***



## Attaching roof and visor to front end wall

- Cut out the visor and clamp it to the underside roof lip.

*Make sure it's centered and tight against the roof lip before clamping and drilling.*

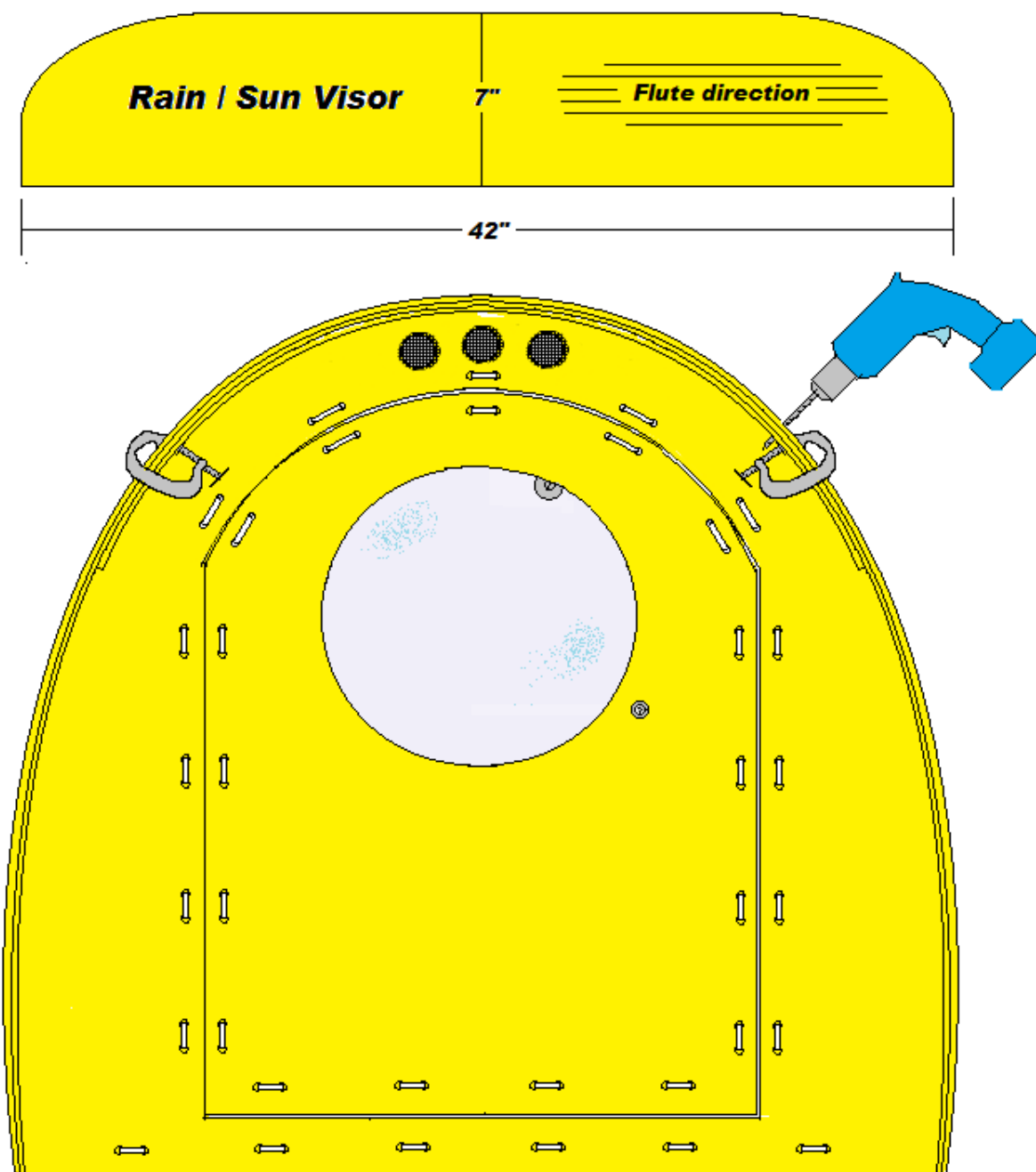
*Drill holes through the roof (and visor) about half an inch from the roof edge.*

