

Phil's Narrow Gauge

Assembly Instructions Part 1
7/8ths Scale Caboose 556
Sandy River & Rangeley Lakes

Part # PNG-784



Tools Needed:

Sandpaper
Wood Glue
ACC Glue
#’s 66, 60, 56, 54, 53, 52, 51, 50 and 47 drill bits
Drill press and handheld “Dremel” type drill
Xacto knife
Needle nose pliers
Diagonal (wire cutting) pliers
Various plastic and metal small clamps
24”, 12” and 6” Ruler
Needle Files

556 Parts List

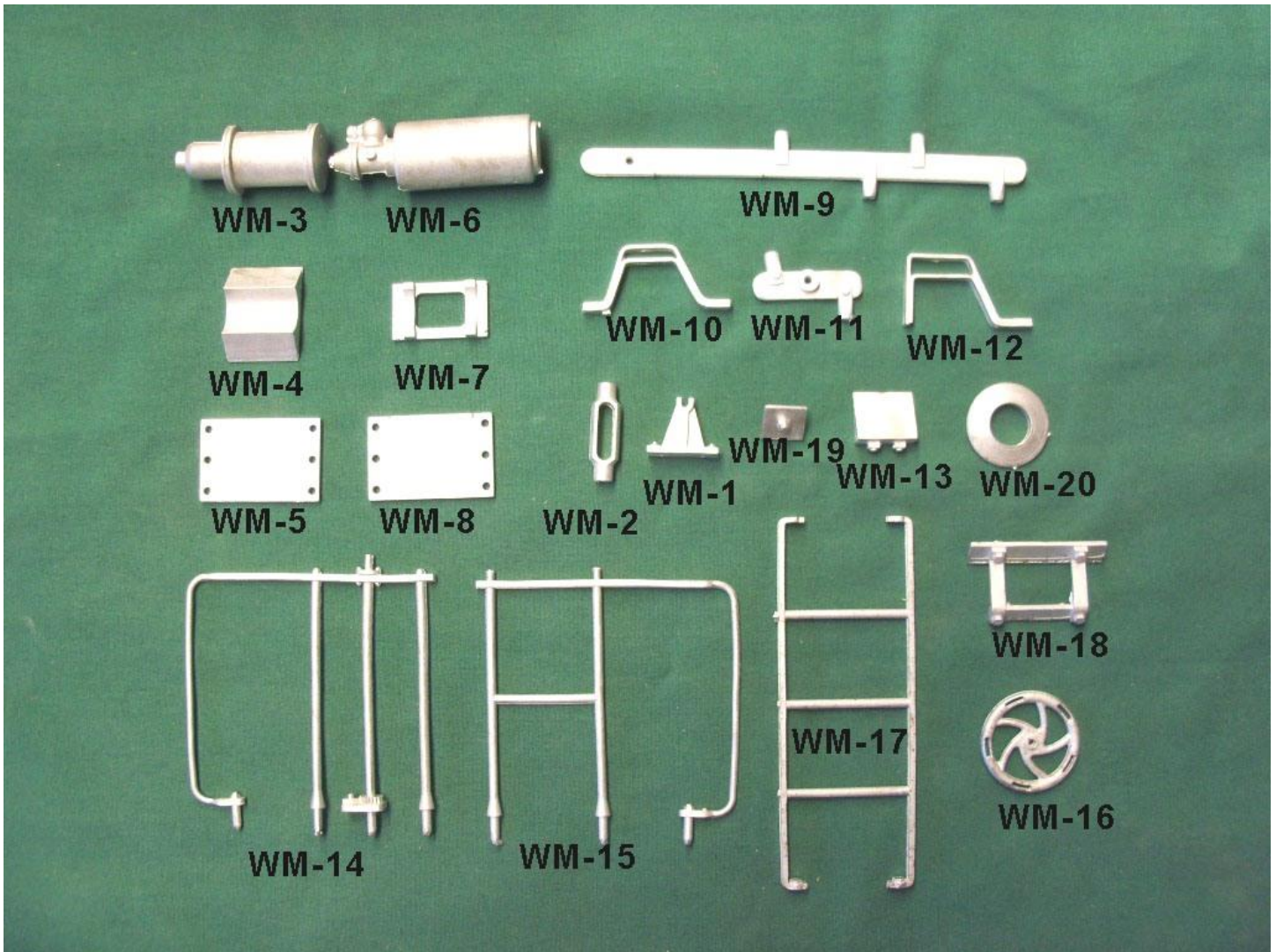
Wood & Plastic

| | | |
|------|--------|---|
| W-1 | 1 ea. | Frame, Fully Assembled |
| W-2 | 1 ea. | Outer A Side, 4 Window Lasered Poplar Plywood |
| W-3 | 1 ea. | Outer B Side, 5 Window Lasered Poplar Plywood |
| W-4 | 1 ea. | Outer Long End, Door Centered Lasered Poplar Plywood |
| W-5 | 1 ea. | Outer Short End, Door Offset Lasered Poplar Plywood |
| W-6 | 4 ea. | Outer Cupola Sides/Ends, Lasered Poplar Plywood |
| W-7 | 3 ea. | Inner A Side, Short End, Long End, Center, Lasered Poplar Plywood |
| W-8 | 3 ea. | Inner B Side, Short End, Long End, Center, Lasered Poplar Plywood |
| W-9 | 1 ea. | Inner Short End, Lasered Poplar Plywood |
| W-9 | 1 ea. | Inner Long End, Lasered Poplar Plywood |
| W-10 | 3 ea. | Inner Cupola Sides/End |
| W-11 | 1 ea. | Cupola Seat & Cabinet Bag. 16 Pieces |
| W-12 | 1 ea. | Chair Bag. 6 Pieces |
| W-13 | 1 ea. | Long Bench (Chair Side) Bag. 11 Pieces |
| W-14 | 1 ea. | Short Bench (Stove Side) Bag. 11 Pieces |
| W-15 | 1 ea. | Stove Bag. 1 Stove. 3/8" Brass Tube 1-1/2". 3/8" Brass Tube 2-1/4". 3 Pieces Lasered Poplar Base 12 Bricks. 1 Stove Pipe Cap. 1 Stove Pipe Roof Base (White Metal) |
| W-16 | 1 ea. | Bag of 4 Platform Steps |
| W-17 | 7 ea. | Cupola Roof, 4 Braces, 2 Fillers (between cupola & car sides) |
| W-18 | 3 ea. | Short End Car Roof & 2 Braces |
| W-19 | 7 ea. | Long End Car Roof, 6 Braces, 2 Rafters |
| W-20 | 5 ea. | Center Car Roof, 4 Braces, 6 Rafters |
| W-21 | 4 ea. | 1/4 Rounds (side door trim), 4.7" Long |
| W-22 | 12 ea. | Side Door Bag. 2 Outer, 2 Center, 2 Inner, 2 Glass, 4 Long & 4 Short Hangers |
| W-23 | 5 ea. | Long End Door Bag. 1 Door & Glass, 1 brass Hinge Rod, 1 Spring, 1 Custom Rafter, 1 Doorknob |
| W-24 | 5 ea. | Short End Door Bag. 1 Door & Glass, 1 Brass Hinge Rob, 1 Spring, 1 Wood Upper Hinge Capture, 1 Doorknob |
| W-25 | 12 ea. | Catwalk Supports |
| W-26 | 4 ea. | Catwalk Boards. 3/32 x 3/8 x 18" |
| W-27 | 9 ea. | Side Windows & Glass |
| W-28 | 2 ea. | Cupola Side Windows & Glass |
| W-29 | 2 ea. | Cupola End Windows & Glass |
| W-30 | 2 ea. | Letter Boards |

White Metal

| | | |
|-------|-------|-------------------------------|
| WM-1 | 2 ea. | Turnbuckles |
| WM-2 | 4 ea. | Queen Post |
| WM-3 | 1 ea. | Brake Cylinder |
| WM-4 | 1 ea. | Brake Cylinder Saddle |
| WM-5 | 1 ea. | Brake Cylinder Base |
| WM-6 | 1 ea. | Air Reservoir |
| WM-7 | 1 ea. | Air Reservoir Saddle |
| WM-8 | 1 ea. | Air Reservoir Base |
| WM-9 | 1 ea. | Main Brake Lever |
| WM-10 | 1 ea. | Main Brake Lever Support |
| WM-11 | 1 ea. | Secondary Brake Lever |
| WM-12 | 1 ea. | Secondary Brake Lever Support |
| WM-13 | 4 ea. | Bolster Terminating Plate |
| WM-14 | 2 ea. | Brake Wheel End Rails |
| WM-15 | 2 ea. | Ladder End Rails |
| WM-16 | 2 ea. | Brake Wheels |
| WM-17 | 2 ea. | Ladders |
| WM-18 | 2 ea. | Catwalk End Supports |
| WM-19 | 4 ea. | Truss Rod Square Nut Bolt |
| WM-20 | 1 ea. | Stove Pipe Roof Base |

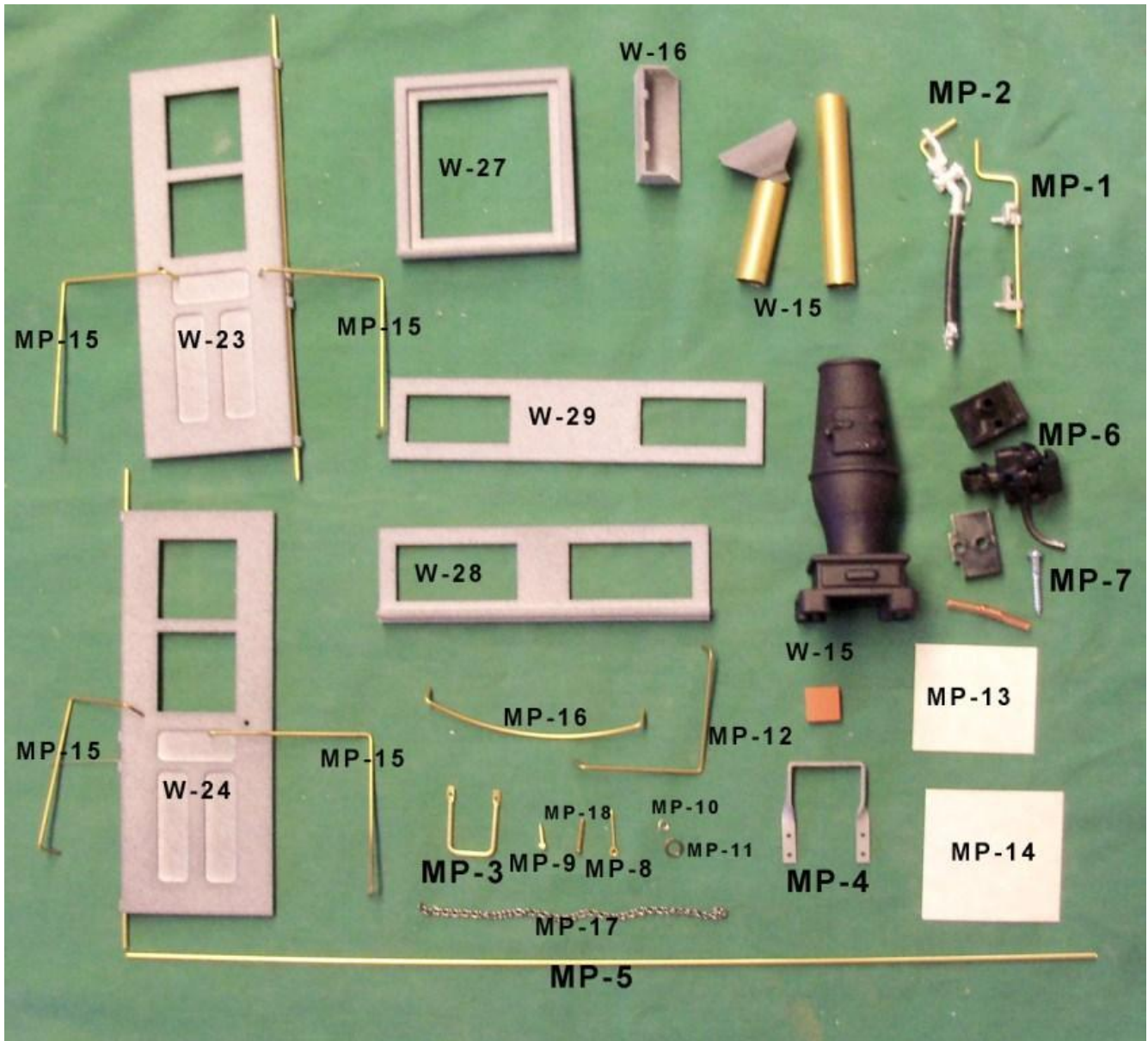
White Metal Parts



Misc. Parts

| | | |
|-------|--------|--|
| MP-1 | 2 ea. | Coupler Lift Bars |
| MP-2 | 2 ea. | Brake Hose Assemblies |
| MP-3 | 1 ea. | Brass Wire Main Brake Lever Limiter |
| MP-4 | 2 ea. | Stainless Steel Strap Steps |
| MP-5 | 4 ea. | Brass Rod, 1 foot long, 1/16" Diameter |
| MP-6 | 2 ea. | Kadee Couplers |
| MP-7 | 2 ea. | #4 Wood Screws for Kadee Couplers |
| MP-8 | 12 ea. | Eye Pins |
| MP-9 | 50 ea. | Brass Nut Bolts |
| MP-10 | 6 ea. | 3mm Jump Rings |
| MP-11 | 2 ea. | 5mm Jump Rings |
| MP-12 | 4 ea. | Cupola Grabs |
| MP-13 | 80 ea. | Roof Tiles, 1.3" X 1.5" |
| MP-14 | 20 ea. | Roof Tiles, 1.6" X 1.7" |
| MP-15 | 4 ea. | Platform Grabs |
| MP-16 | 4 ea. | Car Ends Curved Grabs |
| MP-17 | 1 ea. | 5" Chain |
| MP-18 | 2 ea. | 3/64 Rivet (roof hold down) |
| MP-19 | 4 ea. | Side Door Grab Irons |

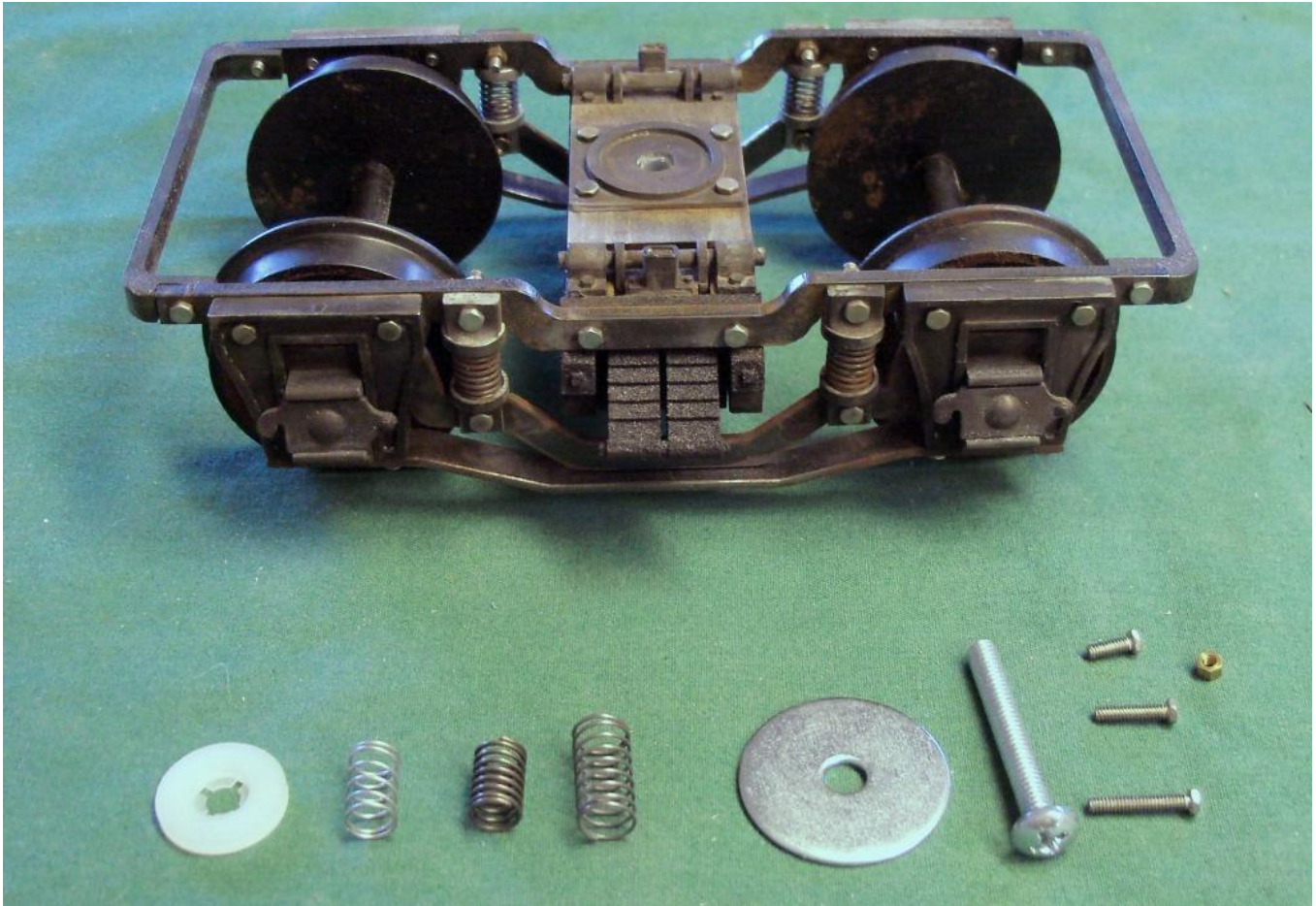
Misc. Parts



7/8ths Passenger Trucks

| | | |
|------|--------|---|
| TR-1 | 2 ea. | Trucks, Assembled |
| TR-2 | 2 ea. | 5/8 White Nylon Washers |
| TR-3 | 2 ea. | 1-1/4" 8/32 Machine Screws |
| TR-4 | 12 ea. | Springs. 8 Installed, 4 Spare 6-8 lb Car Weight |
| TR-5 | 12 ea. | Springs. Alternate Springs for 4-6 lb Car Weight |
| TR-6 | 6 ea. | Truck Mounting Springs |
| TR-7 | 2 ea. | 1" Fender Washer |
| TR-8 | ---- | Misc. Spare Parts. 2/56 Thread by 1/4", 3/8", 1/2" Stainless Bolts & Brass Nuts |

Trucks



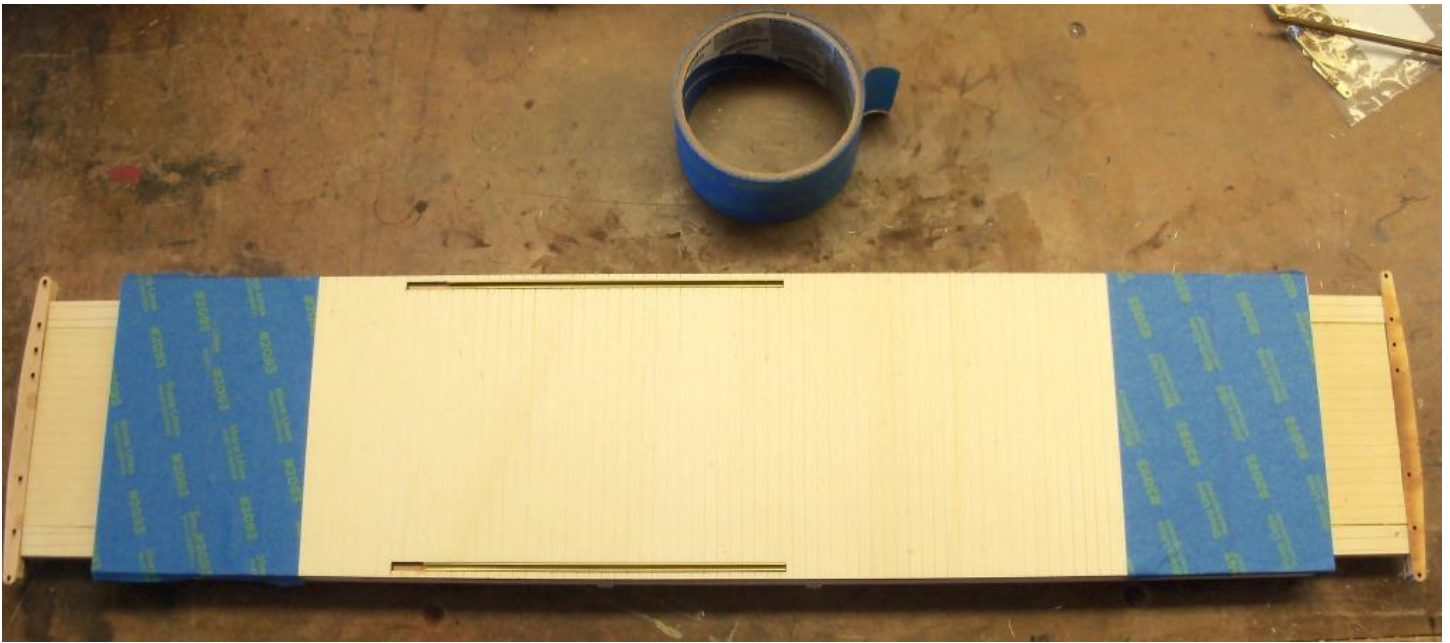
Step 1.

