

Construction Notes on The Side Paddle-Wheeler *Ticonderoga*

Part 5



By Alex Derry

Photo 1. *Ticonderoga's* final resting place in the Shelburne Museum.

Welcome back to Part 5. The last thing that we were discussing was the construction of the abaft partition for the first deck as shown in **Photo 95**. The last project that I discussed were the two sets of doors that were needed to separate the working area on the first deck from the passenger-focused salon and grand staircase which lead up to the second deck. These areas abaft of the doors were adorned with rich varnished paneling of black cherry and butternut woods. In my case, I used black cherry and basswood since butternut wood is a protected wood and therefore difficult to find. Basswood's lack of grain and honey color served well as a substitute. **Photo 95** shows the completed partition for the salon that incorporated these two types of wood. The chamber created forward of this partition was built up as is shown in **Photos 96 and 97**. The captain's quarters and Purser's office are shown in these Photos. Both of these spaces were slated to be lit by LEDs once the next deck was added. The Grand Staircase is seen in **Photo 96** which was installed onto the abaft wall of the engine compartment. You will note that there is a flooring placed in this space that is quite unusual. The texture is best seen in **Photo 97**. I believe that the original covering for this space was an early form of linoleum tiling. Each tile was



Photo 95. The salon partition wall shows the two types of wood used in this area.



Photo 96. The area around the grand staircase was constructed in black cherry and butternut woods. The interior of the captain's quarters has been finished and will be lit by LEDs.



Photo 97. The interior of the Pursers office has been finished and will be lit by LEDs. Note the flooring texture in this space.

small and it appears to have been laid one at a time into a complex pattern. Once I had the staircase finished, and it was mounted, I made a paper pattern to provide the dimensions for the simulated tiling's cutting pattern. **Photo 98** shows the finished pattern. I have found it advantageous to build the pattern for complex spaces out of pieces of paper that are cut for sections of the space and then taped together. The shiny tape can be seen in portions of the photo. Lots of adjustments were possible with this method to get things perfected. It was necessary to organize the use of the pattern by labeling the "top" side so that when being placed on the textured styrene sheet the "tops" of both the pattern and styrene were oriented correctly. I found in my not so local model train store, sheet styrene that had various types of textures. This one was of a paving stone pattern which, for this purpose worked well.

The Grand Staircase added an element of formal grandeur. The elegant woodwork and the elaborate entrances and exits helped to raise the appreciation of the passengers for *Ticonderoga's* uniqueness and value. I began the process of building the staircase by considering the total height of 5.1 cm and knowing that there was a specific number of steps. Also, I had measured the distance from the base of the staircase to the wall of the salon. With this information, I was able to diagram in scale the depth of each of the steps and the angle of the staircase required to fit into the space available.

Photo 99 shows the side frame for the mounting

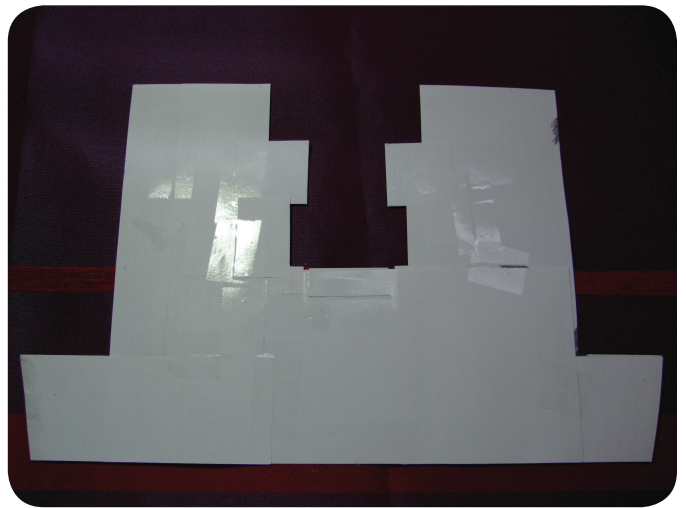


Photo 98. The pattern that was pieced together to provide the pattern for cutting the textured polystyrene for the floor of this area.