*Add zip tie locations near the ends of the visor.*

*Try to make the zip ties about 8" apart.*

*At the ends of the arc place the lowest hole one inch from the ground. This way the zip tie will pass through the floor tray lip.*

*Drill your zip tie holes all the way around the arc.*



## ***Attaching roof and visor to front end wall (continued)***

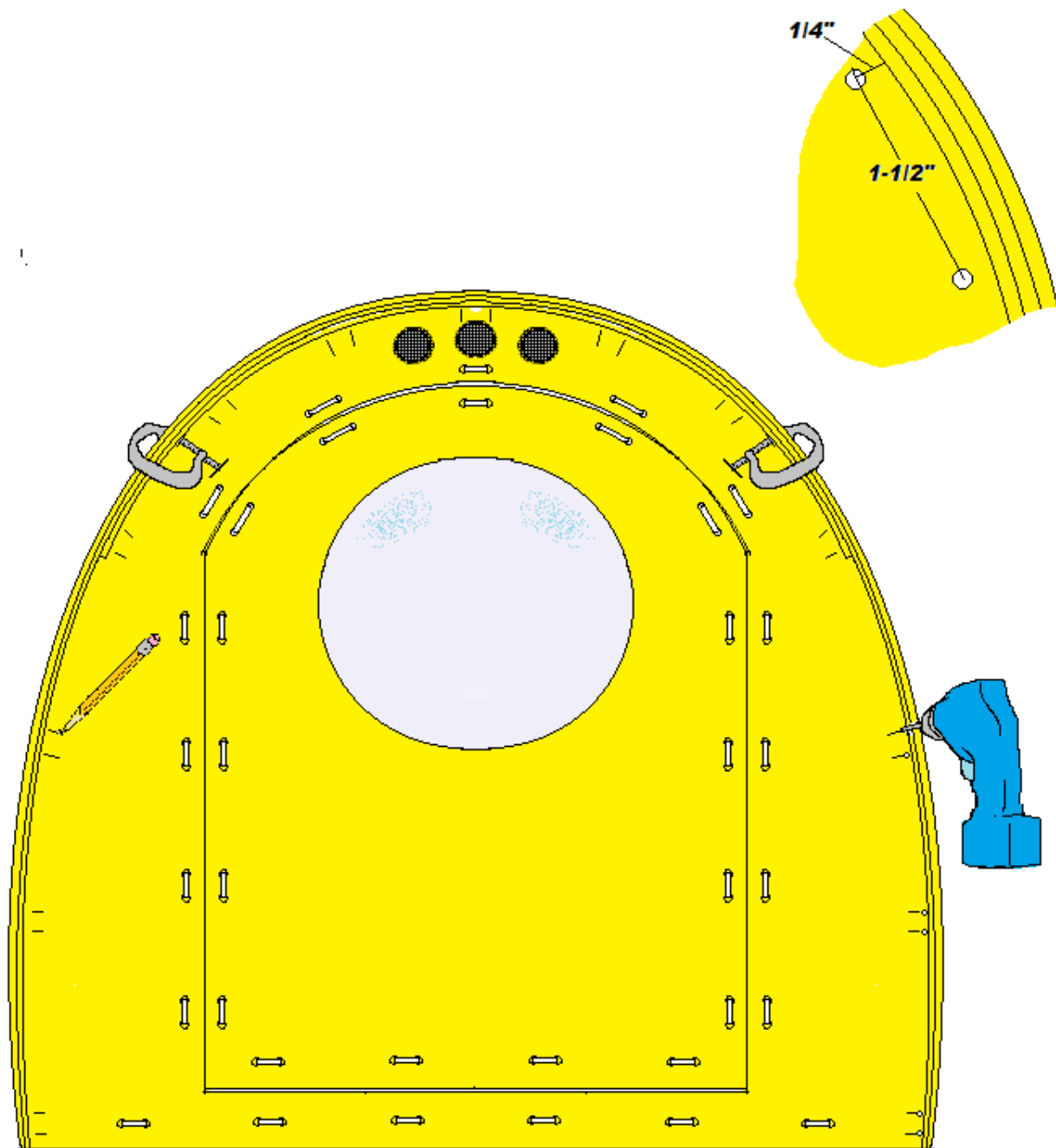
***Pull the side wall against the roof lip.***