Sand any fuzz and or glue spots from the frame. The frame is fully assembled. It's easier for me and cheaper for you for me to cut the wood, fit into a jig, glue and pin verses cutting extra wood to provide a jig for you to construct the frame upon.

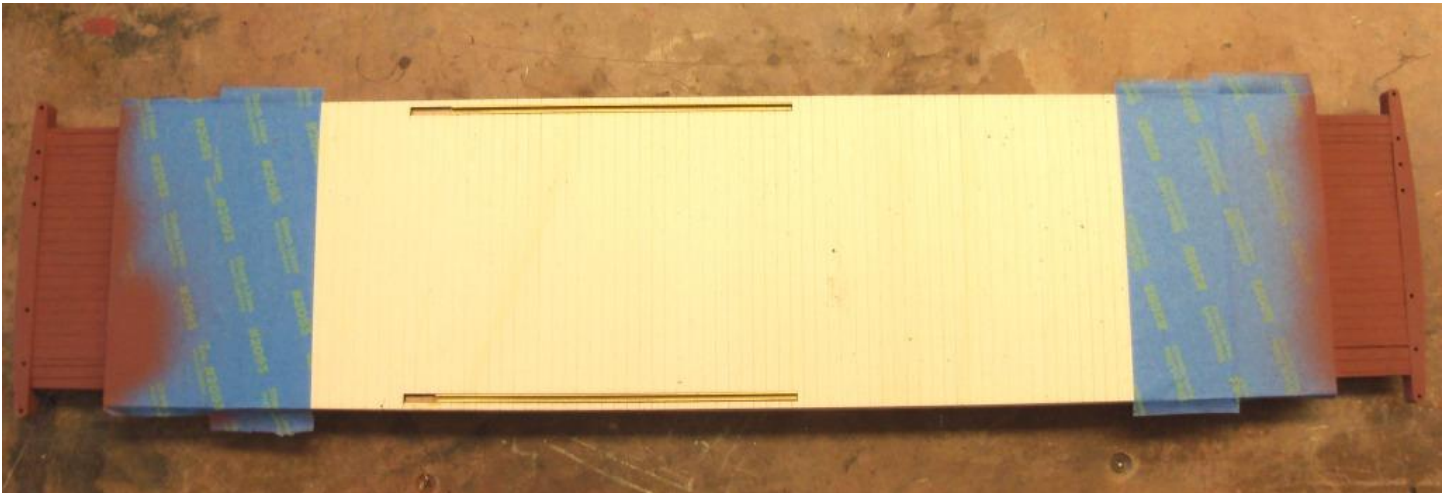
I refer to the caboose as the long end and the short end. The cupola end is the short end. I also refer to the interior as the chair side and the stove side. The chair side has 4 side windows and the stove side has 5 windows. The chair side is where the cupola cabinet assemble sits at the short end of the car. The brass channel is pre-glued into the floor. The end with most of the channel is the short end. The end door is centered in the long end and offset to the stove side or 5 windows side at the short end. Read through all instructions before you start assembling or gluing any parts together, so you don't build with the wrong parts on the wrong sides or ends.

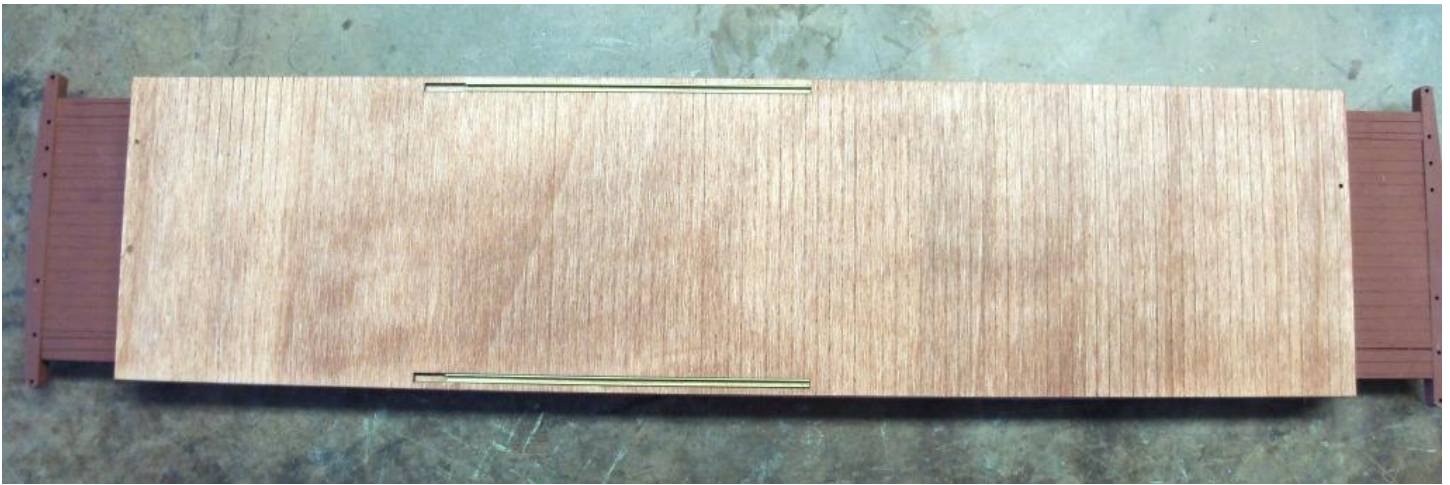
Step 2.

Painting and staining. I used Rustoleum Colonial Red for the exterior and Rustoleum Satin Green Apple for the interior. I also used Varathane Gunstock stain for the inside floor. I do thin it a bit with paint thinner and get a light oak color. Fell free to use any colors you desire or even paint the interior floor. I used Rustoleum Flat Red Primer for the underside of the frame. It dries to more of a boxcar red/brown. I use it on all my 1:20.3 freight cars and cabooses. Again, color is a personal choice so use the colors of your choice.



Start by taping the tops of the ends of the interior floor. This is so when painting the underside and end platforms, paint won't get on the interior floor. Paint and let dry.





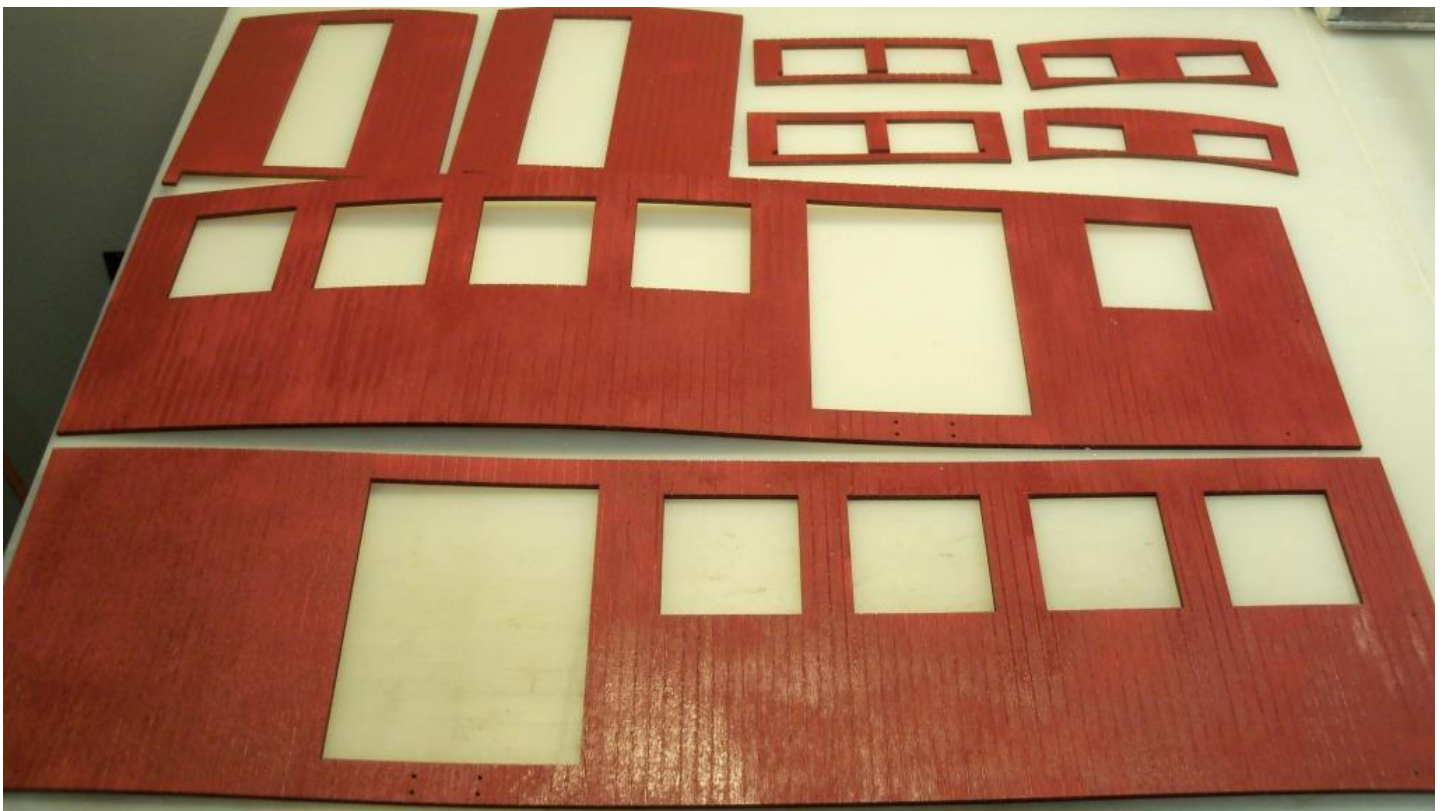
Short End

Long End

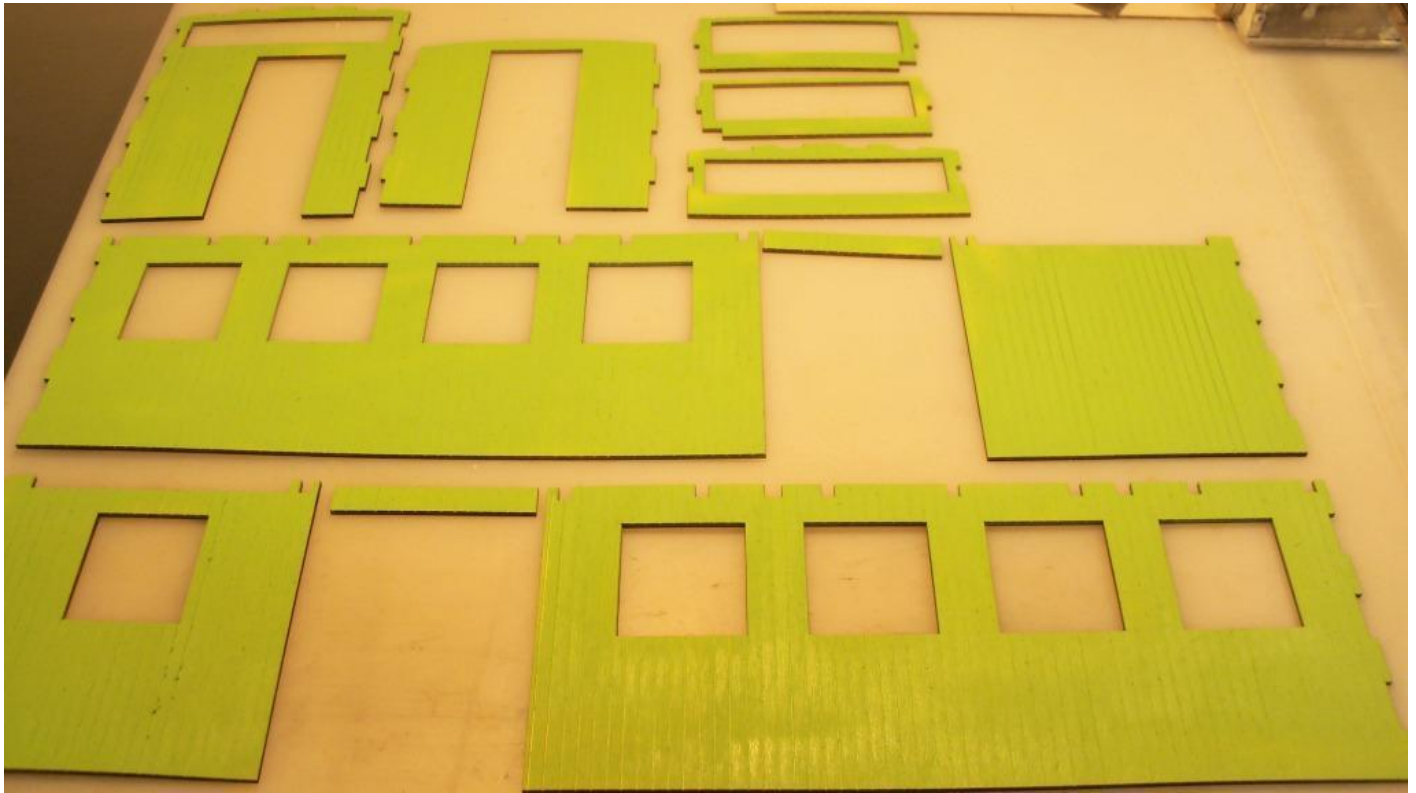
Now stain the interior floor and let dry.

Step 3.

More painting.



Paint the outer sides and ends and cupola outer sides and ends.

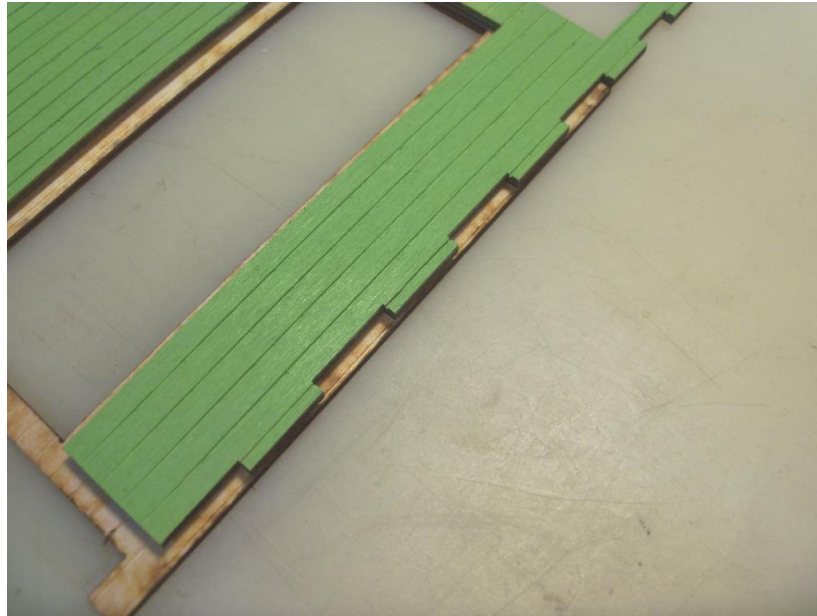


Paint the inner sides and ends and inner cupola sides and ends. Note the inner car sides are 3 pieces.

Step 4.

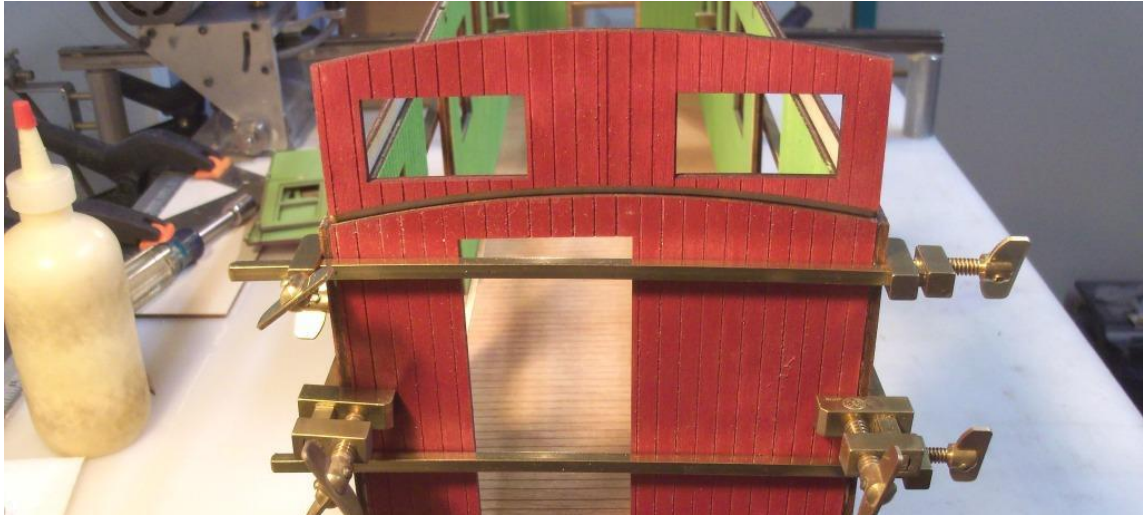
Gluing outer and inner sides and ends together. You need a perfectly flat surface and weights to press the parts together. This will remove the warping very common in light plywood sometimes called aircraft plywood and strengthen the parts. All sides and ends of the car body and cupola use a modified finger joining method so positioning of the inner and outer walls is critical. Test fit parts together following the pictures, so you understand this methodology. Start with the short end inner and outer ends.