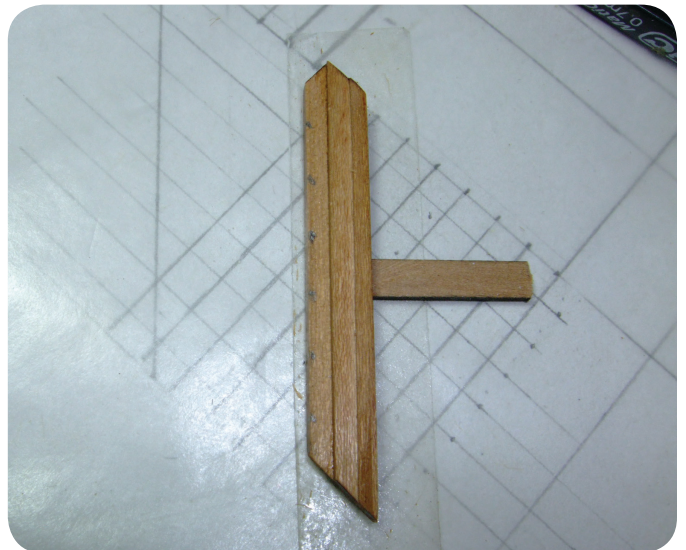


Photo 99. The side frame of the staircase was placed on the scale drawing of the grand staircase to establish the angles of its ends to match the slope required for the risers.

of the step treads. All of the necessary angles required for this piece were taken from the diagram once it was positioned on top of the diagram. This piece formed the sides of the main portion of the staircase. At both the top and bottom of this section, there were landings. There are two steps down from the second deck by either side to reach the top landing. It was framed in the background by a large mirror surrounded by an ornate black cherry frame that covered the second deck's abaft wall of the engine enclosure. **Photo 100** shows this arrangement. I decided that a real mirror was required to accomplish the full effect of the upper portion of the staircase. The lower landing offered a three-step decent to the first deck. The treads were tiled and each had a brass kick plate added



Photo 100. The top landing of the staircase backs onto a wall which has a full sized mirror surrounded by a black cherry frame.



Photos 103 & 104. Some of the refining details required.

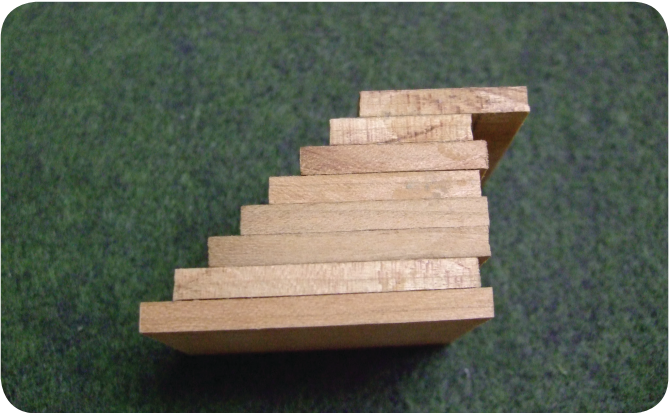


Photo 101. The assembly for the main section of the staircase. The layers are scaled to represent the risers.



Photo 102. Three scaled risers laminated were added to the bottom of the main section of the staircase. This provided the lower landing. The upper landing needed to be widened to accommodate the steps down from deck two so, two rectangle pieces were added, one on each side of the main section of the staircase.



Photo 105. The addition of the spindles to the side frame of the staircase.



Photo 106. The finished grand staircase.



Photo 107. The one-millimeter thick core for the salon partition was cut following the contours of the deck and ceiling.

