

Photo by Mike Tylick for MR Magazine

This signal tower is one I am building from a picture in a Model Railroader Magazine from some time back. The model was built by George Sellios for his HO layout *Franklin and South Manchester*. He built his in HO scale (1:87). I'm building mine in N scale (1:160) for my own layout. The base is brick and the upper story is clapboard. One of the aspects I will find challenging will be scratchbuilding a set of stair risers. But first, lets list some of the tools and materials I'll use:

Materials

.040" plain styrene
 .080" channel
 HR Bricksheet
 GL 8005 windows (Qty=8)
 3X5 index card (Qty=3)
 HO 2x8 strip styrene
 HO 1x6 strip styrene
 GL door (Qty=1)
 .040" V Groove Styrene (.040" spacing)
 4x4 HO strip styrene

Tools

1 sided razor blade
 #11 Xacto blades (a couple) and Xacto knife
 3" and 5" metal machinist squares
 Dial Calipers
 MEK
 various small files
 Scale Ruler
 razor saw
 metal straightedge
 compass
 divider set

PROJECT START DATE: Wednesday June 2, 1999

The first thing I did was to modify the windows needed for the front view wall. These are 8-pane windows, which I changed to a 2-pane window by carefully cutting the inner muntins using a sharp razor blade. The muntins I cut out are drawn thin below. The outer frame and the muntin across the center are the only ones left. I then filed the cut area to smooth out the window frame.



Fig. 1

Once I cut out the 4 windows that will be used on the front wall of the tower, I placed them flush side-by-side. I added 3 scale N feet to either side to obtain the measurement for the clapboard front wall. Before I cut the front wall from the .040" V-Groove Styrene, I took my razor saw and depressed some "grain" into the plastic styrene. This will represent wood grain. At this time, I chose not to cut the window openings yet. Once I got the measurement which came to 18 N-scale feet, I decided to cut out the wooden second floor walls first.

Cutting the Wooden Walls:

The first thing I needed to do was to make sure walls are square. I use a 3" and 5" machinist squares (depending on how much styrene I need) to square up a corner first. I do this by scribing a straight edge using my own straightedge or else I use the grooves already scribed into this particular piece of styrene. I make a point mark using a compass or an old track nail. I place the square along the straight edge, and lightly scribe a line. I measured 18 N-scale feet and made another point-mark. I laid the square on the edge and scribed a second line. These scribed lines should be 90 degrees. By counting the number of boards on George Sellios' model, I determined the height of the second story walls would be 8 N-scale ft. I used the closest groove in the siding as a guide. I repeated the process to make the back wall. The back wall will also contain 4 windows side-by-side. The side wall will contain 2 side-by-side windows and a door. I determined the length of the side wall to be 13 N-scale ft. Using the same procedure, I cut out the 2 side walls that will make up the second story. I plan to

join the walls with a vertical 4x4 styrene strip. The strip will be depressed wood, so once again out came my razor saw.

Cutting out the Window Openings:

I next took the 4 windows that would be on the front view, and filed the sides flat so that when I place them side by side, there would be no rough edges and the MEK would run smoothly and bond the windows together. To keep the windows square, I used both machinist squares to keep the tops of the windows even, and the side of the end window straight at 90 degrees. I used dial calipers to measure the window opening. I didn't measure the framing around the window, since the window framing would overlap the window opening. After recording the measurements, I counted down three rows of V-grooving on the styrene sheet. Once I measured 3 scale feet from the edge, I used the point end of the compass to prick a small hole. Using the 3" square, I then lightly scribed a line which began at the hole, and extended the height of the window opening. I used the calipers which was locked to the width of the entire window opening. (Remember the entire window opening is actually four individual windows bonded side-by-side.) Again I pricked a small hole, and scribed another line from the hole using the square. This line was long as the other line. I carefully followed the V-grooves to scribe the top and bottom of the windows. These 4 lines would make up the window opening. (See Fig. 2 below)

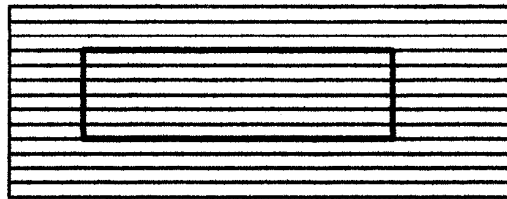


Fig. 2

The bold rectangle in figure 2 represents the 4 scribed lines that form the edges of the window opening. Before I tell you how to cut the window opening, I want to explain one simple rule I follow to make a neat opening rather than a sloppy opening.