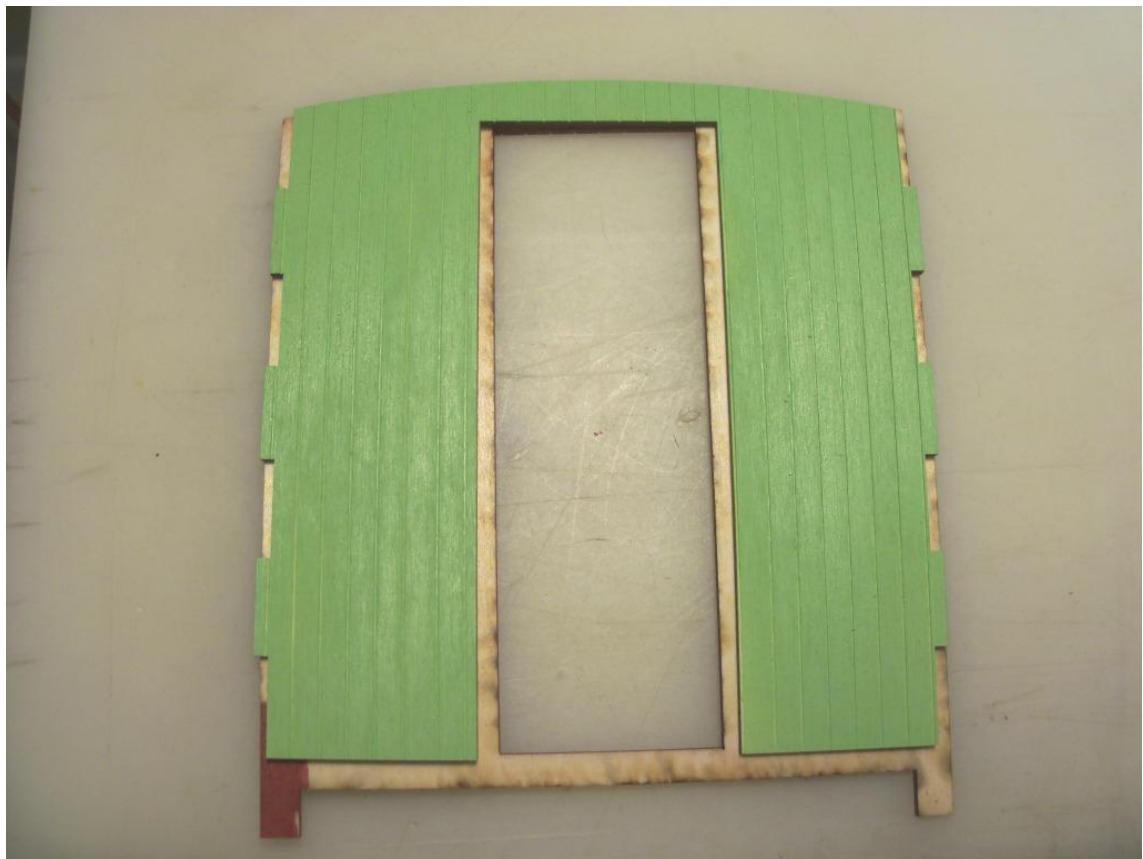


Notice the tabs of the inner wall are flush to the edges of the outer wall. The top of the door opening of the inner wall is a tiny bit above the outer wall. Clamp these lightly and test fit on the short end of the frame. The inner wall should sit of the floor and the outer wall on the platform so that the door opening bottom is flush with the floor. Adjust as necessary and mark for gluing position. Also mark the inner wall where the top of the outer wall ends. You don't want to apply glue where walls don't meet. Same with the tabs. Add glue to the inner wall in the locations necessary to glue to the outer wall. Lay on your flat surface and add lots of weight to bond the 2 walls together perfectly flat. Be sure to clean any glue that may have oozed into the tab area. For weights, I use old rubber spin casting molds. I can stack one or more depending on weight needed. Step 4 has pictures.

I didn't take a picture of one of the outer cupola ends gluing to the top of the short end walls. Once the above walls are dry, lay them on your flat surface, inner wall down. Glue one of the cupola ends onto the top of the inner wall. Both tops will be flush. There'll be a 1/8" gap between the lower half (with the door opening) of the outer end and this cupola outer end. This gap is where the roof end will fit into and glue. On the sides, the outer cupola wall will be equal to the tabs of the inner wall.

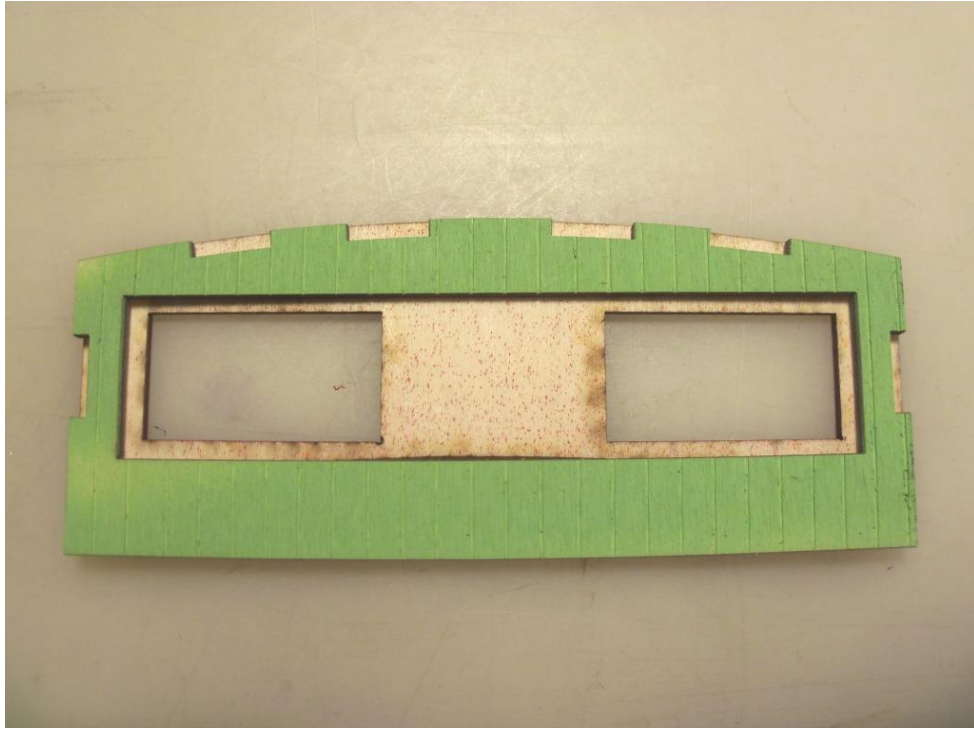


This is a picture of the gap that the short end roof will glue into. Picture is of the car further along but is a good reference.

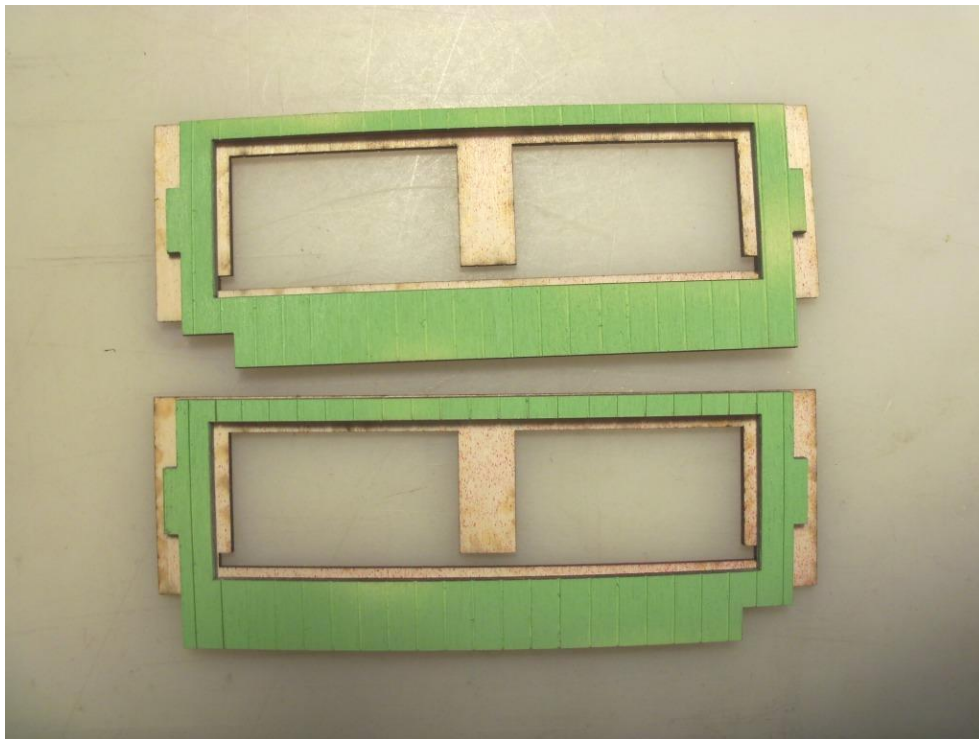


Gluing the long end inner and outer is easier. The inner tabs are flush to the outer wall width and both tops are flush. Again, lightly clamp and test fit on the long end of the frame just to be sure. Add glue to the inner wall, press the walls together. Lay on your flat surface and weigh with your weights.

Cupola inner and outer wall gluing.



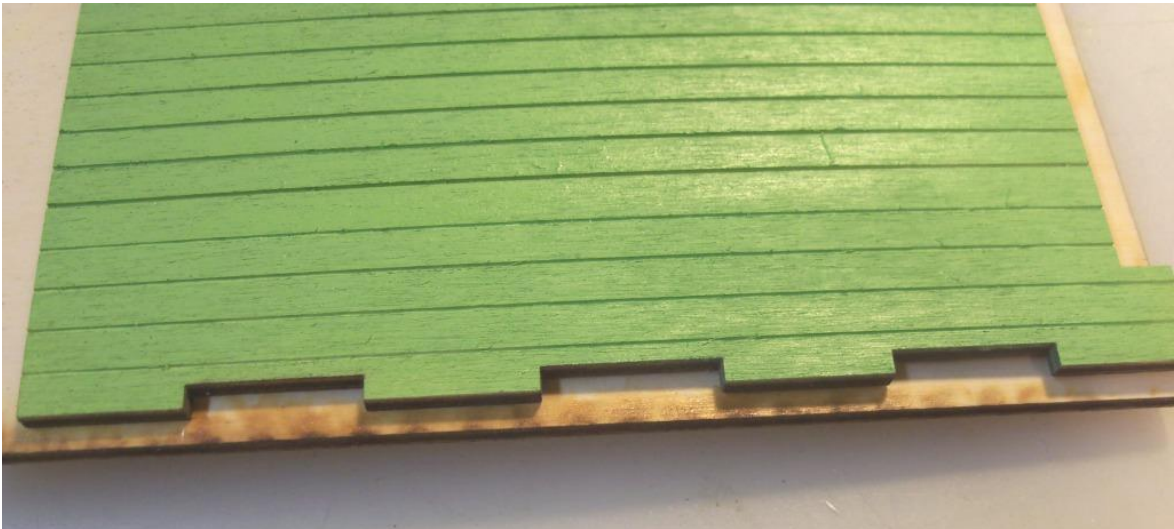
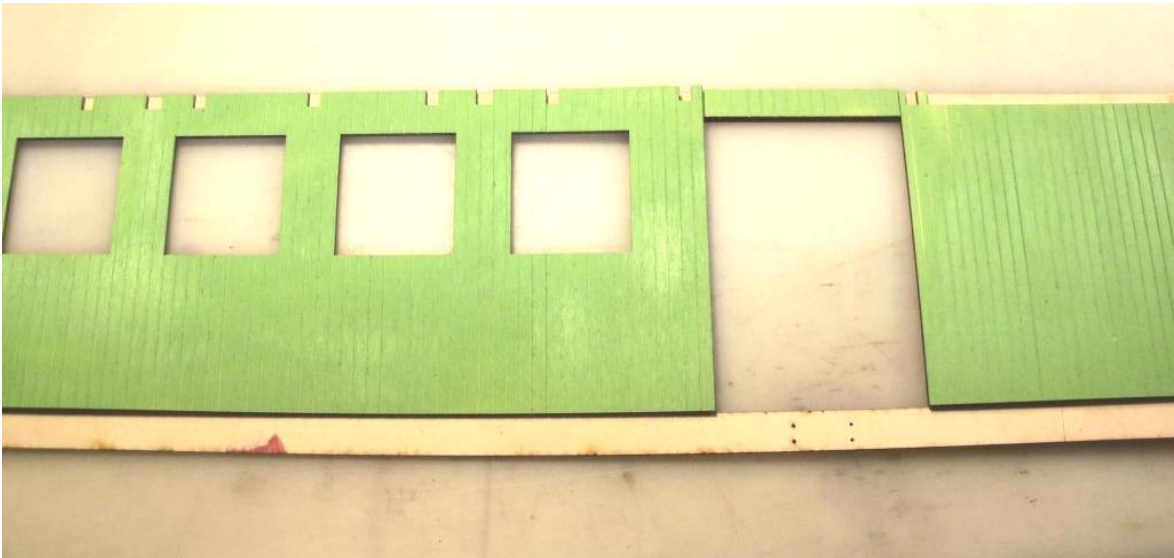
Glue the remaining inner and outer cupola end walls as pictured. Top and side are flush. Bottoms are not. Mark the inner wall and the bottom of the outer wall so you don't add glue where not needed.

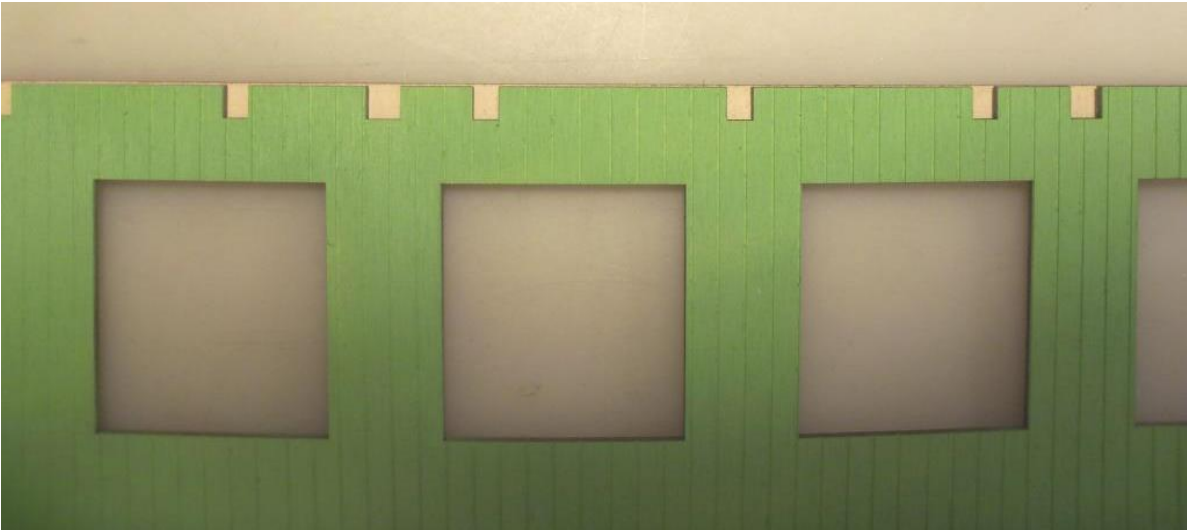


The cupola sides are chair side and stove side. The inner walls are different, but the outer walls are identical. The tops of inner and outer are flush on both sides but notice the window openings of the outer walls and how the inner walls glue to them. The bottom of the outer wall openings have tabs for the 3D printed windowsills that line up with the edges of the inner walls. The edge tabs of the inner walls are not flush with the edges of the outer walls.

Step 5.

Gluing the sides.





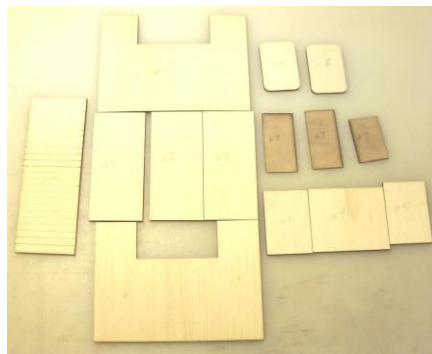
Looking over the above 6 pictures should give you an idea how the inner sides will glue to the outer. Both sides are flush at the tops but recessed the thickness of the plywood at the tabs on the edges. I used an unused plywood part (as of yet (roof piece?)) to measure the distance. The bottom is recessed .6" or equal to the height of the frame side sill plus the floor. The left and right halves of the inner sides are separated with the small inner center piece. The outer wall window openings are larger than the inner. The 3D printed windows will glue into the outer wall to fill those spaces in a later step. Glue the three inner sections to the outer wall and weigh until dry.



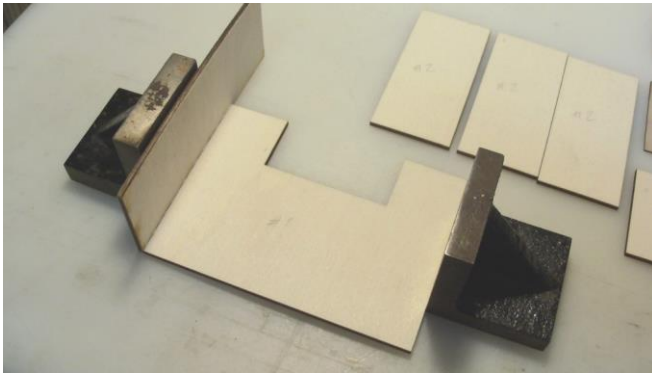
I use old, wore out spin casting molds for my weights. I can pile them up if I need more weight. Some report back to me that they use sheets of glass so they can see that nothing has moved before adding weights. Repeat this for the other inner and outer sides. Be sure you use the 4 window inner and outer walls together and the 5 window inner and outer walls together.

Step 6.

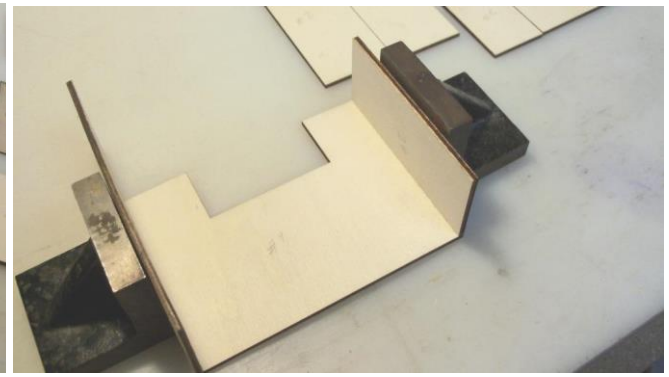
Interior "furniture". Open the cupola seats and cabinet bag. There are 16 pieces of wood in it. Lay them out.



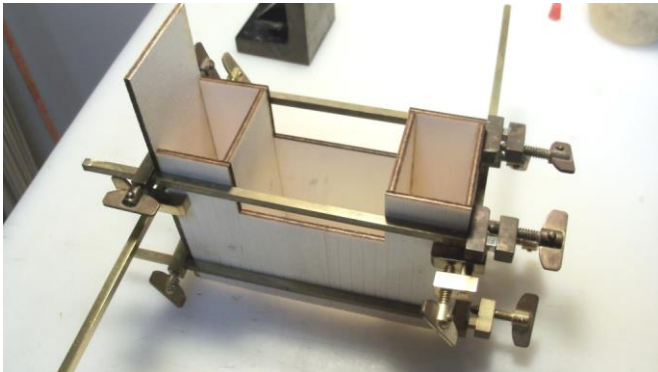
From the left; Scribed left side, (middle top down) front, 3 spacers, back. (Right top down) seat cushions, cabinet doors, seat, foot platform, seat. Not pictured are the 2 ladder steps.