The construction of the steps were done by stacking the scaled risers so that their tread outer edges followed the angle required in the drawing. **Photo 101** shows their rough structure. Following this, a lamination of three risers were added to the bottom of the main portion of the staircase as is shown in **Photo 102**. This provided the lower landing. Steps were added to the two sides of this landing. The top landing needed to be wider so on each side of the main portion of the staircase rectangular pieces were added to the sides of the main portion of the staircase, and then two sets of stairs were added for each side. **Photos 103** and **104** show refining details added to the basic structure. Banisters and newel posts were next to be added. **Photo 105** shows the first spindles being added to the top of the side frame. This required relief holes to be drilled on the vertical plane. To accomplish this task, the staircase was put below a drill press, and then with gentle pressure, the holes were cut. Careful planning was needed here to ensure that the spacing of the spindles were equidistant and



Photo 108 (above) & 109 (below). The paneling of this partition.



uniform for both sides. The banister was built with a slot in its bottom edge to accommodate the tops of the spindles. This provided a location for their attachment. Careful cuts in the banister allowed it to integrate with the newel posts. **Photo 106** shows the four newel posts for the staircase. Also, there are two tall newel posts that are designed to anchor into the ceiling beams and a small section of railing. The grand staircase was at this point ready to be installed on the ship.

The grand staircase leads down to the salon where meals were served and socializing occurred. The partition that separated the salon from the exit way from the grand staircase was built up from a one-millimeter thick plywood core shown in **Photo 107**. The core shape was traced from my pattern of the deck camber. The width of the partition was measured to fit between the two-planked walkways shown in **Photo 95**. In this photo, the finished partition is shown resting on the walls of the Purser's and captain's quarters. Aft of that, the floor tiling edge shows the final location for this

partition. The walkway boundaries are also shown here. The plywood core was laminated with cherry on both sides once the two entrances were cut away. Basswood panels were then added as is shown in **Photos 108 and 109**. The glazing was added using wood frames to lock them in place. **Photo 110** shows the partition in place. The walls of the salon are also shown along with the green flocked flooring.

The exterior walls of the salon were paneled both on the inside and out plus, included thirty-four sash styled windows. This structure presented a real challenge for many reasons. Its shape, for instance, was extreme as the sides had to follow the curve of the outer planked, walkway. Also, the tight turn that the wall needed to follow at the stern required laminations to form a permanent unstressed shape. The demands of this part of the build seemed to be endless. To start, I cut a plug out of pine which was patterned from the shape of the salon inner wall. This shape was taken from the drawings and then applied to the existing shape created by the planked deck walkway. It needed to be adjusted to produce an accurate pattern. The pine plug was cut to this shape, attached to a base once a layer of waxed paper was laid underneath the plug. The sides of the plug also needed to be wax papered. Two sided tape was used to hold this layer in place. **Photo 111** shows this structure. I decided to build the wall up in two parts. The lower portion was first. **Photo 112** shows the inner layer of cherry wood laminate placed against the plug. At the tight curve, the laminate needed to be cut into sections since the laminate wouldn't tolerate the stresses of following the curve. Two sided tape was used to hold this layer in place while a layer of one-millimeter plywood was attached. **Photo 113** shows a test lamination at the tight curve. Look closely, and you will see that the plywood has been relief cut to allow it to conform without tension. I reversed the relief cuts to face outward since it formed around with less resistance as is shown in **Photo 114**. The assembly needed to be braced during the gluing step. Next, a layer of 0.010" polystyrene was glued in place. Evergreen Scale Models Inc. is my source of polystyrene, and this choice was part number #9006. The outside of this section of the wall was built up as raised panels. **Photo 115** shows the framing required for the raised paneling. I built this up using a variety of polystyrene stripping. This was a complex and tedious task. Each opening must form an identical rectangle that will accommodate identical sized raised panels as is seen in **Photo 116**. Careful choices of materials allowed



Photo 110. The final position of the partition.



Photo 111. The plug is mounted on a waxed paper covered base. The sides were also covered.



Photo 112. The cherry wood laminate has been attached to the plug by two sided tape.



Photo 113. The plywood laminate was relief cut to allow it to conform to the curve.