Rule 1: Never cut the whole way through styrene with an Xacto knife unless it is a scrap piece of styrene. Blades on Xacto knives are beveled and leave a small ridge where you press the knife. This causes lots of filing later.

To cut the window opening, I drill a hole through the center of the window area of the styrene. This would be the center of the bold rectangle in figure 2. Then from each of the 4 corners in turn, I cut a line to that center hole using a straightedge. Do not cut from the center hole out to the corners. Notice I said "cut", not "scribe". I cut the lines the whole way through the styrene. These pieces will be scrap. Do not cut along the bold lines. Once there is a line from each corner. There are now 4 different triangular pieces of styrene cut inside the window area. Since I scribed the lines lightly along the edges of the windows on the grooveside of the styrene, I want the groove side of the styrene face up. I'm going to push each triangular piece of styrene away from me. The styrene should snap where the 4 scribed lines are, leaving a clean and smooth opening for the windows. The corners will need filed with a square file from my small file assortment.

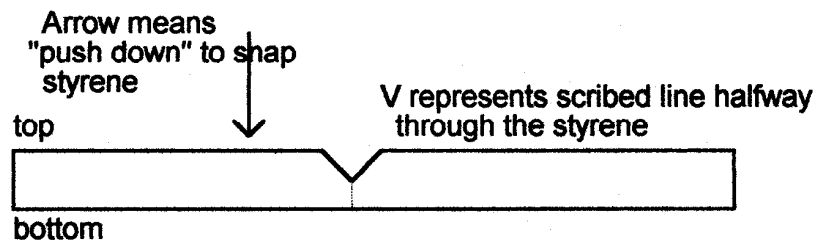


Fig. 3

Figure 3 shows a cross section of styrene that was scribed. It shows which direction to push the scrap piece to break it off. That's it for cutting the window openings. Measure the windows, locate them on the groove styrene, mark them, scribe and remove the scrap pieces. I did all four walls and cut out the necessary window openings. The window on the side is only 2 side-by-side windows rather than 4 windows. That window set was built the same way. The door opening on the side was done the same as the window opening, except it extended to the bottom of the wall. I still removed the scrap triangular pieces of styrene the same as the windows.

Building the Lower Brick Story:

Because the second floor would overhang the first floor (see the photo at the top), I needed to construct a base floor for the second floor. I glued the 4 second-floor walls together using MEK. (Note: MEK which stands for Methyl-Ethyl-Ketone is a very potent bonding agent when it comes to styrene plastic. A drop or two of this liquid will bond two pieces of styrene together in seconds. Capillary action allows the MEK droplet to roll along the edge where the 2 styrene surfaces meet. This brings me to my second rule:

Rule 2: When bonding styrene using MEK, always make sure that the 2 surfaces are held tightly together without any gaps between them. You will need to file the edges straight to be sure they are absolutely flush. Hold them up to a light and check for gaps. Also remember MEK is a potent and potentially dangerous chemical. Treat it with respect and BE CAREFUL

Once the four upper floor walls were bonded together (it only takes 5-10 seconds with MEK), I took measurements for a floor. Since I wanted the floor to fit neatly INSIDE the opening, I had to carefully measure this opening as precise as possible. Enter: my trusty calipers. With these, I can measure in .001" increments. I made a cutout of the floor with a 3x5 index card. After all, ruining an index card with a wrong measure is better than ruining a piece of styrene, even if it is only 2 or so inches square. Once I got the card trimmed and it fit, I transferred the measurements to a piece of .040" plain styrene I had in my grab box. It fit nicely, after a touch with my file. I bonded it in place with MEK.

I built the bottom floor somewhat larger than the top floor, although the top floor overhangs in the front. The doors and windows on the bottom floor were cut out in the same manner as the second-floor windows. However, there is one twist. The bottom floor is brick while the top floor was clapboard (represented by V-groove). The windows on the lower floor have arches above them. To achieve the arches, I just rounded off the opening above the window.