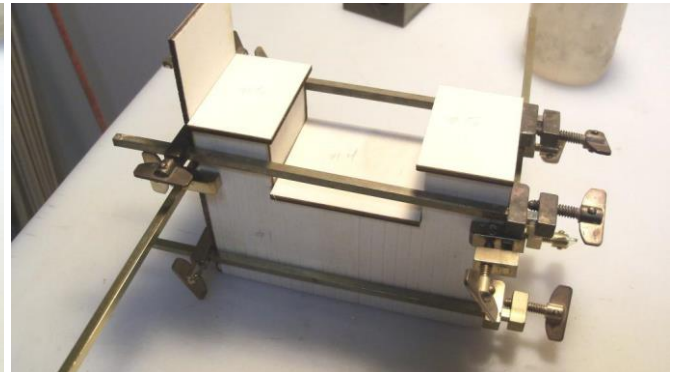
Left side and back



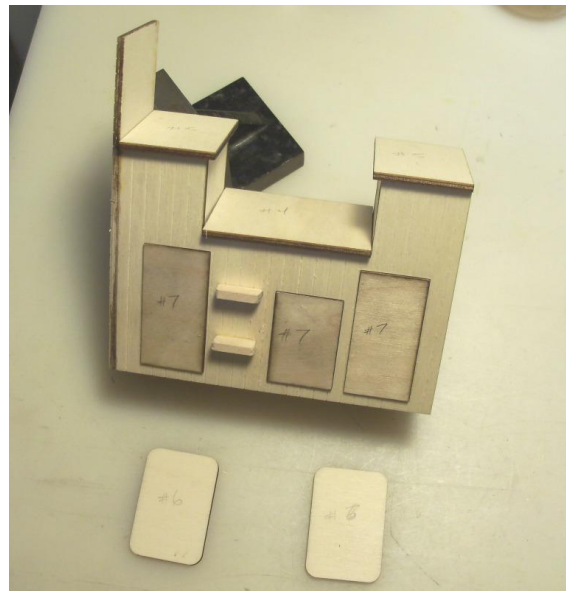
Left side, back and one spacer (on top of back)



Left side, 3 spacers and front



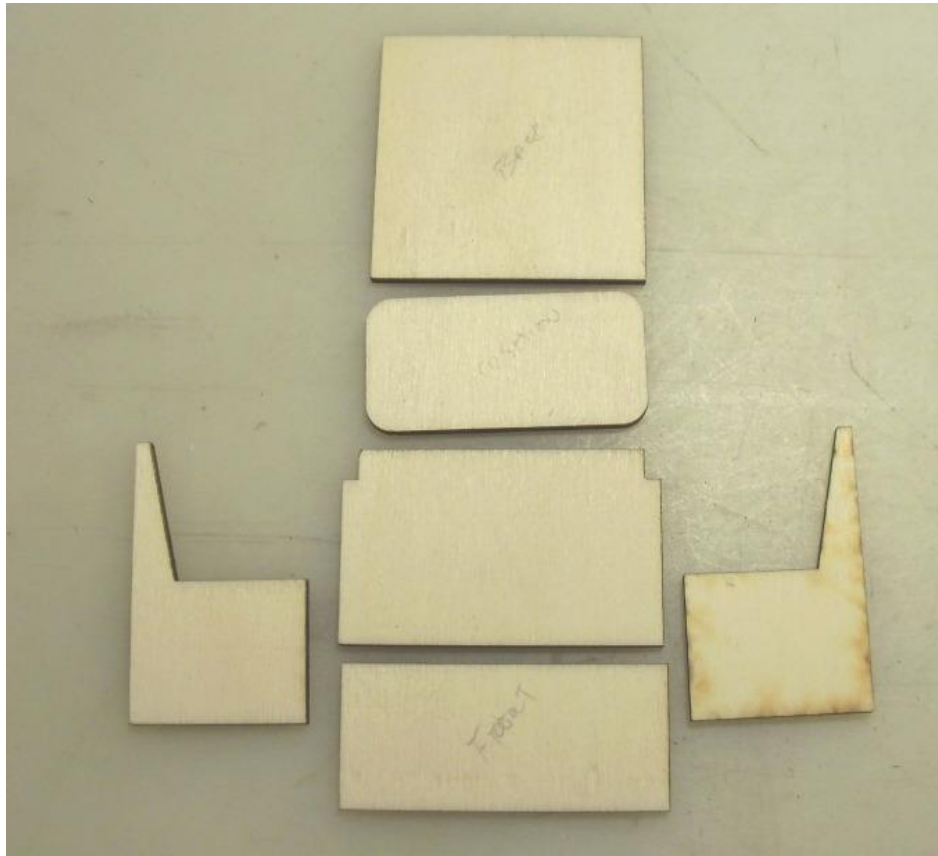
Both seats and foot platform added.
All parts flush with back.



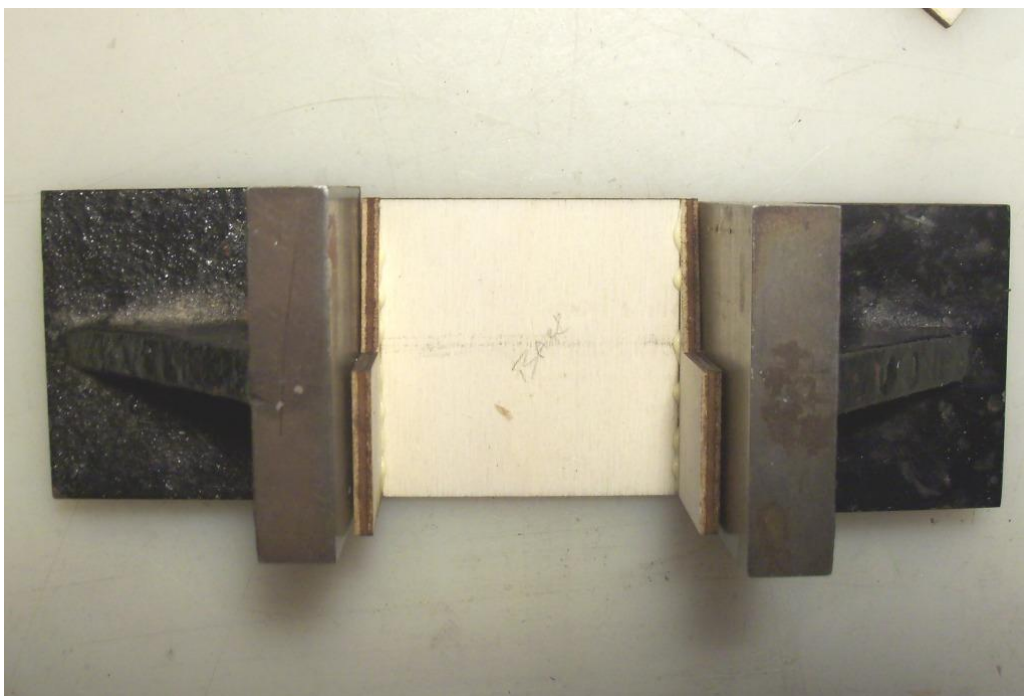
3 cabinet doors added and both steps. Cushions will be added once painted.

Step 7.

Chair. Open the Chair Bag.



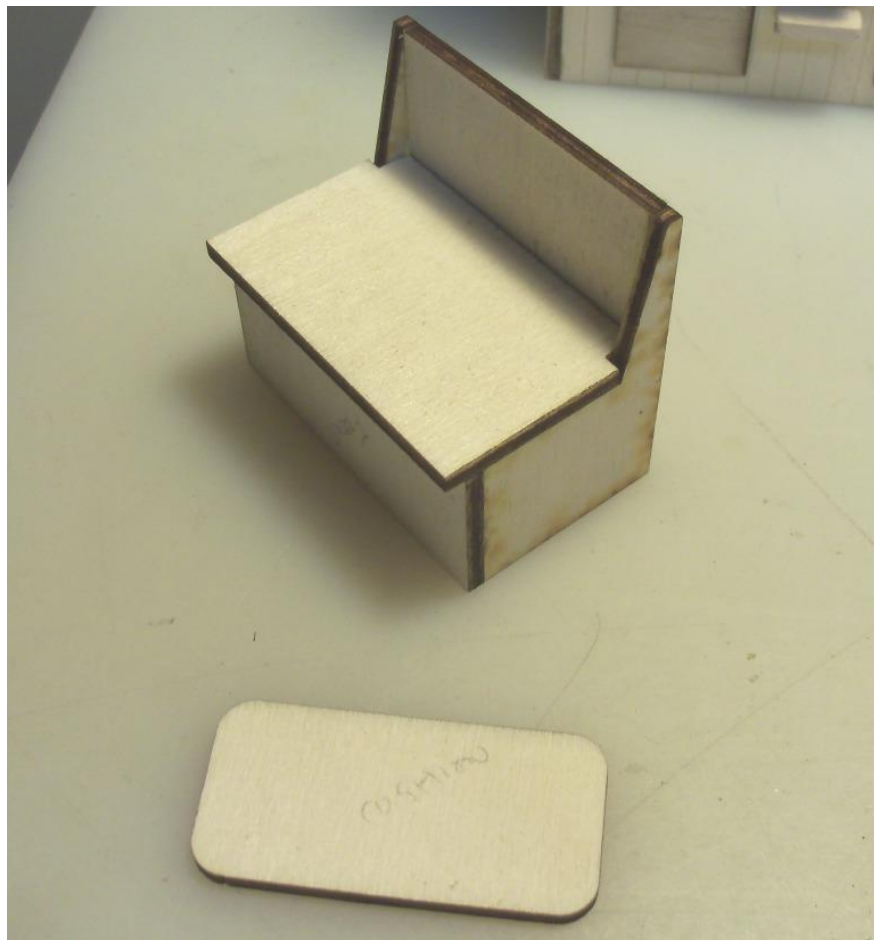
From left; left side, center top down; back, seat cushion, seat, front, right side.



Left and right sides glued to the sides of the back



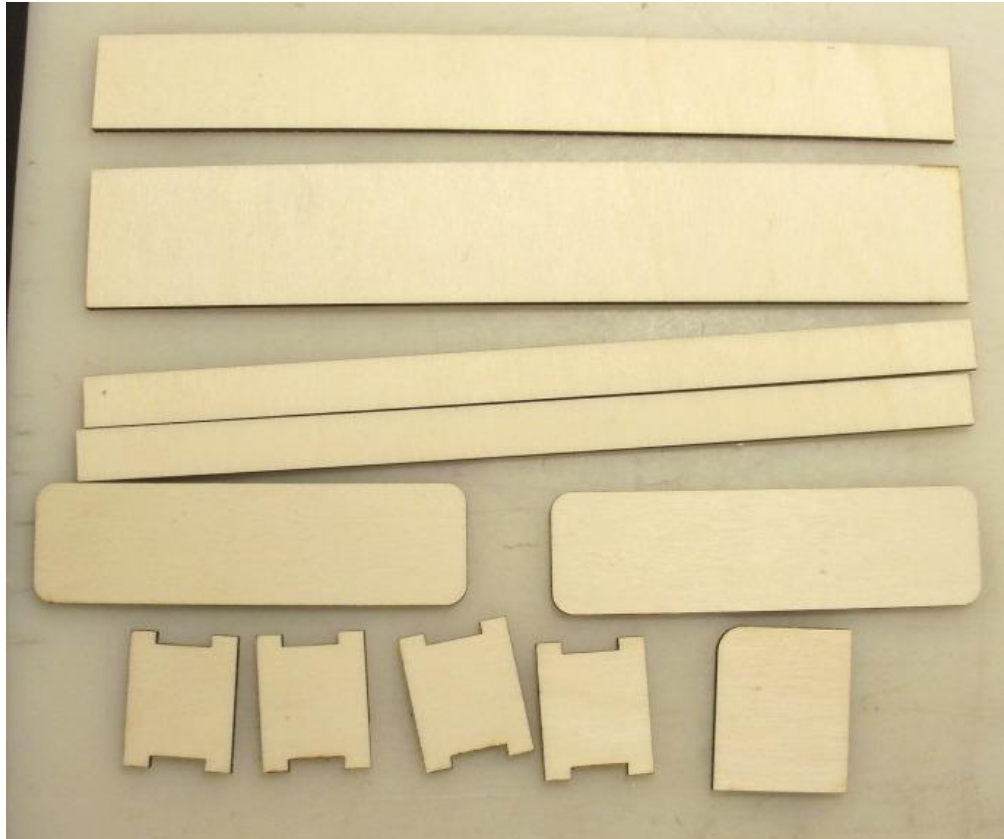
Seat glued to the sides and back



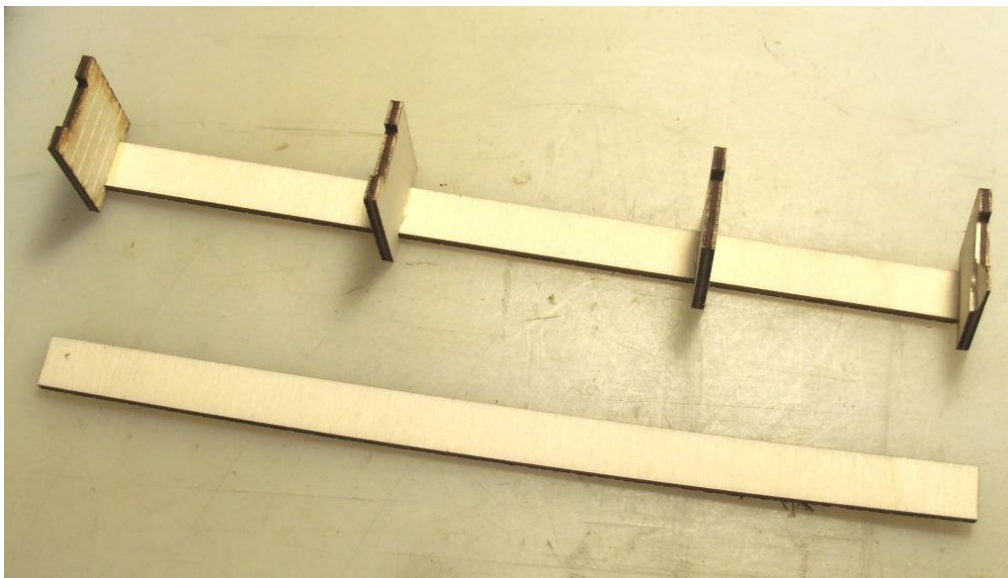
Front glued on. Cushion will get glued on after painting

Step 8.

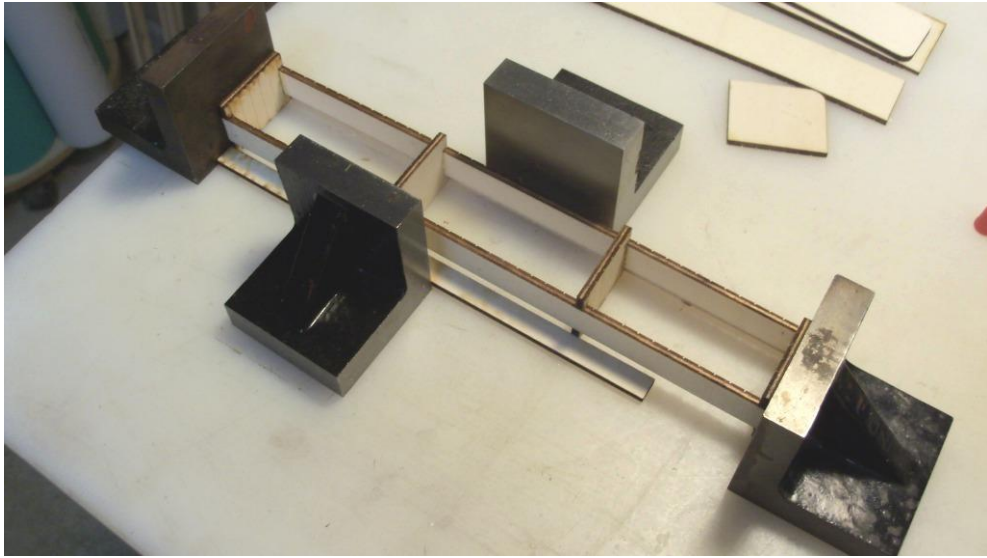
Long and short benches. Both benches are assembled the same way except for the end caps. The end cap glues to the right side of the long (chair side) bench and the left side of the short (stove side) bench.



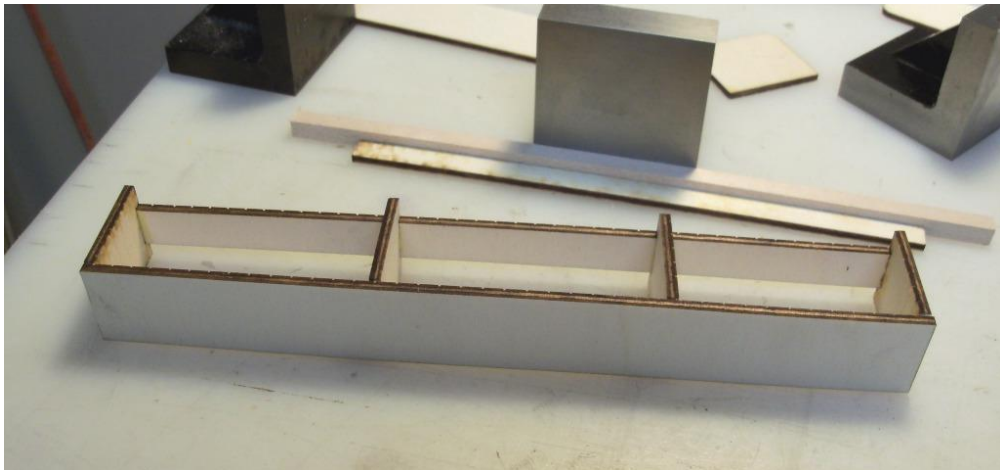
Top down; front, seat, 2 braces, 2 cushions, 4 cores and the end cap.



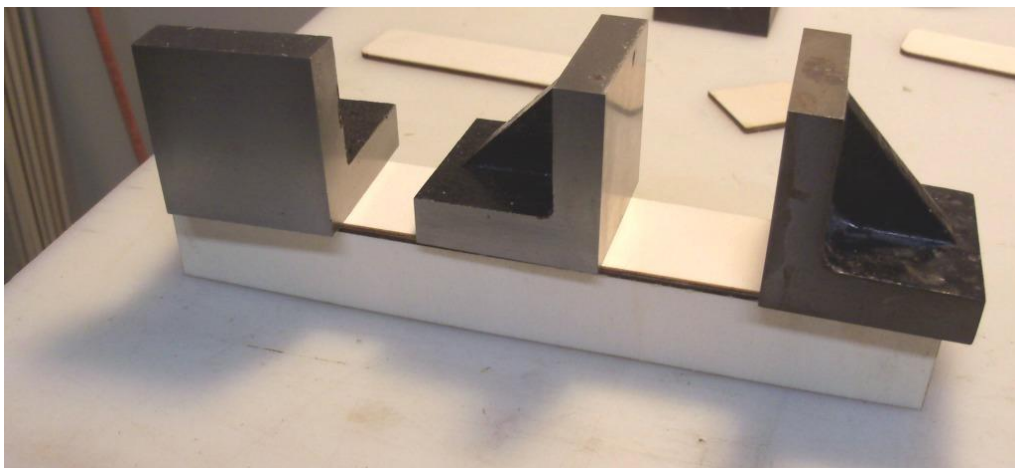
Glue the 4 cores to one of the braces. Then the second brace to the cores.



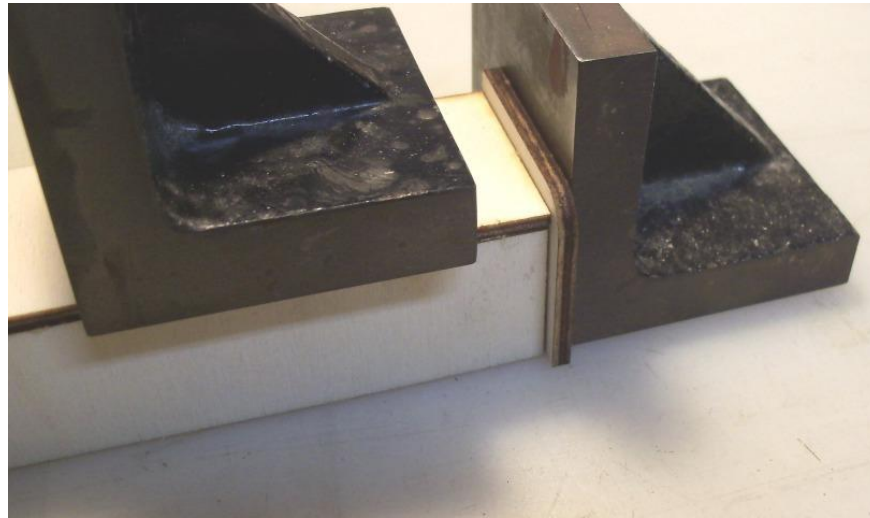
I use my heavy angle blocks a lot for holding small pieces together. This bench tried to curve a little, hence the extra brace holding 3 of the cores straight.



Front glued on.