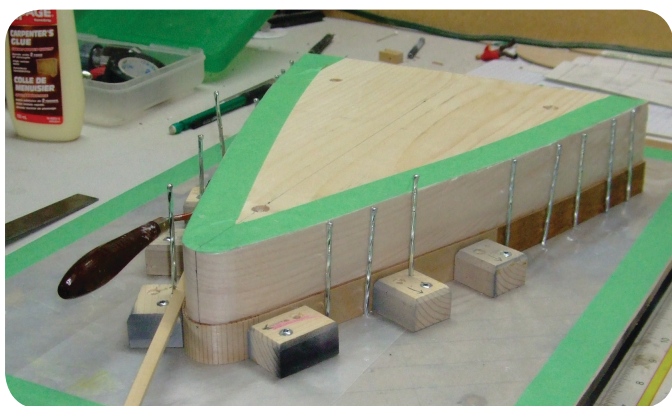


Photo 114. The plywood laminate is braced during its attachment.

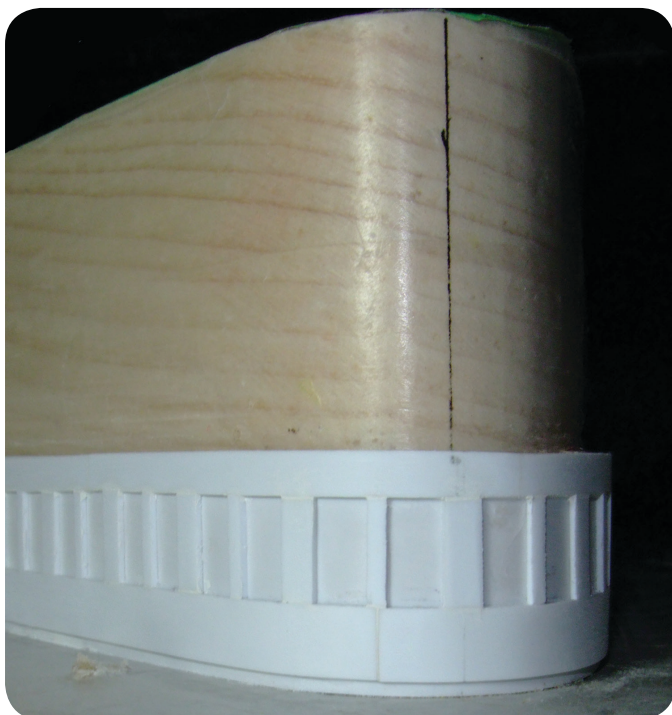


Photo 115. Polystyrene framing has been attached to make ready for the raised paneling.

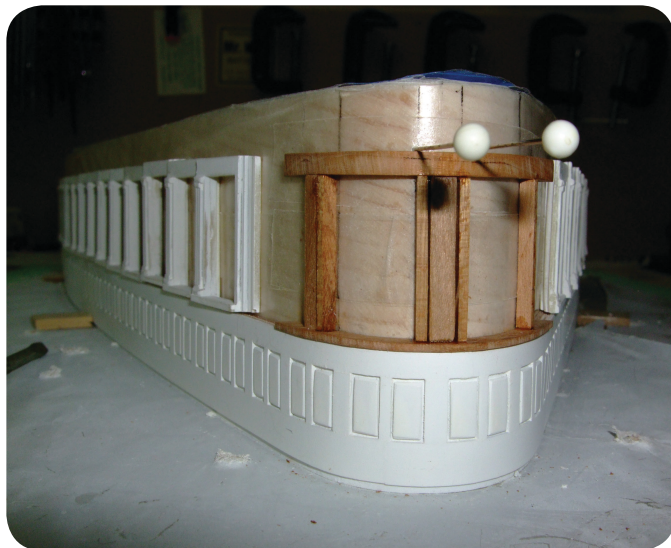


Photo 116. Wooden window frames were built to allow for the tight curvature while separate window frames were used for the rest of the wall.