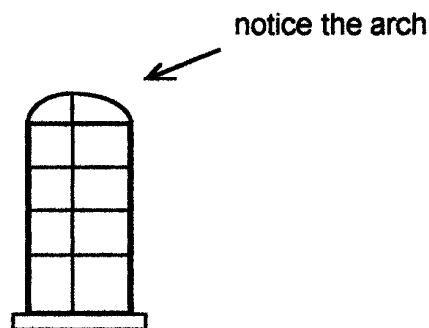


Fig.4

I used leftover pieces of Holgate and Reynolds Bricksheet to make the brick walls of the first floor. The brick is only .020" thick. Therefore, I had to glue it to a support wall of .040" styrene. I used a superglue ACC called Quiktitite to achieve this. Once the glue set (it only takes a minute or so), I cut the window openings and door opening from the back. I glued the walls from the inside using MEK, and added a support 4x4 styrene strip in each corner for support. I knew the roof of the first floor would be a flat gravel roof, so I cut the 4x4 strips about 1/16" from the top. I then glued 4x4 strips around the walls 1/16" from the top. These strips would support the sunken, flat roof when it came time. After the walls were together, I spray painted them a red primer color that closely resembles brick. With H&R brickface (an embossed vinyl sheet), one can add mortar easily, as well as painting random individual bricks a different color. This adds some character and is the way it's done in real life. To paint the mortar, I brush-painted the red brick walls white a little at a time. I then went back right away and wiped off the white paint in a downward, then sideways motion. If done right, it leaves the white mortar lines, but removes the white from the brick. Once this was complete on all the brick walls, I took a flat toothpick and dipped the tip of it into Raw Umber paint, and painted a few random bricks. I then took a different toothpick and dipped it into Red Clay and dabbed a few more bricks. My third and final varying color was Burnt Sienna. Once these were dry, the next step I wanted to tackle was a subassembly that would be added later...the stairway to the second floor.

Scratchbuild the stairs and handrailing

Had this been an HO model, open stairways would have been easy to add since Central Valley, among other companies, produce a realistic stairway set. Unfortunately, my model is N scale, and the CV steps would be just too big for the small size of the tower. Therefore, I needed to scratchbuild these open stairs and railing. I decided to cut the risers from 2x8 styrene, and the steps themselves from 1x4 styrene.

I would use 4x4 for the railing posts and 1x4 for the railings. I had built a jig one time as an aid to gluing the steps to the risers.

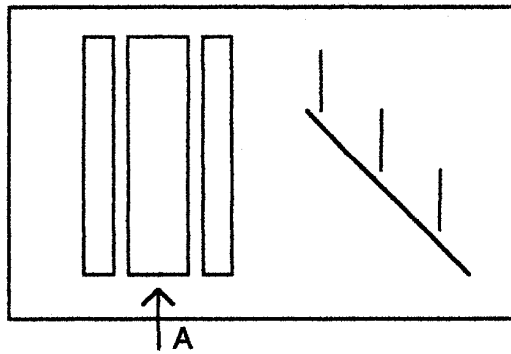


Fig.5

The picture above is basically what the jig looks like. 'A' is a piece of stripwood 3 scale feet wide. Two other pieces of stripwood are glued to the jig's wooden base a scale 2" on either side of 'A'. 'A' represents the width of the stairs. The pieces of stripwood are .030" thick. The lines on the right represent the railing and posts. I slip a 1x4 strip along the 45 degree piece of stripwood. I use a Northwest Chopper, a mitering tool used for cutting styrene using a single-edged razor blade to cut the posts at 45 degrees. I made the posts 3 scale feet high. The Chopper came in handy for cutting multiple pieces of strip styrene to the exact same length in rapid time. I used MEK to glue the railings to the posts. **HOWEVER**, instead of using the MEK needle, I used a fine #00 brush. The main reason was that I didn't want too much MEK melting the styrene, and messing up my wooden jig. Once the railing was complete, I set that aside. That was the easy part. Now comes the challenging part.

When it came to building the risers, I let out a few expletives I won't repeat here. I needed something that had right angles, and perfect squares to use as a base for cutting the roughly 9"x9" risers. The first thought was graph paper, but I would have needed the grid to be smaller than 1/16th of an inch. I couldn't find anything smaller than 1/8th. Then I remembered that a friend of mine named Joe Dube had once given me a mesh material to use as a support for some mountains I had once built. I found a small piece and measured the size of the squares. They were so close to the right size, that I decided to try it. I carefully took a SHARP razor blade, and using a magnifying glass, cut the mesh on a diagonal to form a stairway-like object.