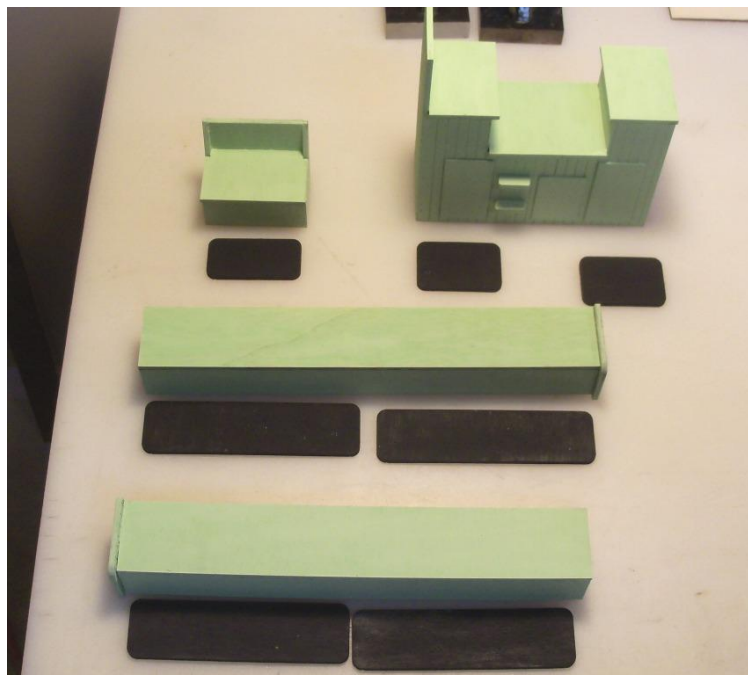
Seat glued on. Poplar plywood tends to have warpage, hence the weights



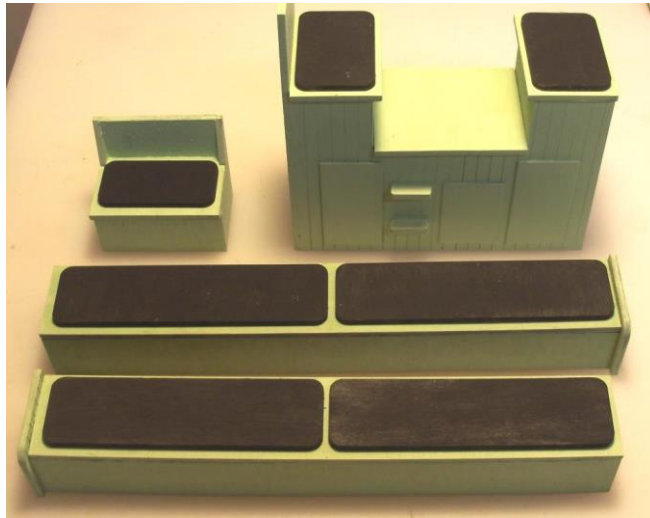
This is the long bench / chair side of the car. The end cap glues on the right side towards the chair.



When I rattle can painted the cupola seat/cabinet, chair and both benches, it didn't cover all that well, so I add a hobby store acrylic paint. This is Folk Art #526, Soft Apple. Matches the Green Apple (rattle can) fairly close.



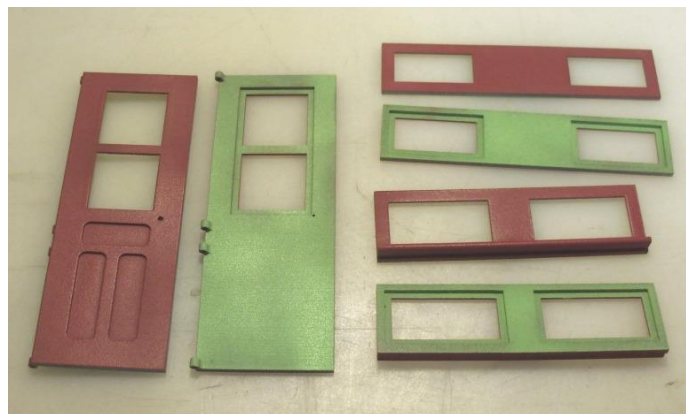
Furniture painted green and seat cushions painted black.



Interior furniture ready to install

Step 9.

A little more painting. Gather up the 3D printed doors, side windows and cupola windows.



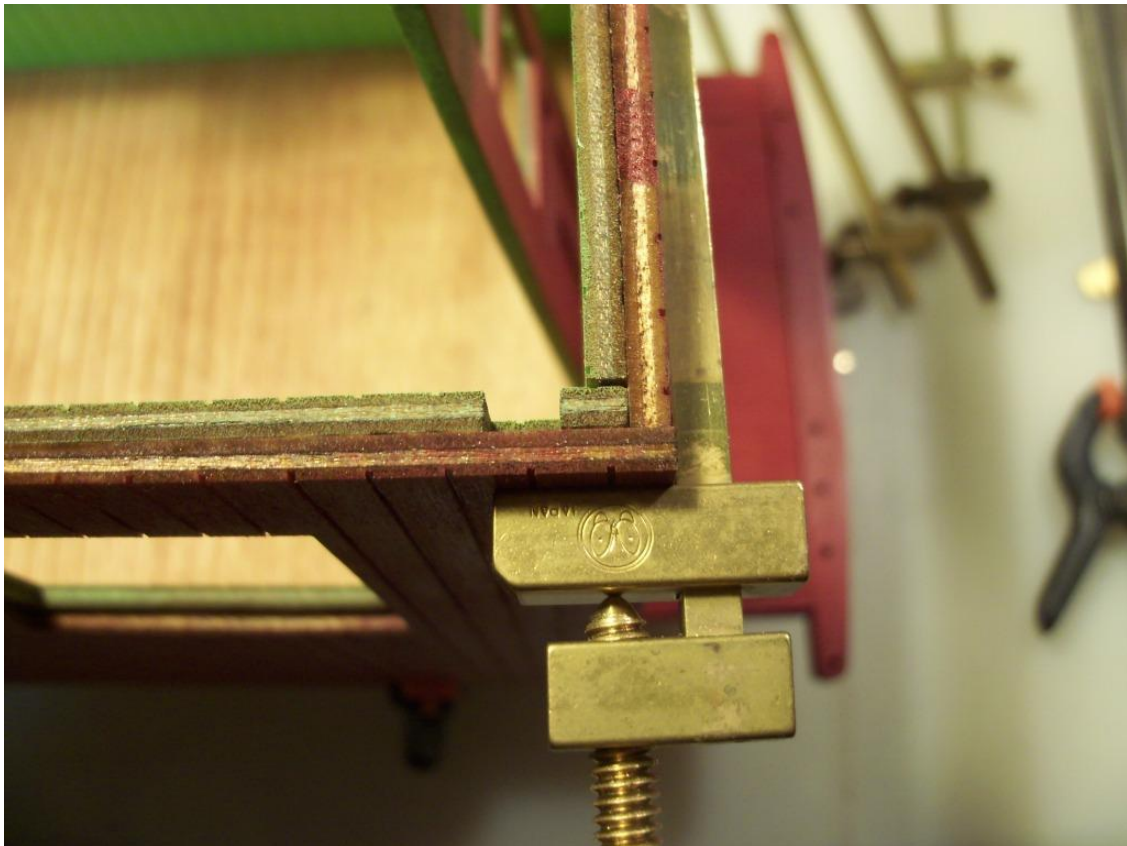
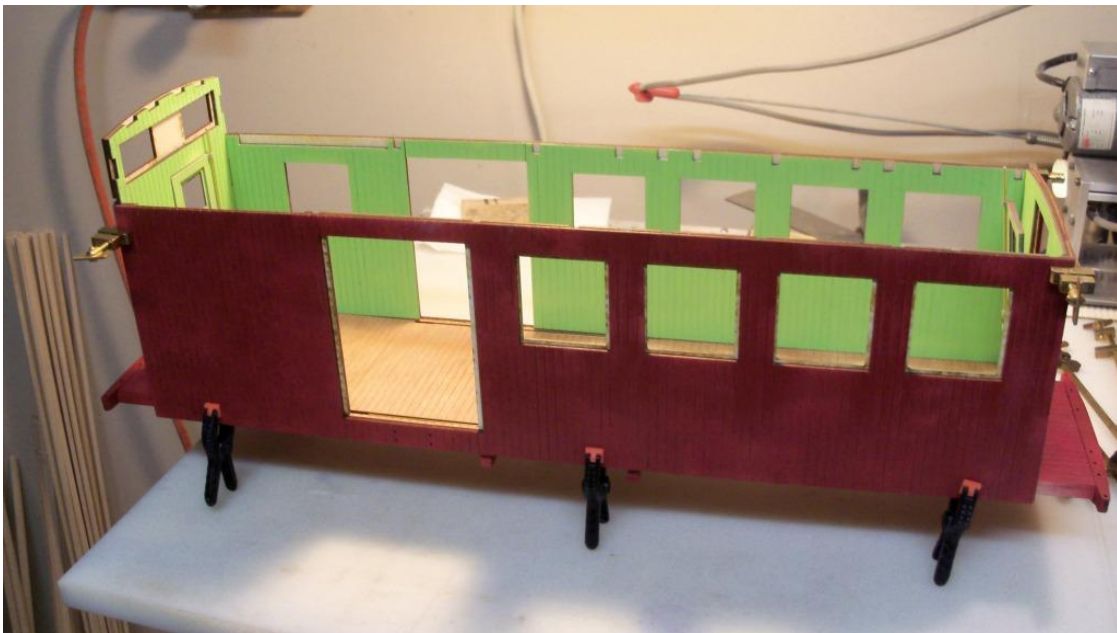
Paint the insides green and the outsides red.



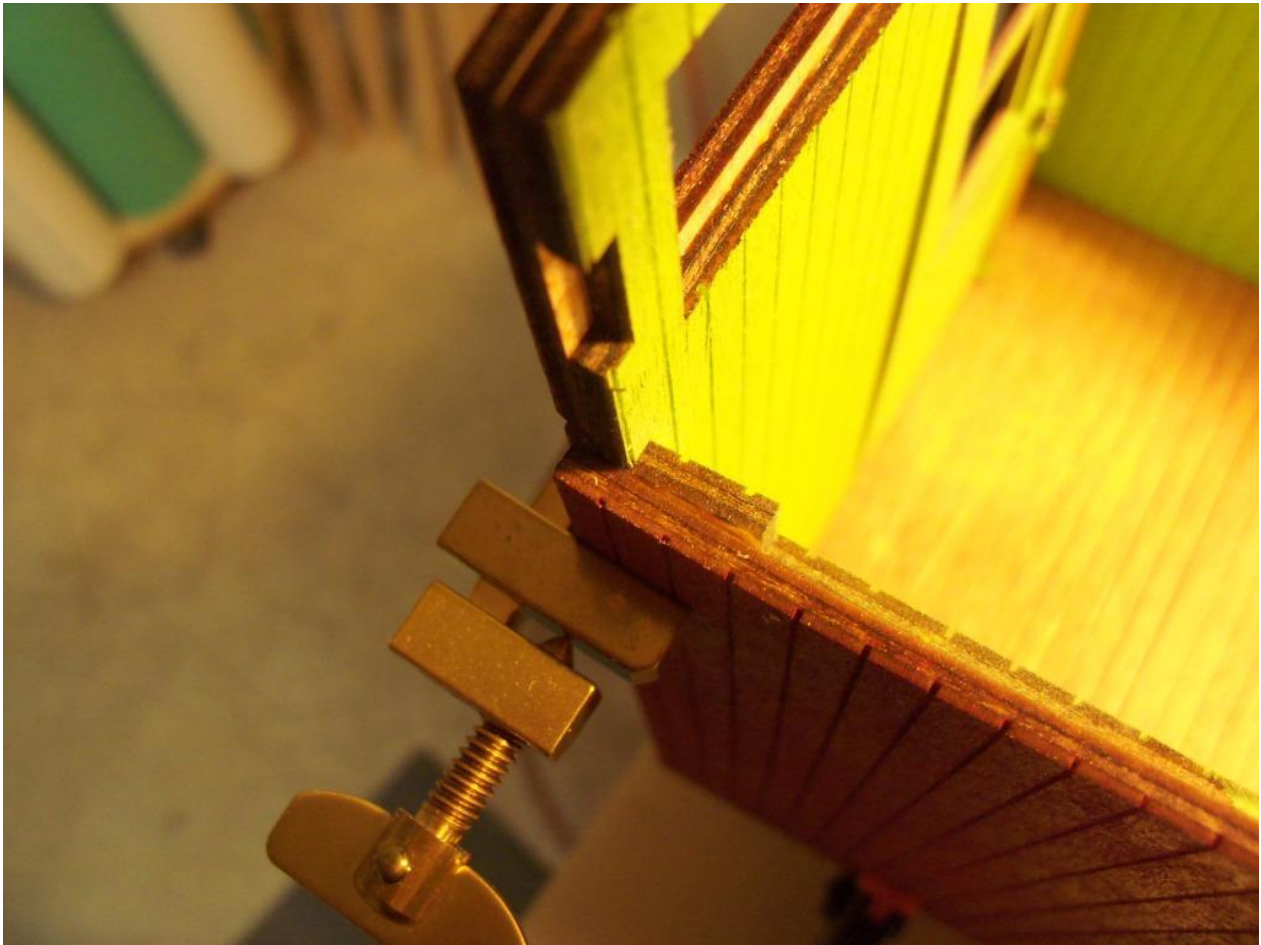
Side windows painted red.

Step 10.

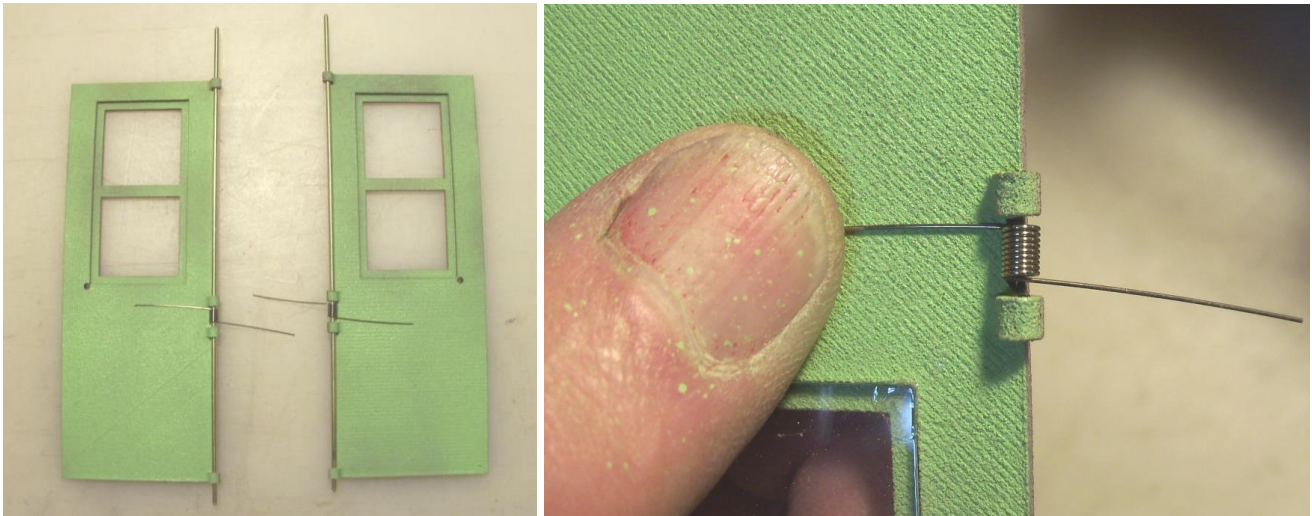
Assembling the sides and ends. You need to do a lot of fitting and testing before actually gluing anything together. Start by clamping the sides and ends to the frame and to each other. Make sure you have the long end to the long end of the frame, or the side doors won't fit or work.



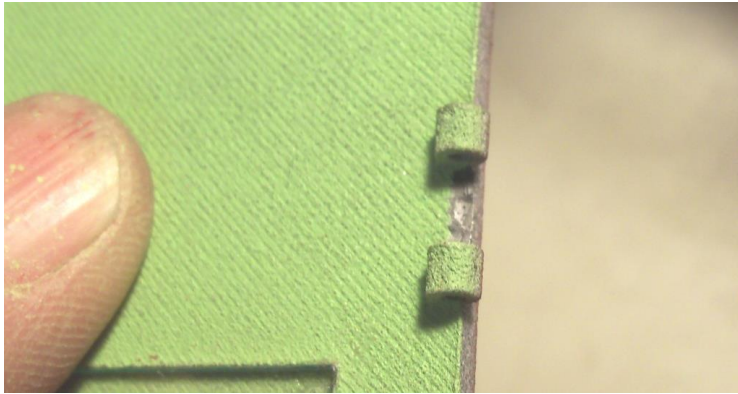
Make sure all your corners are fitting together properly. If they don't, you may have glue that seeped out into the tab areas that needs to be cleaned up. This is the long end of the car.



This is a corner of the short end of the car.



I shipped the doors with the brass rod “hinge” and spring put together. The spring shouldn’t be pinched. If it is, remove the brass rod and trim the edge of the door a little more to give room for the coils.



You can see the slight bevel I carved into the door edge between the hinge tabs. Reassembly the rod, spring and door if you had to do this.



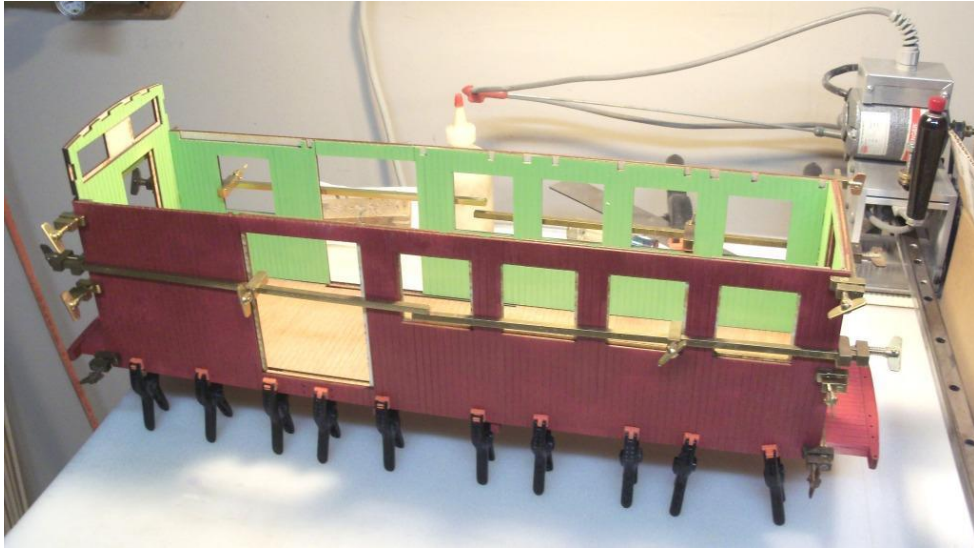
Test fit the short end door in place holding the top of the rod with a finger or thumb and verify the door swings open and closes with the spring. Tilting the rod top left and ring will clear any side issues. If the bottom of the door is dragging, raise it a tad on the rod. Don't glue anything yet!!!