***With a pencil, make zip tie location marks on the wall.***

***The marks will be directly opposite of the roof holes.***

***Start your hole in the wall a 1/4" from the roof lip as shown in the illustration above.***

***Repeat process for the back wall.***



1

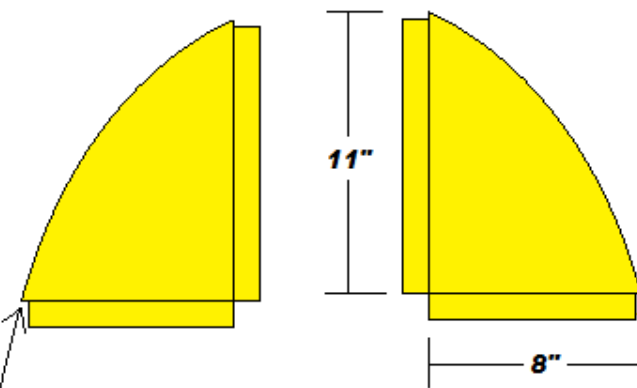
2

***Joining the walls to the roof***

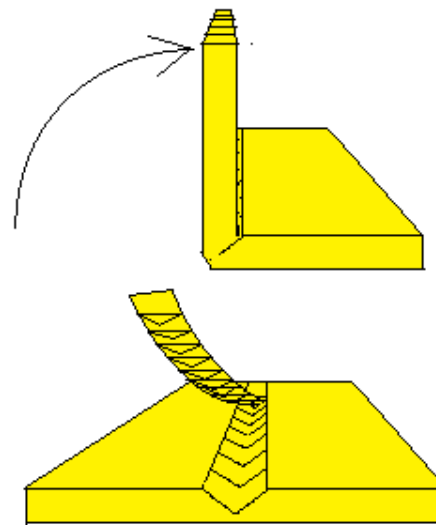
3

4

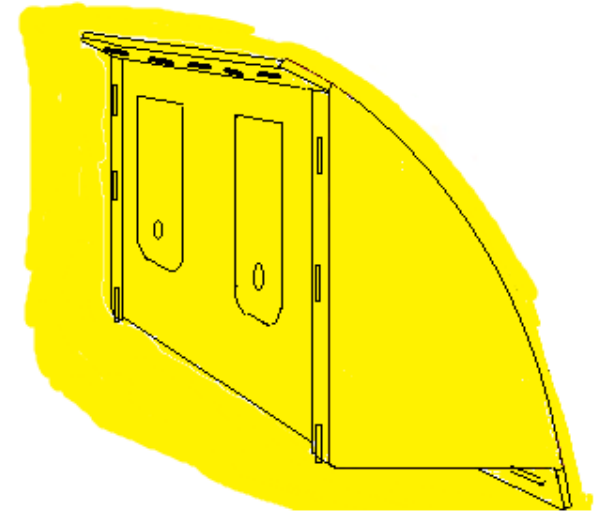
## Interior storage shelf



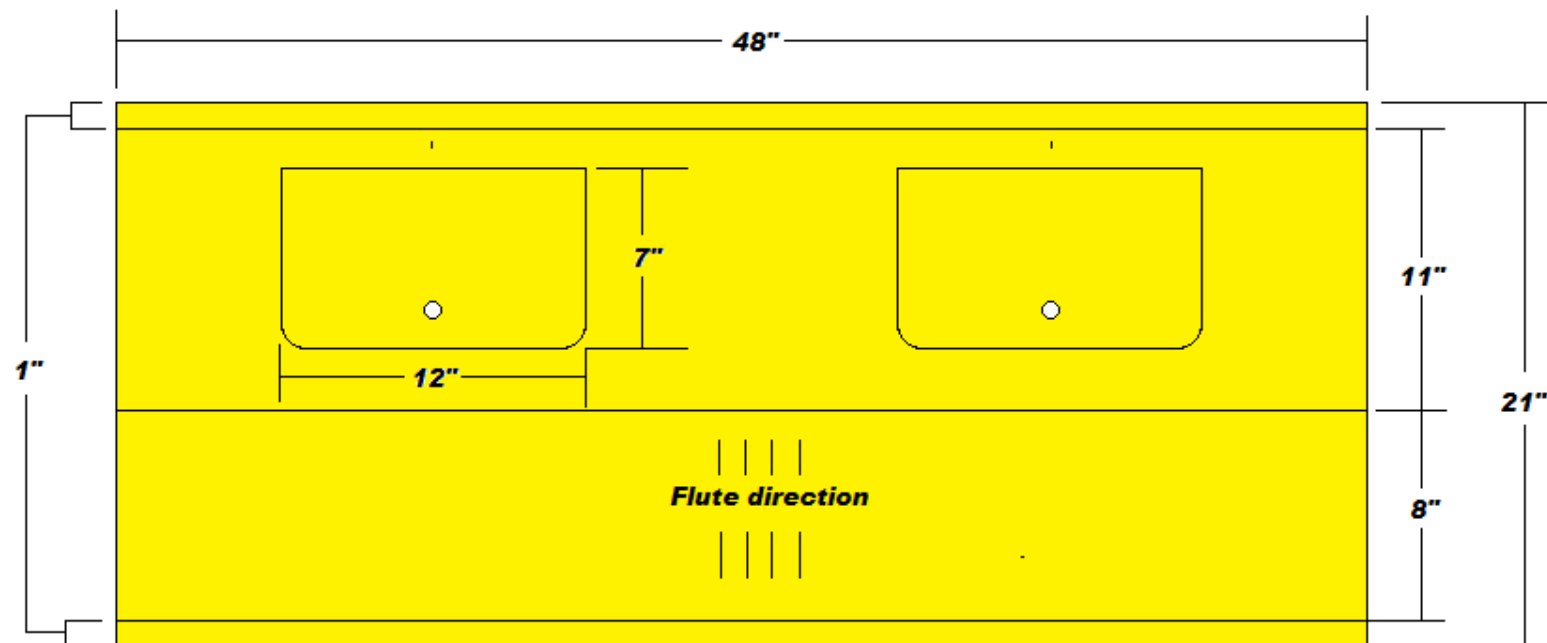
*Make two mirror image shelf end caps.  
For smooth edges make 'V' groove cuts on the back side of both flaps, then fold in 90 degrees.  
Inset the flaps 1/4" where they meet the ceiling.*



*To create a smooth outer edge  
cut a 3/8" wide 'V' groove (shown above)  
on the back side, then fold 90 degrees.*



*Attach the end caps to the shelf.  
Tape the self down to the roof  
and drill your location holes.  
Add zip ties starting on the inside.*