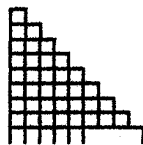


Fig.6

Notice the stairway-like appearance in Fig.6. I took one strip of 2x8 and taped it to my workbench. I taped a second piece parallel and next to it to help support the mesh material. I then taped the mesh material to the strips and to the workbench so it wouldn't move as I began to cut out the stairway from the 2x8. I lined up the points of the mesh with the edge of the styrene strip, and was careful not to stretch or distort the mesh during taping. Once it was taped and everything was secure, I took my SHARP razor blade, and carefully cut out the risers, being extra careful not to cut the mesh, but cutting into the corners as far as possible. This chore took 5-10 minutes to cut out about 8 stairs. I cut out enough for 4 sets of risers (2 risers with 8 steps and 2 risers with 3 steps). Once finished, I carefully untaped everything. All the risers were neatly done.

I placed the 2 longer risers in my stair jig (Fig.5) and lined them up to match. I used the Chopper to cut 11 identical pieces of 1x4 styrene for the steps. Using my #00 brush, I dabbed on MEK bonding each step to its proper place. The steps overhung the risers slightly on both sides as it is in real life. However when I went to line up the stairs for gluing to the landings I'd built, I found I needed an extra step since I forgot to take into account how I wanted to glue the stairs to the landings. Back to the drawing board, and I made more steps. I finally got all the steps glued to the landings and the railings in place. I let the stairway assembly sit a bit before I spraypainted it. I spray painted it Dove Gray to start. Once that dried, I dabbed on small amounts of rubber cement. After that dried, I resprayed the stairs a Hunter Green color, and allowed that to dry. Then I took a piece of masking tape, and dabbed the areas where I had dabbed the rubber cement. I also rubbed the masking tape over the stairs. The effect was a nice peeling paint effect to add to the weathering process I would do once the entire tower was finished.

Install Windows & Doors

The windows and door are castings made by Grant Line. Since they are styrene, I used MEK to glue the windows together, and to

glue the door to its frame. I left the door slightly ajar to add a little character. I then needed to paint the castings. I took a piece of masking tape and looped it to make a piece of double-sided tape. Then I taped it to a piece of scrap 3x5 card. I then taped the window castings and door to the tape. Again I wanted the peeling paint effect, so I first spray painted them Dove Gray. I let that dry quickly, then added the small dabs of rubber cement. A spray of white paint followed, however I made it a very light coating. To accomplish this, I just held the can back farther (about 18").

Once the windows and door were complete, I glued them to the walls from the inside using the MEK. I then needed to add some glazing to the inside of the windows to represent the window glass. I used thin, clear styrene as the glass. Being made of styrene, I can glue it using the MEK. (Note: In some of my buildings, I like to model broken glass in some windows. I chose not to do that in this particular model, but to model broken glass, just cut out sharp pointy pieces of the clear styrene with a sharp razor blade or Xacto knife before gluing the glazing in place. Also make sure the broken glass is contained to one pane on the window casting, rather than across 2 panes.) Once the windows are glued in place, you may add shades by cutting small pieces of 3x5 card and gluing them to different heights on the inside of the glazing. Again, make sure they are not too wide where they will cover more than 1 window.

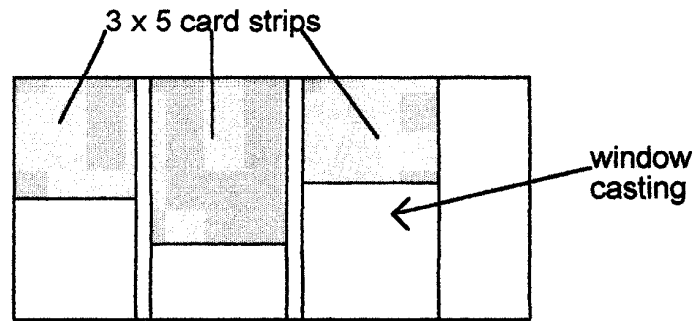


Fig.7

Building the Hip Roof and the Small Flat Roof

Once I had the walls glued together with the internal bracing for support, I started on the hip roof that would cover the second floor. I wanted this roof to be removable for when I got the time to detail the inside, and perhaps add lighting. I measured the dimensions of the walls.