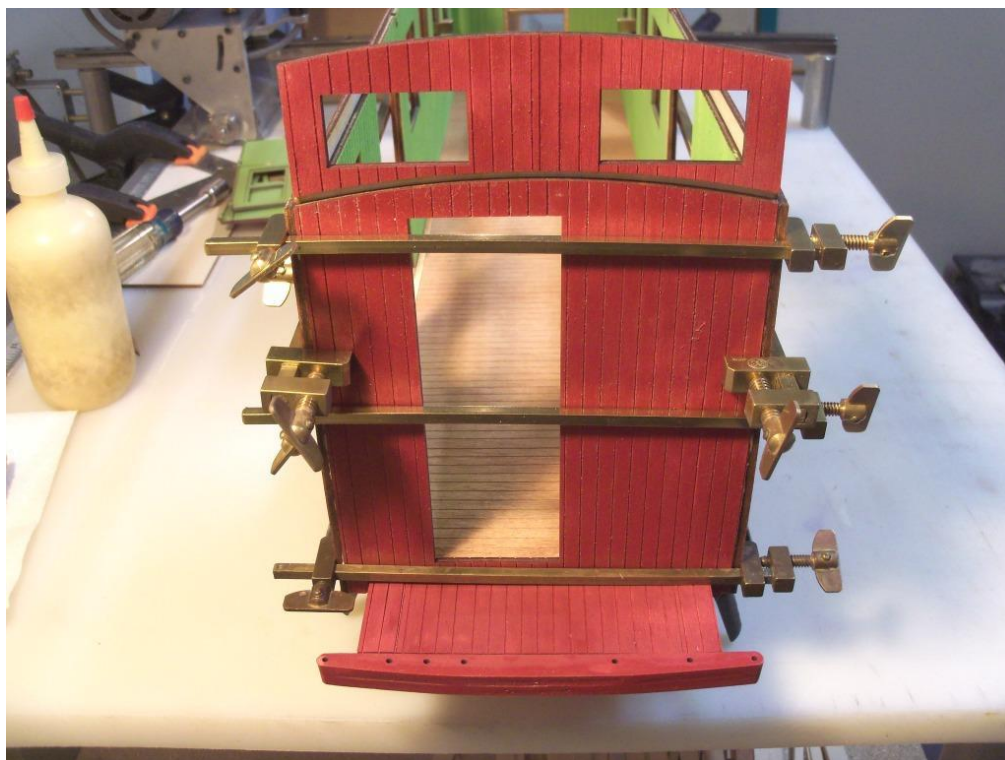
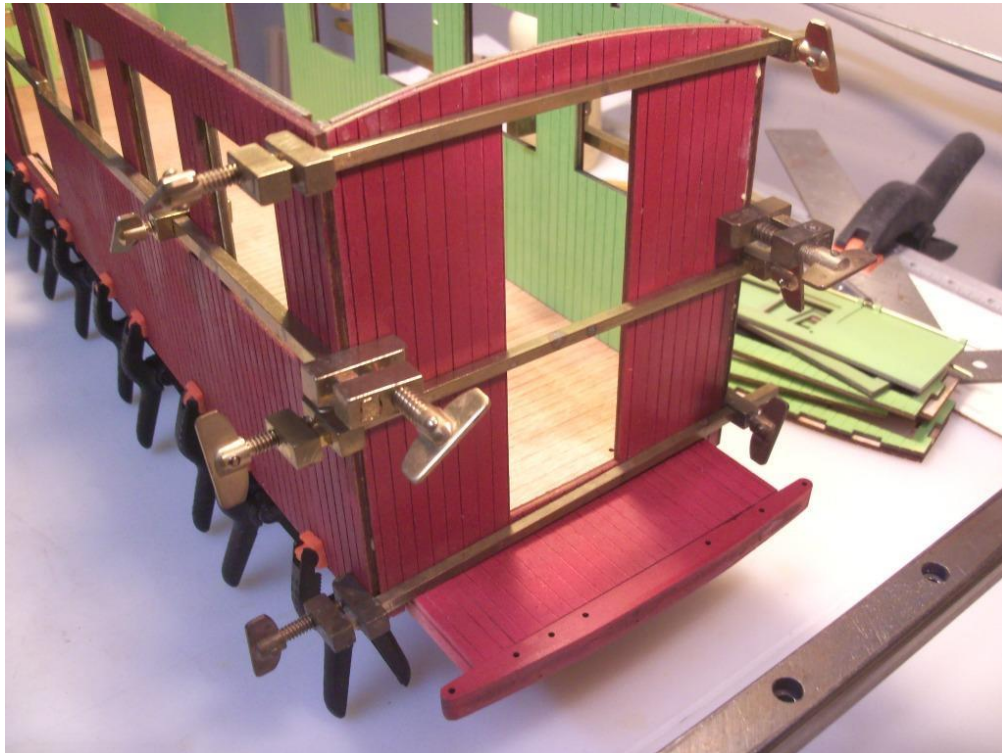


Test fit the long end door the same way.

Step 11.

Gluing. You need lots of clamps. As in LOTS!



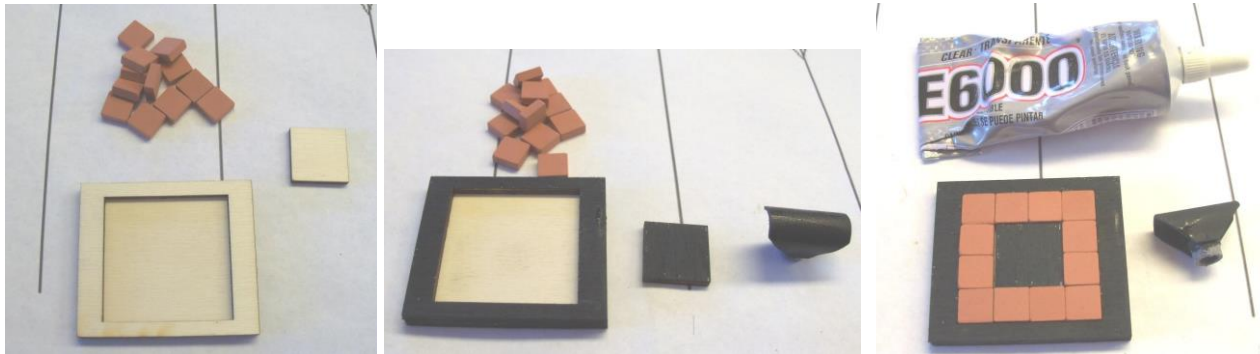


I have several pairs of these brass clamps. 2 pair of the short. 3 pair of both the medium and long and I used all 16 of them. Plus 20 medium size plastic clamps. As I've said, poplar plywood tends to warp. I lasered the outer sides with the grain running one way and the opposite way for the inner sides (and ends) so when gluing those sides together, would help flatten the finished sides and ends. Of course, gluing with lots of weigh is a must. But still, the sides and end might bow out or in a little. Hence lots of clamps to ensure all joint are tight.

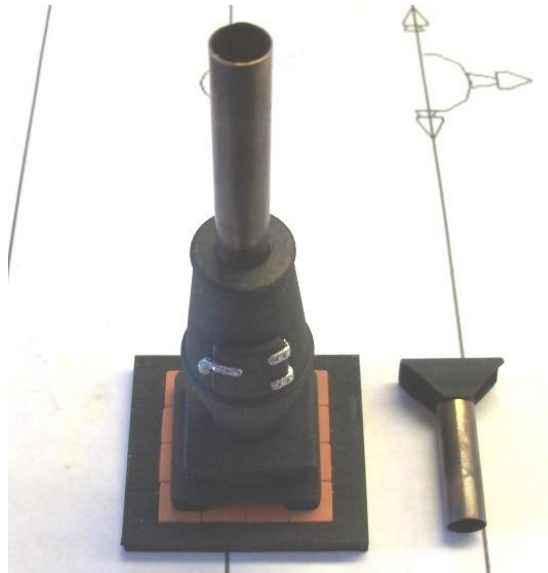
At this point, I let this dry thoroughly overnight.

Step 12.

Stove and side doors. Open the stove bag and glue the edge to the base and paint the 3 pieces of wood that make up the stove base. The center will be covered with brick so it's not necessary to paint it. You can paint the hinges and handle of the stove door as well with a silver or gold paint.



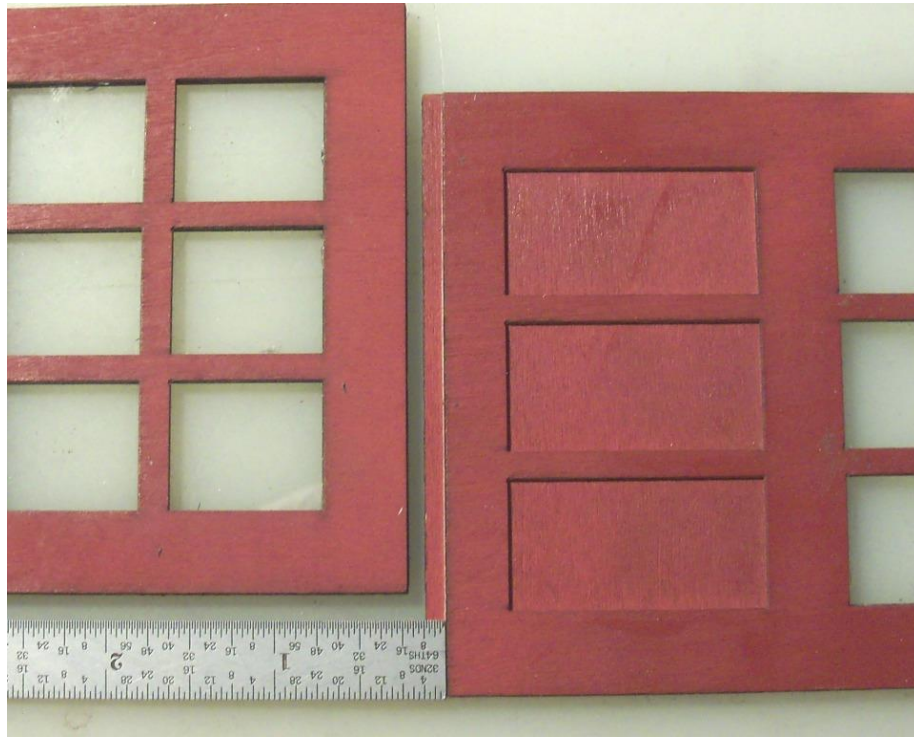
I use E6000 clear/transparent glue to glue the bricks down as well as gluing the Lexon windows into the 3D printed frames. While you have the black paint out, paint the stove cap as well.



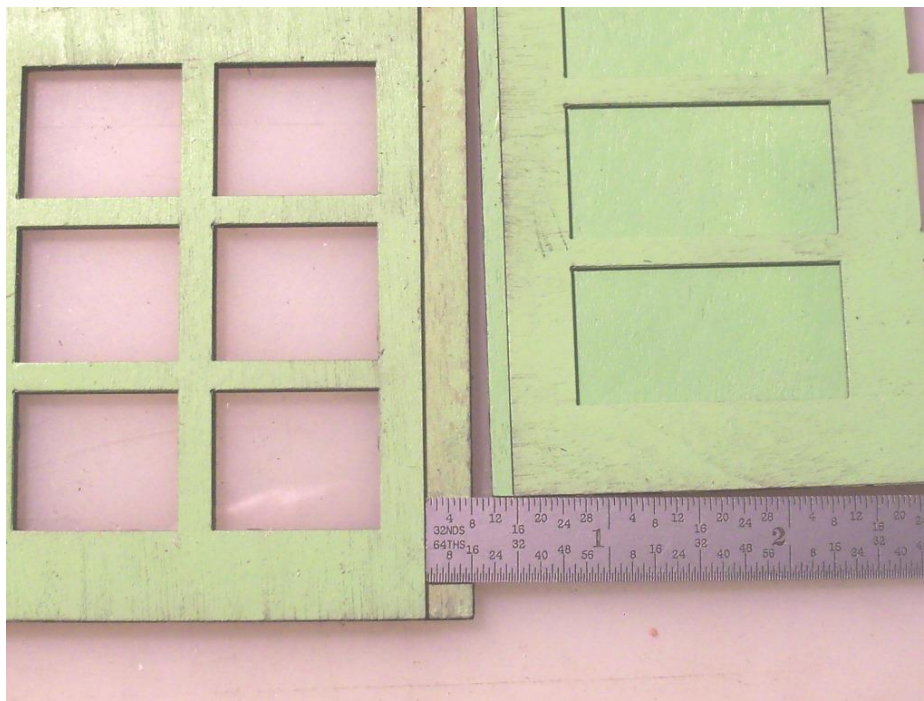
I polished up the brass stove pipe tubing with sandpaper and a wire brush in my Dremel. Then blackened with a stain glass black patina. Novacan for solder or zinc works better than hobby shop blackening agents and is far cheaper. I also use it on all white metal parts.



Open the side door bag and paint the inner, outer and center pieces. The outer is longer than the inner.



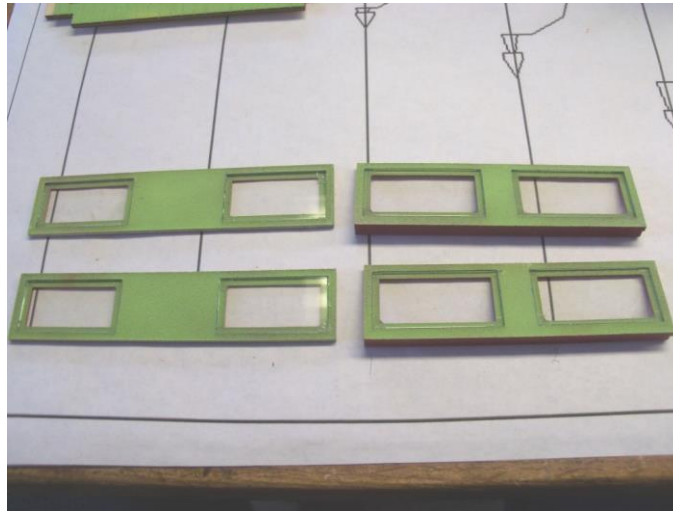
When dry, glue the outer door trim to the center core. The tops and sides are flush. The center is 1/8" longer than the outer. This section fits into the brass channel in the frame.



Peel the blue protective film off both side of the Lexon window and lay into the opening in the center core section and then glue the inner door trim to it. You don't need to glue the glass in as it will be firmly locked in. There'll be a 1/4" space at the top of the door (for inside track) and a 1/8" space at the bottom so the center core will fit into the brass channel. Just like gluing the sides and ends, lay the doors on a flat surface and add weight on top of them so they dry perfectly flat. Let them sit like this for a few hours or overnight.

Step 13.

Cupola windows. Now glue the Lexon windows into the 3D printed cupola window frames. Again, I've found E6000 works pretty good for this. It won't etch the Lexon if you get it where it doesn't belong. It dries clear and flexible and holds all sorts of dissimilar materials together. Set aside to dry.



Step 14.

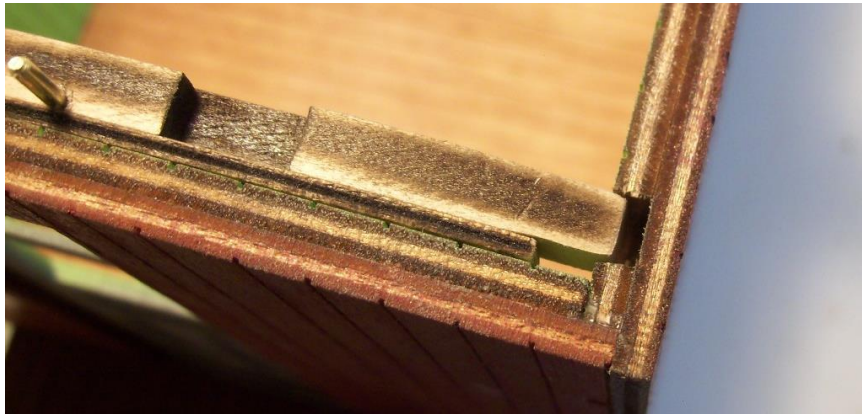
Installing the end and side doors. Glue the Lexon door windows into the 3D printed doors. Also glue the brass door knobs into the holes. The doorknob shaft is .078" in diameter which is a #47 drill bit. You may need to drill out the hole for the knob to push in. Fit the long end door into the hole in the floor and fit the custom rafter onto the brass hinge rod. Slip the rafter into the notches in the side walls. The rafter is shorter than the width so you can slide it back and forth for the perfect position for the door to open and close freely. If the door is dragging on the floor, move it up the brass rod. Make sure to rod in bottomed out in the floor hole.



The brass rod will extend above the rafter (for now). When you're satisfied the door swings freely, add a drop of ACC glue to one or more of the tabs and brass rod to lock the door height to the rod. Make sure the rod is bottomed out in the floor hole.



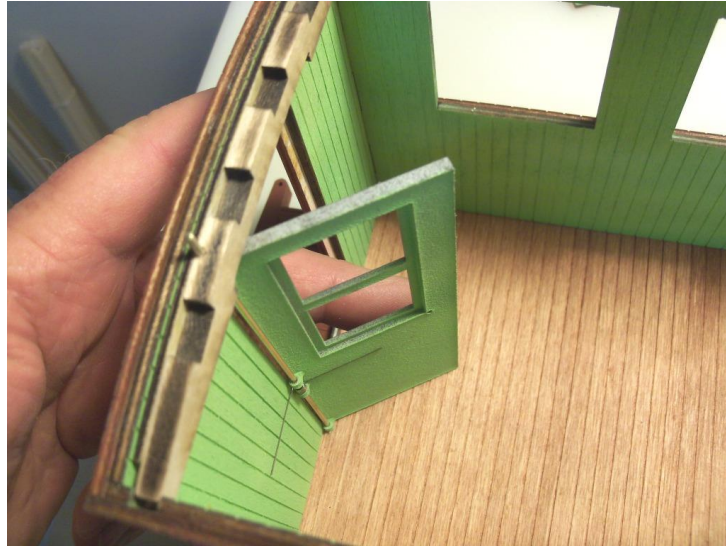
The rafter is short enough for you to move it back and forth to find the sweet spot for free door swing.



Make sure the gap between the door and car end door opening is equal. Will insure a good free swing.



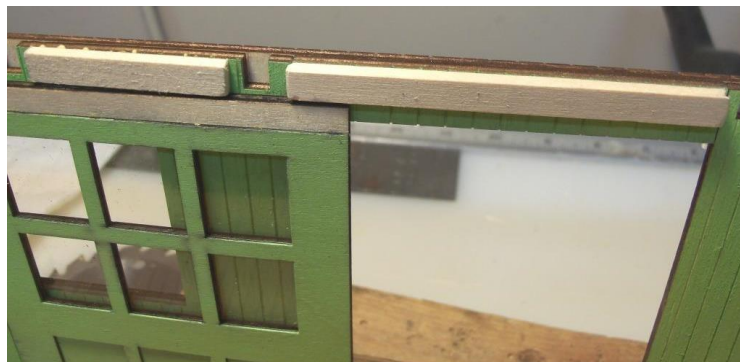
Now, mark the rafter for the side to side position, remove, add glue at the ends only and glue in. Position the rafter to your position marks and verify the swing is free and let dry. Once dry, trim the excess brass rod to be flush with the top of the rafter.



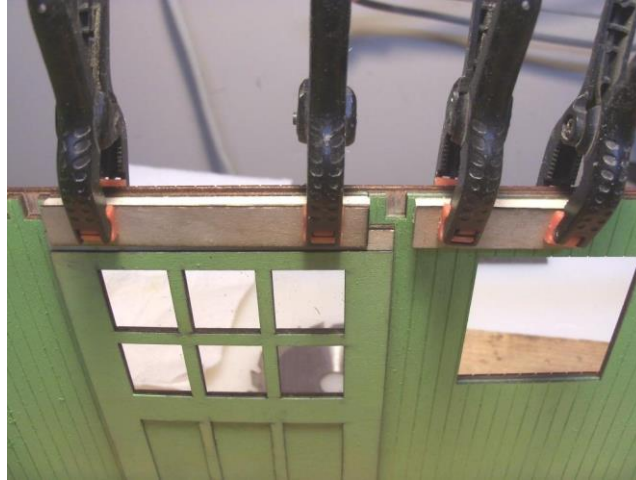
The short end door goes in the same way except you only have to position the block of basswood to the correct side to side position and glue in. Use a clamp to hold it in place until dry.



Slip a side door into the channel. Glue the 1/8 by 1/4 basswood sticks from the side door bag in place as shown.

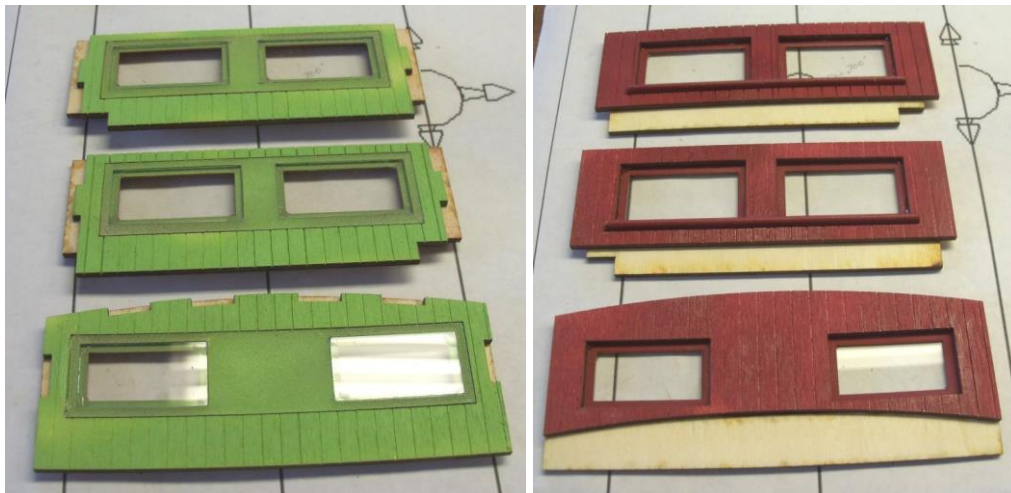


Now glue the 1/16 by 1/2 basswood sticks in place and clamp. Make sure the door can slide back and forth freely. If it won't close all the way, check if you might need to sand a bevel on the door opening.