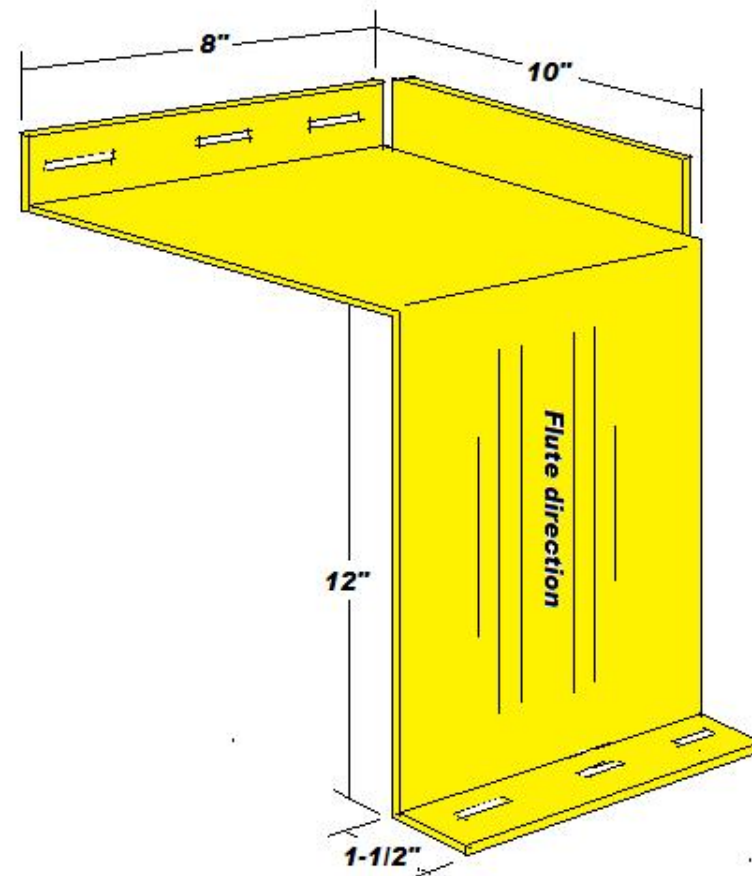
## ***Shelf Detail***

***Here is a closer look at the shelf.***

***Here I folded the upper mounting flap inside, but either way will work.***



## ***Trash can drinking water holder***



***I added this shelf for the drinking water jug.  
I should have made it double walled seeing a full  
2.5 gallon water jug weighs about 17 pounds.***

***I cut down a small waist basket to fit underneath.***

## ***Vent flap detail***





***To seal the zip tie holes  
I layed strips of colored  
Duct tape over the ties.***

***This lasted for several  
years before the tape  
became brittle from sun  
exposure.***



## ***After four years of weather exposure***



***This picture shows how non UV protected Duct tape will deteriorate after several years of sun exposure. silicone calk might be the better option.***



## ***Optional door configuration***



***The Homeless Emergency Shelter was my first Quonset hut style structure. On this I chose to have the door swing to the side. A notch on the visor helps keep the door open.***



***On a later shelter I call the Nomad bicycle camper, I chose to have the door swing up to act as a sun shade and to keep the rain off me when sitting under the door.***



## ***Bubble wrap foil insulation***



***In my Nomad bicycle camper I applied bubble wrap foil reflective insulation on the ceiling and floor.***

***I used chrome duct tape to cover the seams.***

***This helped retain body heat when staying in the shelter.***

***I had nominal success with the Elmers spray-on glue used to attach the insulation sheets to the coroplast, but the temperature was less than the recommended minimum as per the instructions.***

***An alternative is to apply eight foot long 2" wide arced fluted plastic strips inside spaced every foot or so to help support the material.***





## ***Painting your shelter***

***You may wish to paint your shelter.  
I used Krylon Fusion paint for the Homeless Emergency Shelter and recently on the Nomad bicycle camper.  
You can find it at most Big box home improvement stores.***

***It adheres fairly well to the coroplast, but I've noticed on the nomad camper that it didn't adhere to well to the Duct tape. Again, I painted the bike camper during the winter, so temperature conditions were not what you'd call ideal.***

***Still, as you can see from the photo the Emergency homeless shelter the paint job has held up quite well, considering it was applied almost four years ago.***