I wanted the roof to overhang the walls 1 scale foot on all walls. I determined that the roof base would be 24'x21'. I cut out a rectangular piece of styrene with these dimensions. I wanted to add on some spouting. I selected .080" channel to represent the gutters. This is made by Evergreen in their family of strip styrene. I used the Chopper to cut 45 degree angles. I then glued 4 pieces of channel around the outside of the styrene roof base. Of course, I used MEK since the channels were styrene.

Making the measurements for the hip roof were tricky. I wanted the roof to be 10' high, and I wanted the straight part of the roof line to be 8' long.

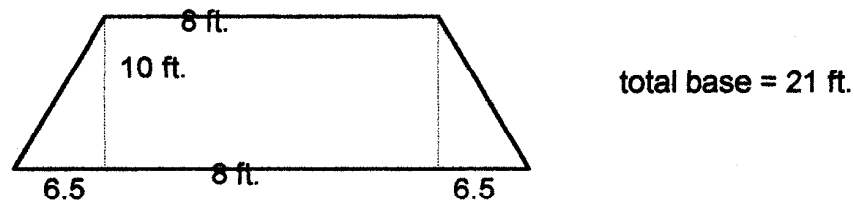


Fig.8

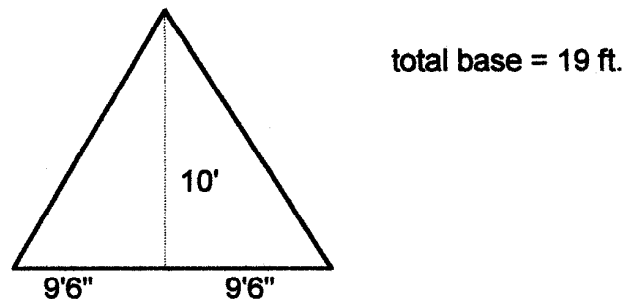


Fig.9

Figures 8 and 9 show the basic calculations for the roof. I needed to make 2 triangle supports (shown in figure 9) out of styrene. I would then need to glue those to the roof base 6' 6" in from each end (shown in figure 8). On the roof base, I measured in 6' 6" from each end, and using my 3" machinist square, scribed a very light line with the back of an Xacto Knife. I then took a piece of styrene and cut out 2 triangular pieces using the measurements shown in figure 9. I then glued the triangular pieces to the roof base along the scribed lines.

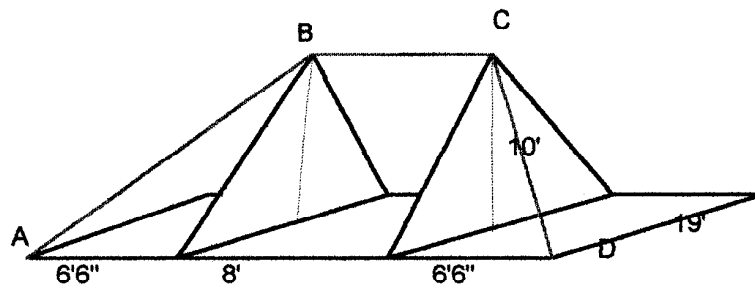


Fig. 10

Once the triangular pieces of styrene were glued, I cut a piece of styrene to be used for one of the four sloped sections of roof. The three red lines and the base form the one slope. The piece uses A, B, C, and D as its corner points. I glued this piece on along the base of the roof and along the triangles. There is an identical slope on the backside of the roof. The end slope of the roof was a triangular piece of styrene with its point at the peak (C) and its base along the roof base on the end. Again, there are two of these end pieces to the hip roof. The MEK was applied along the base and the roof joints.

Doing the shingles was a tedious task. I used masking tape cut with a razor blade. Rather than spending mucho dinero on a pair of pinking shears, I just cut the little diamonds with a razor blade. Doing one roof section at a time and starting at the bottom, I began to overlap rows of masking tape after the diamond shapes were cut out. The masking tape was 1/2" wide, but the diamonds were only cut about 1/4" or half the width of the tape. This way, I overlapped the previous piece of tape with the next one, and lined up the diamond cutouts. I then painted the roof Dove Gray and drybrushed it with antique white acrylic paint.