Step 15.

Cupola windows, sides and ends. Now glue the 3D printed windows and Lexon glass into the cupola sides and ends. One end is part of the short end of the car.



Steps 16.

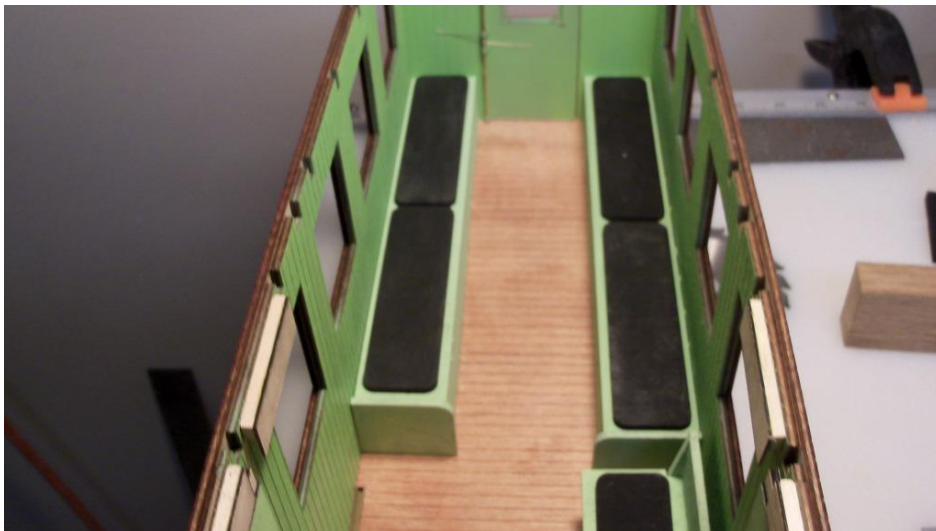
Add all the furniture. First up is the cupola seat and cabinet to the short end, 4 window side.



Next is the long bench on the 4 window side. And then the chair. Make sure the side door will open and the chair position doesn't interfere.



Now glue in the short bench to the 5 window side of the car.

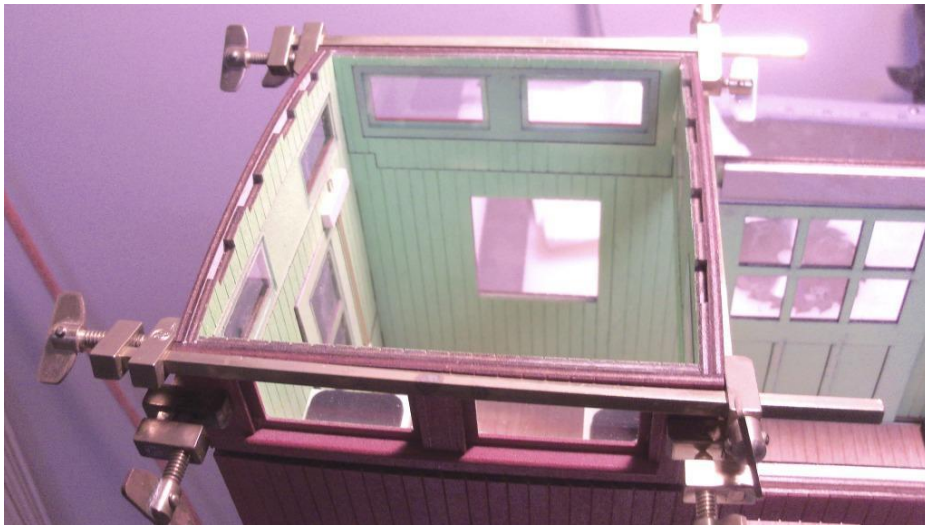


And finally, the stove. Make sure the position doesn't interfere with the side door.

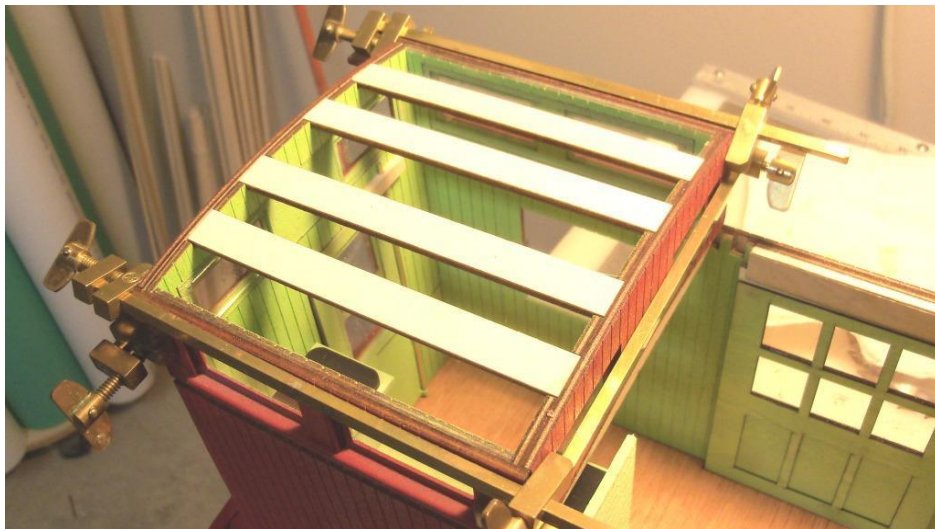


Step 17.

Cupola and quarter round door trim. Glue and clamp the 2 cupola side and remaining end.



If you have a figure to sit in the cupola, glue it in now. Otherwise, glue in the 4 braces.

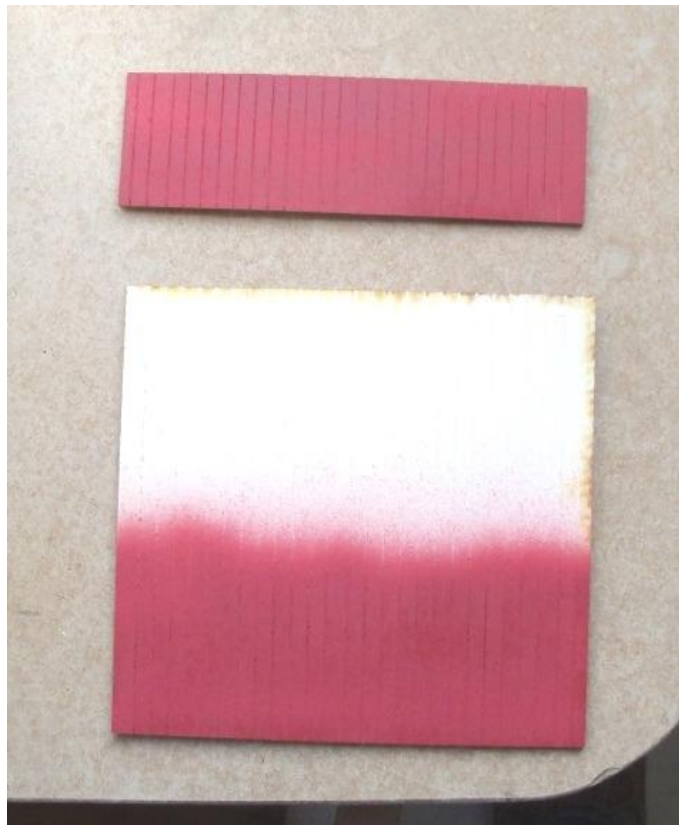


Paint the 4 quarter rounds and glue and clamp into the outer sides of the door openings.



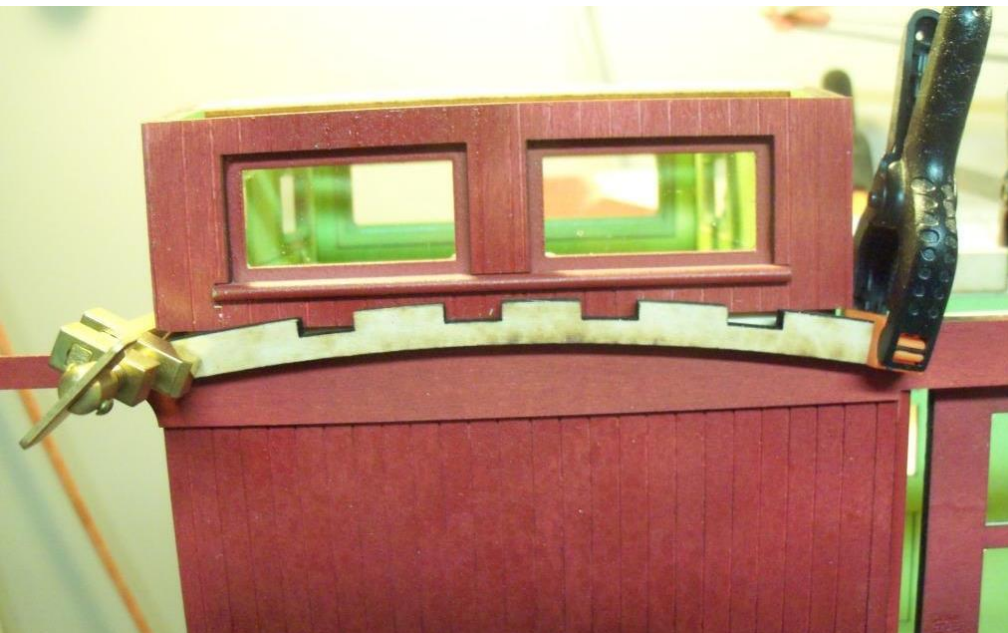
Step 18.

Short end roof. Long end roof. Cupola roof. Side letter boards. Paint the undersides of the short end and long end roofs. The undersides are scribed all the way or halfway. Paint the underside edges of the cupola roof. Paint all sides and edges of the 2 letter boards. Paint all 4 of the outer door braces. First, glue the letter boards to the upper sides of the car. Notice the notches in them that fit over the side doors. Most of the boards can be clamped easily to the sides. Under the cupola, I used a couple rafters to help hold them tight to the car sides. Glue them flush to the top edge of the sides. If they are too low, the 3D printed side windows won't fit into the window openings. You can pop a couple windows in (don't glue) to help with positioning. First picture, undersides of long and short end roofs.

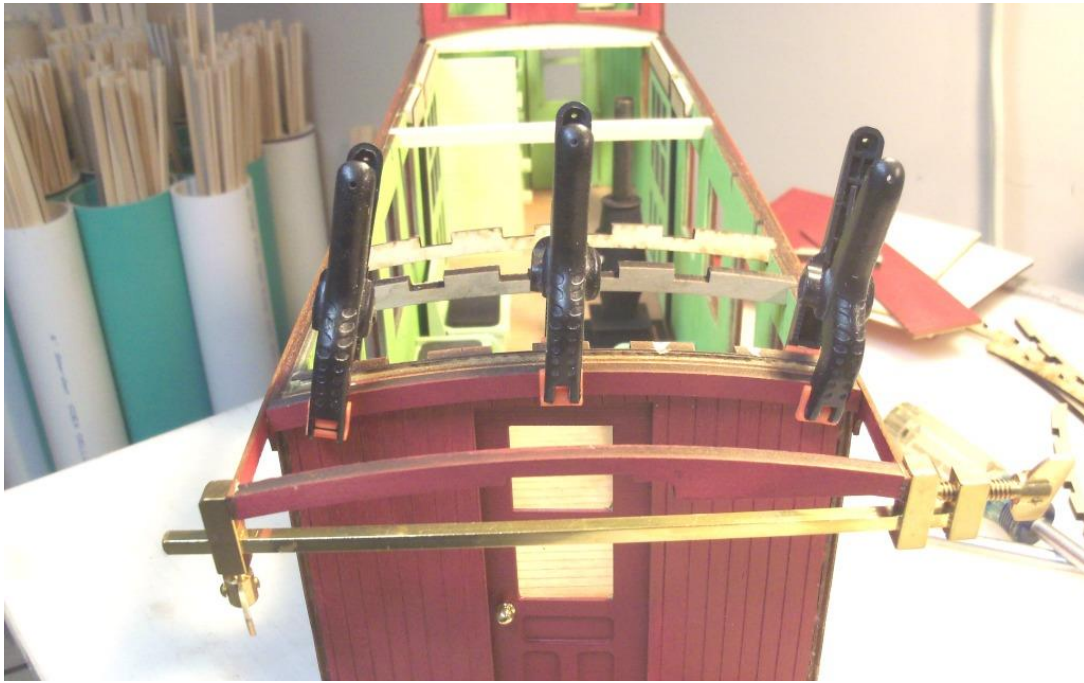




I used a rafter to help clamp on the 4 windows side.



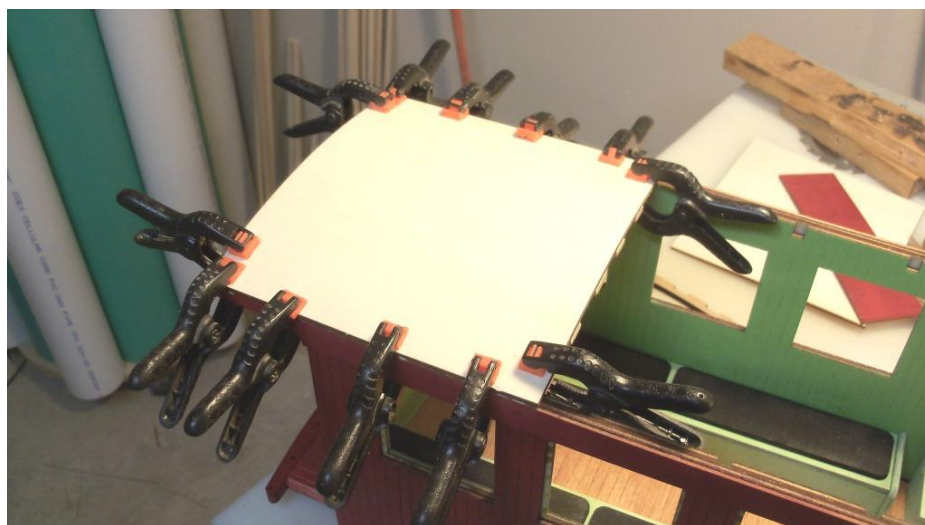
2 of the 4 roof braces are notched for the catwalk end supports and left side ladders. 2 are not. Glue an un-notched brace to the car between the letter boards and flush with the top of the end. Glue the notched brace between the letter boards and clamp as pictured. This is the long end of the car.



Do the same at the short end of the car. The top of the un-notched brace glue flush with the bottom of the roof notch in the car end wall. Clamp until dry.



Glue 2 rafters into the first 2 rafter notches in the long end of the car and then the 4 braces into the 4 notches in the rafter. Same as you did for the cupola roof braces. I failed to take a picture of this. Then test fit the long end roof onto the car. The roof will only bend one way. The painted scribing is to the outside and should only overhang the end brace by 1/16". When satisfied with the fit, add glue to the car edges, brace tops, position and clamps



Now glue the cupola roof on. It will only bend one way. Again, I used rafter to help clamp tight.



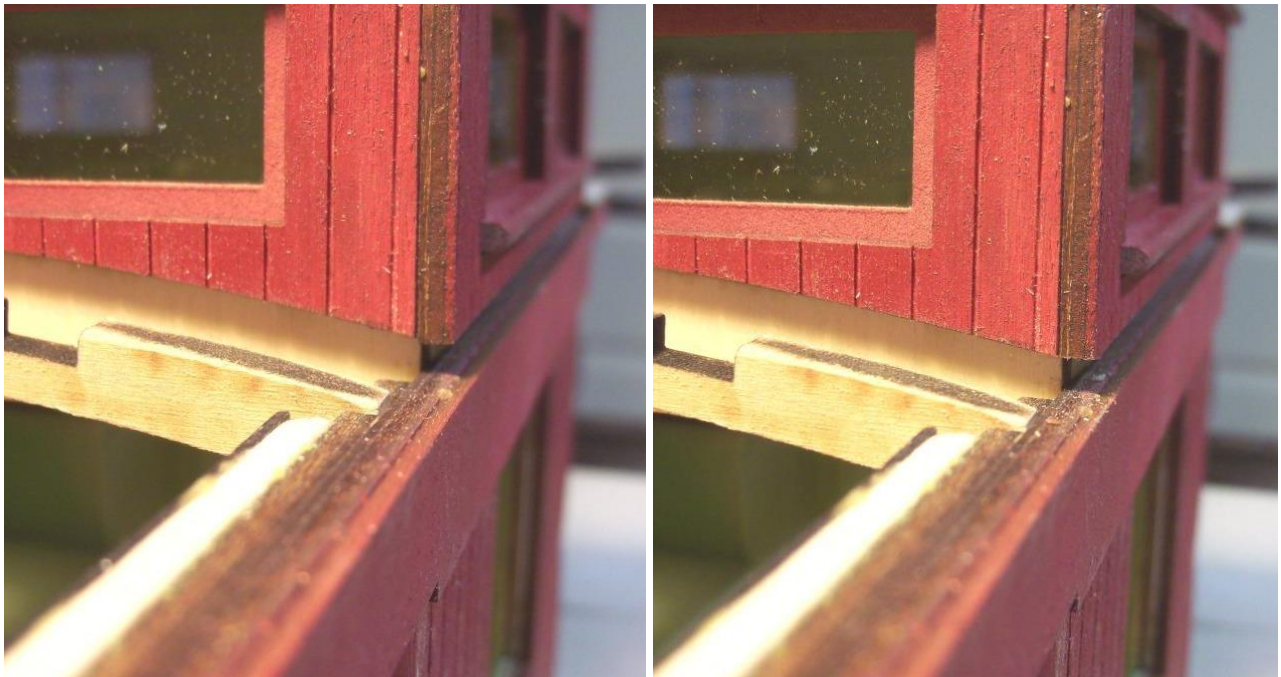
Now glue the short end roof on. Painted scribed side down. You might need to sand the car edge to fit into the notch if, for some reason, it's too tight to fit in. Once you have a good fit, add glue and clamp into place.



Let thoroughly dry before removing clamps.

Step 19.

The removable roof. First step is to cut and sand the side edges of the long end side of the cupola as pictured. Hard to see but the bottom edge of the cupola side is square cut verse the round cut of the end wall of the left picture. I used my exacto knife to trim that corner edge to match the curvature of the rounded end wall. This allows the roof to fit under the cupola end wall better.



All the rafters fit snugly into the rafter notches. You need to sand the sides of both ends of the rafter so they are a loose fit, so the roof comes loose easier.



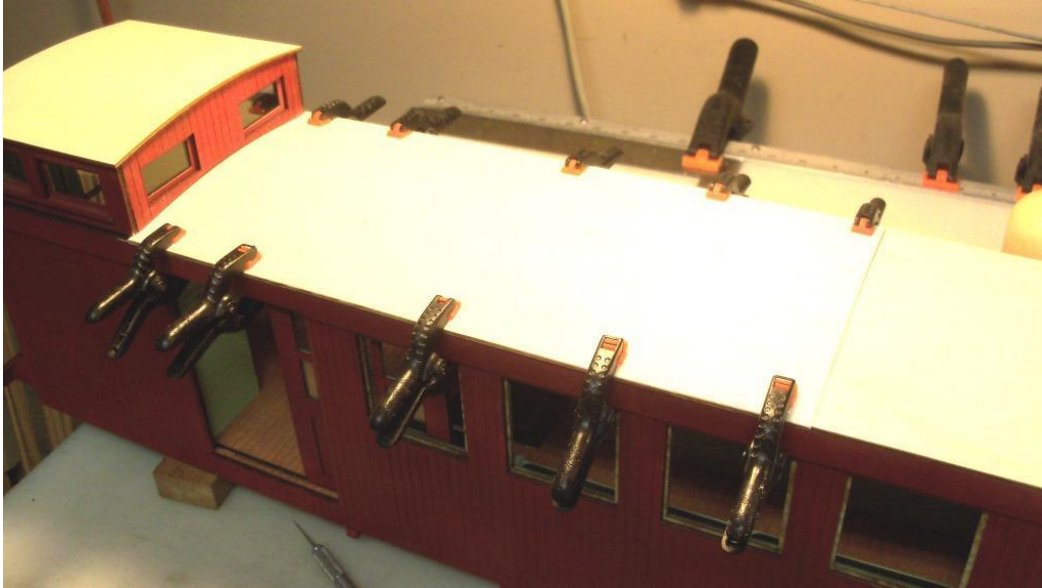
Lay out the 6 rafters and 4 braces but do not glue.



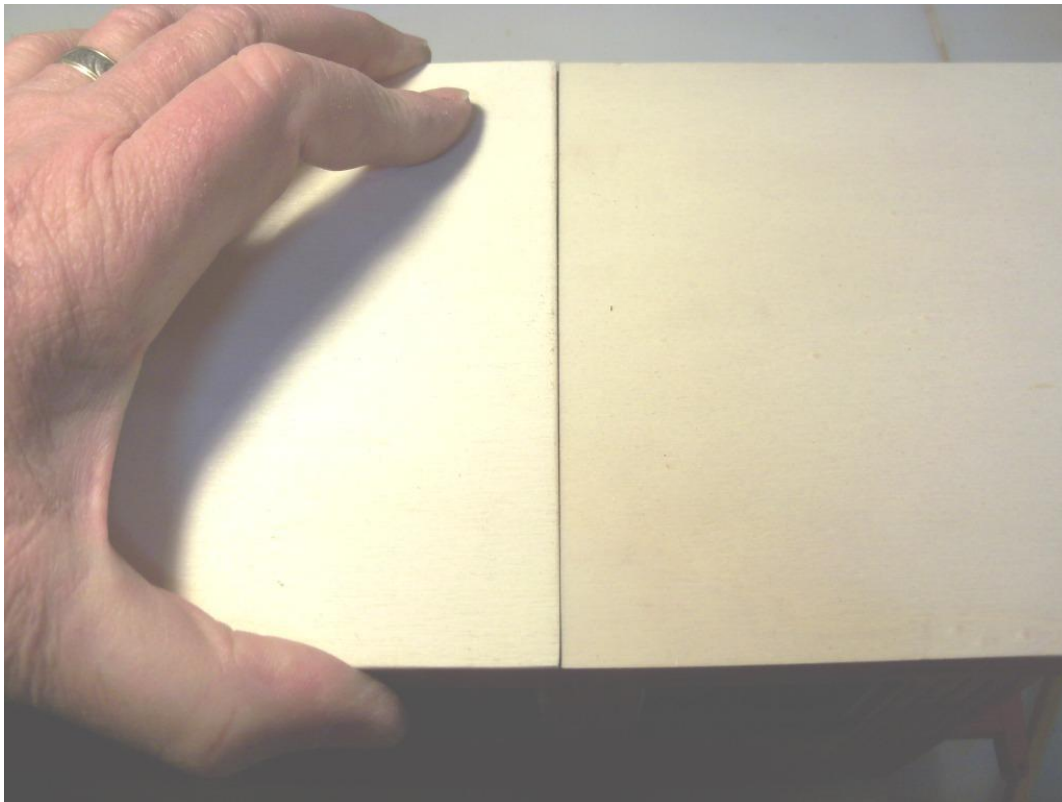
The methodology to remove the roof is that the roof slides in under the cupola, then drops in at the long end of the car. To do this, the rafter next to the cupola must be able to slide front to rear. For that to happen, the notch next to the cupola must be twice as wide as the other rafter notches. And, the rafter must sit in that notch all the way next to the cupola. The braces are 12" long and should glue into the rafters flush at the cupola end. At most, a 1/16" overhang at the long end roof section. Approximately in the middle of this section is a wider notch for the 1/4" by 1/4" car width brace/spacer. If the car sides warped in a tad, this will help the sides stay out to the proper width. When all looks good, glue the braces to the rafters making sure the cupola end rafter is at the back end of the notch, next to the cupola. **DO NOT** glue the rafters to the car sides. Once dry this assembly should lift in and out easily. You can lift up the long end and slide it to see how this will work.



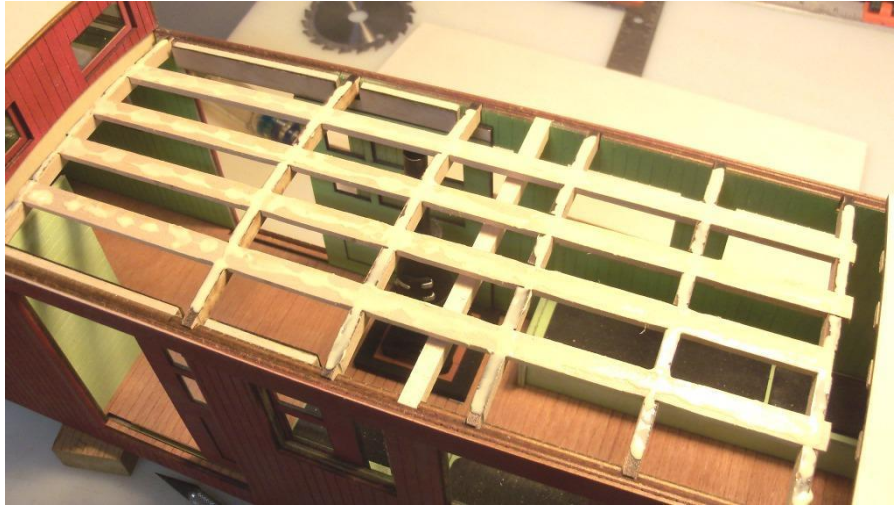
Now test fit the roof to the frame. Slide one end under the cupola end wall. If the edge of the roof won't easily fit under the cupola, sand the top edge until it does.



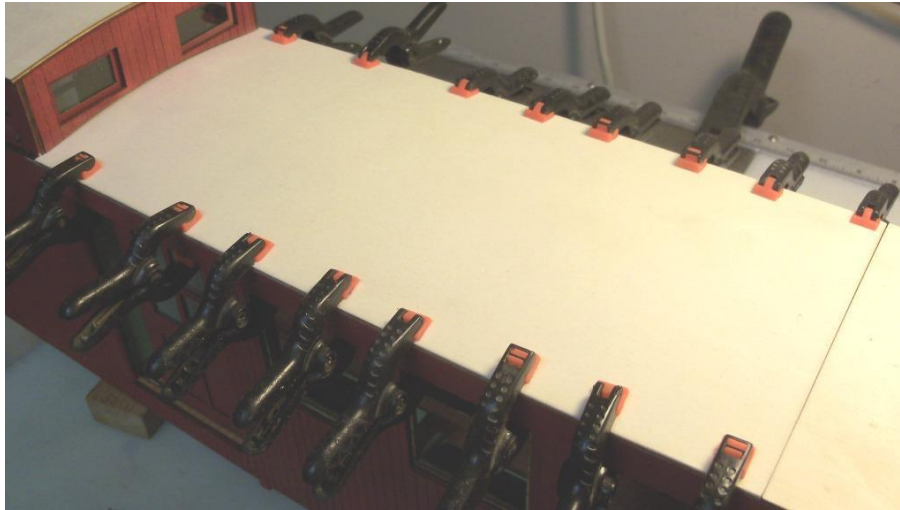
The long end, end of the roof should line up with the long end roof previously glued into position. There should be a 1/16" gap to 3/32". If not, you may need to trim the roof's length. Make sure the other end is securely under the cupola before any length cutting. Once you have a good fit, glue it to the rafters and braces.



When adding glue to the rafters and braces, stay clear of the rafter edges close to the car sides. You don't want any glue to ooze into the rafter car notch and glue the rafter in.



Lots and lots of clamps. Plywood doesn't like being bent this way so lots of clamp and let this dry overnight. I clamped from the window openings to the roof edge.

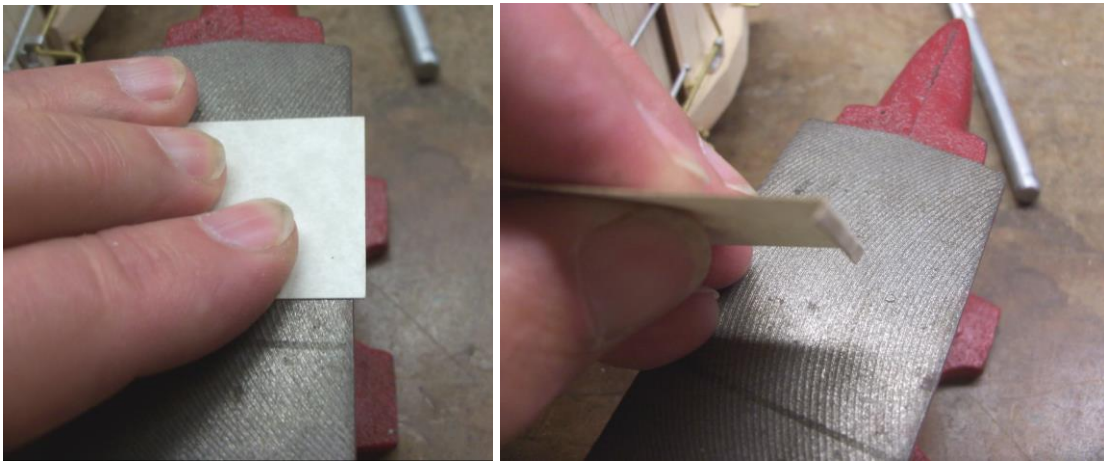
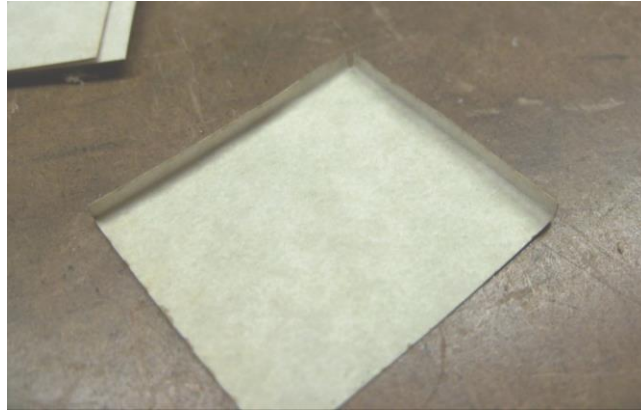


Once dry, remove all the clamps. Lift the roof up at the long end roof section so the rafters clear the notches. Side the roof towards the long end until the plywood roof clears the underside of the cupola. It should come out at this point. If not, look through the side doors and see if the rafter is moving within the notch. I've built 3 of these cars and one I had to get in with an exacto knife to enlarge the notch a tad. Once you can remove and install the roof OK, add glue to the ends of the rafters at the roof edge and clamp. This will reinforce the rafter edges so the roof won't try to break loose from the rafters at the edges. Set aside until dry. On mine, I added glue along both sides of the rafters and the roof. Also, in the roof bag are 2 thin pieces of lasered plywood, these are the fillers for the gap between the cupola and car sides. You may need to sand the thickness. Glue both in.



Step 20.

Roof tiles. Included are 2 sizes of tiles. Grab the larger 20+ each at 1.6" x 1.7". Let start with the short end roof. Start by cutting a .1" by .1" corner from one corner of two of the tiles. Then bend down the 2 sides .1" as pictured here. These 2 are the corners. The roof is 1.6" wide so the 1.7" length is to the side so .1" will overhang and cover the back edge and .1" of the 1.6" length will overhang and cover the side edge.



I use one of my anvils that has a good sharp edge for bending the edges of the tiles.

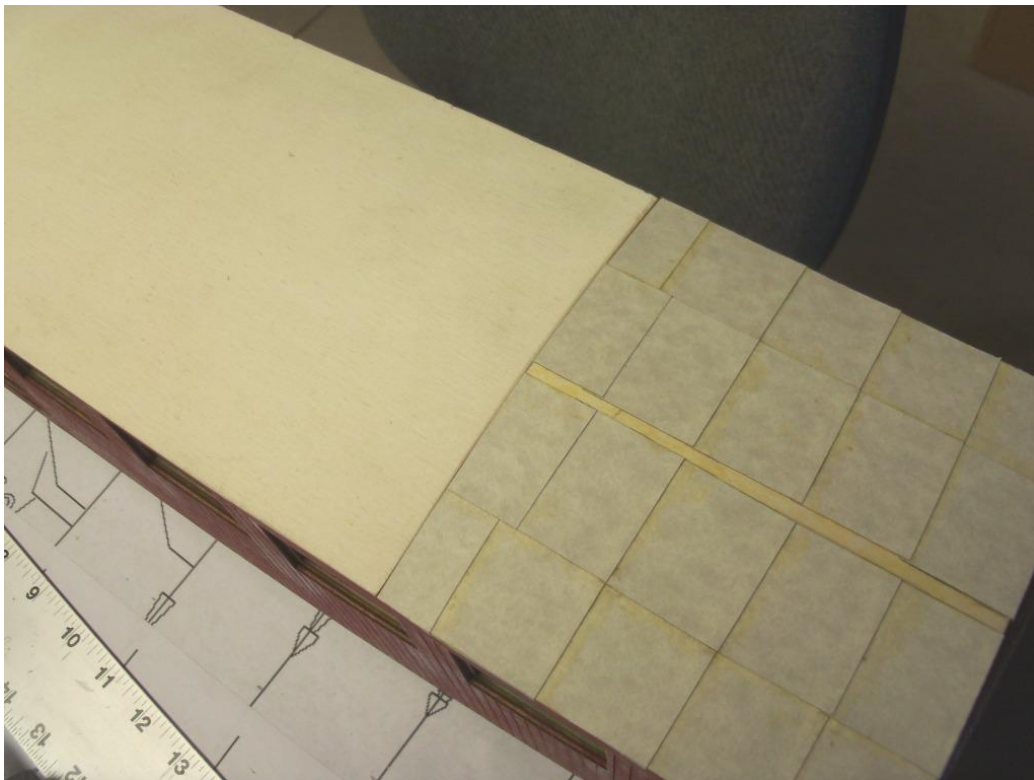


One corner tile at each end and 2 with only .1" of the long edge bent so the remaining tile is 1.6" by 1.6". Overlap the corner tile by .1". Any gap in the middle will be covered with the catwalk.

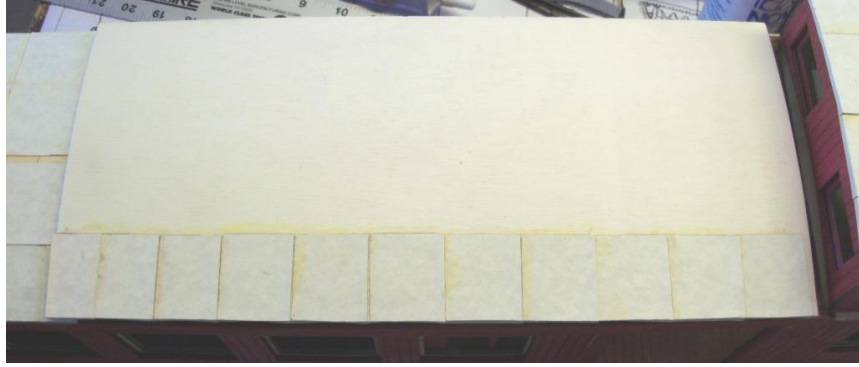
You'll need the remaining 16 of the 1.6" by 1.7" tiles to cover the cupola roof. The orientation of the cupola tiles is 90 degrees rotated from the cupola. You need 4 corners, 4 with the 1.6" edge bent and 4 with the 1.7" edge bent. The last 4 with no bends. The 1.6" length edges are to the sides and the 1.7" length edges are to the front and back of the roof. Glue the corners on first. Then the 2 tiles along the front edge and back edge. The plywood roof is 5.7" wide. 4 tiles 1.7" long is 6.8". With .1" overlap on the sides and .1" or more overlap of the center tiles, you'll be able to fully cover the roof with 16 tiles.



Now grab the 80 smaller, 1.3" by 1.5" tiles. You'll need 20 to cover the long end fixed roof. Start and the corners and work towards the removable section of roof. 4 full tiles will get close to the center of the roof. Cut a tile to finish flush with the edge. The do the center tiles. Any gap in the middle (like mine) will be covered by the catwalk.



The remaining tiles will go on the removable section of roof. Start at the cupola end. Leave approximately 1/8" bare so the roof edge can fit under the cupola. It won't fit with tiles glued to the edge.



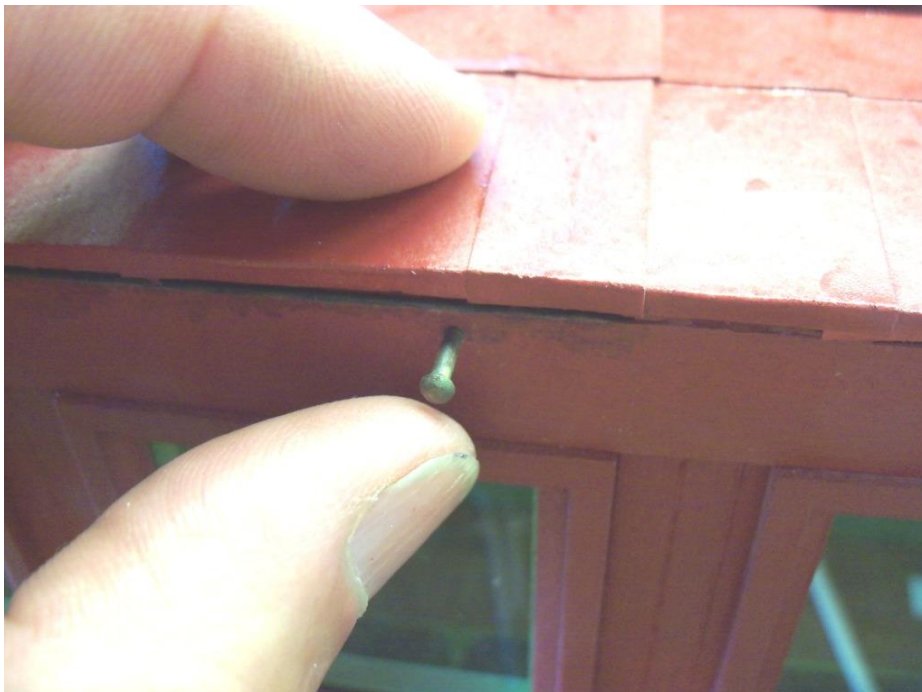
Overhang the long end fix roof by approximately 1/8" to hide the joint. Finish adding tiles.

Once all the tiles are dry, remove the center roof and paint the underside/inside green and the top/outside red. The tiles don't readily suck up the paint, so you'll need to do 2 or 3 light coats, so it doesn't run.

Mask up all the windows on the cupola, short end side windows and door windows. I taped newspaper all around both ends of the car and over the open center section so no paint would get sprayed into the car. Spray the roof red with 1 or 2 coats of paint. Let dry and touch up any thin spots. Once dry, remove all the masking and fit the removable roof section into the car. Because my roof warped a little, the front didn't stay inserted. The back is held under the cupola so it's tight. To fix this, I drilled a #52 (1/16") hole through the letterboard into a rafter.



Then inserted the 2 brass rivets



I blackened the head, so it wasn't so shiny. If you're roof fits snugly, you don't have to do this. Depending on handling, they will keep the roof in place. You're call.



Due to the length of these instructions, this is the end of part 1. The rest of the build is in part 2.

The under body of the car. The platform ends. All side windows. Catwalks, handrails, couplers, et-all.

Comments are always welcome. Positive or negative. Please contact me for any issues with the construction. My email is phil@philsnarrowgauge.com. Email is the best way to reach me as I check it several times a day. I'm not always near a telephone.

Please send photos of your completed model. I always enjoy seeing my customers work.

Thank you for the purchase and I hope the build was as fun for you as the design was for me.

Phil Dippel
Phil's Narrow Gauge