Building the Base

To build the base, I decided what space it would occupy on my layout, and what details I wanted to add. I allowed room for the stairs that would be added. I figured the base to be 3 1/4" x 2 3/4". I cut the base from a thick, sturdy piece of cardboard. I had several flat toothpicks I bought at the local supermarket one time (750 to a box for under a buck). I had a small can of Driftwood wood stain by MinWax. I picked out about 75 of the toothpicks and put them into the can of stain. I shook it up pretty good, and let it sit overnight. The next day, they had a fairly nice base stain. The flat toothpicks have one end that is wider than the other. The wider end also is rounded. I glued the toothpicks on the cardboard base using Elmer's Glue. I would alternate the wider ends with the narrow ends so the pieces remained fairly parallel and would be sure that the rounded edges overhung the edge of the base. Once they were glued in place, I went back with an old pair of wire cutters and snipped off the round edges, and any other edges that overhung the base. I kept a few "boards" uneven in length to add character. There were also a few places where I left small gaps between boards. I plan to "plant" some weeds there later. The toothpicks were also different thicknesses which added some realism. I then drybrushed the wooden base with Barn Wood acrylic paint by FolkArt. I then determined where the tower was to be glued, and glued 2 toothpicks lengthwise that the tower would be glued to. Once I had it snug, I glued on the lower storey of the tower.

The roof of the lower storey was a flat roof that was sunken about 1 scale foot. I set my micrometers to about .125" which is 1/8".

I used the end to scribe a light line around the inside of the first storey walls 1/8" from the top. I then glued some pieces of .040" x .040" styrene along these lines. They would serve as supports for the flat roof. I measured and cut a piece of styrene for the roof. When it fit snugly, I glued it on. I had to build a small foundation for the upper floor so it could sit flat on the lower roof. This addition would compensate for the 1/8" distance down to the flat roof. Once made, these pieces of styrene were glued to 2 of the walls.

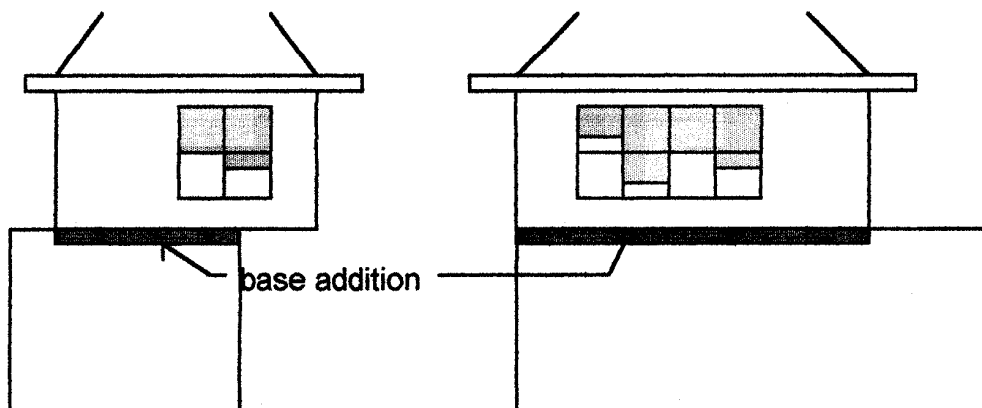


Fig. 11

The dark gray rectangles represent the added styrene pieces. The bottom of the pieces will sit on the flat roof. Once the second storey was glued onto the flat roof, the tower was beginning to come together. I painted the flat roof a flat black (no pun intended), and while the paint was still wet, I sprinkled on some N scale cinders. This represented a gravel roof. The paint would act as a glue holding the cinders in place. I then used 1x6 strip styrene to cap off the lower floor's walls. I used the Chopper to make 45 degree corner angles. The strips were glued with MEK.

Attaching the Stairway Assembly and Weathering It

It was time to now glue the stairway assembly to the tower. I lined it up to the bottom of the door. Since I was gluing the stairs to a vinyl surface (brickface is embossed vinyl), rather than a styrene surface, MEK wouldn't work as well. Therefore, I needed to use an ACC superglue. It attached well and I also glued the base of the stairway to the wood base using Elmer's glue. Weathering was accomplished with drybrushing the assembly with Antique White acrylic paint with Barn Wood drybrushing in some areas.

Drybrushing is the art of dabbing the entire tip of the brush in paint, then drying the brush with a paper towel to remove 90% of the wet paint. What's left on the brush is enough to highlight the higher spots on the surface. These spots include edges and woodgrains I scribed into the styrene before painting.

Next Step: Add those tiny details and maybe a figure or two

The End