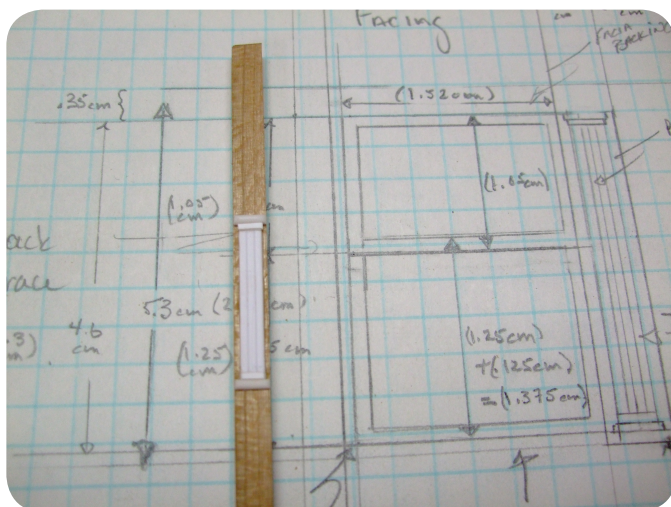
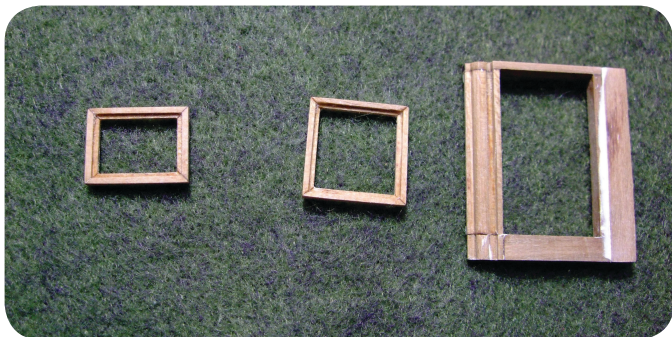
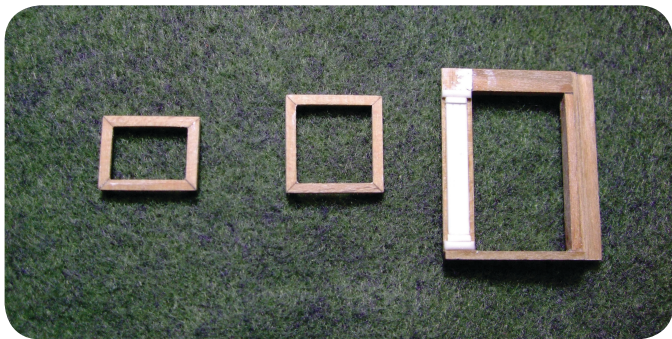


Photo 117. Detailed drawings were necessary to plan the design the interlocking frames.

there to fit within the wall space full panels.

The top portion of the wall involved thirty-four windows and their frames. I decided that since the wall was curved each frame needed to be made independently so that they could conform to that shape without stressing the curve. As is seen in **Photo 116**, careful choices of materials allowed them to fit within the wall space in full panels.

The design of the window frame required “on paper” drawings as is seen in **Photo 117**. The frame needed to interlock to cope with a joint that had to conform to the curve of the wall. This required an over lap so on one side of the frame there needed to be a shaped edge that would “hook” into the edge of the next frame’s edge. **Photo 118** and **119** shows both sides of the frame and the frames of the sash window assembly. There was also the



Photos 118 & 119. The frame master is shown along with the sash window frames. Each image shows the opposite sides, so one can see the interlinking edges and the frame design for accepting the glazing.



Photo 120. The master assembly for the windows.

lamination of the pillar façade onto the frame. The façade was made from Evergreen Scale Model Inc., materials. **Photo 120** shows the whole outer frame and sash window frame arrangement. I chose to cast the window frames since it would ensure uniformity and reduce the build time. **Photos 121** and **122** show the first stages of the mold build. This process requires persistence and patients since

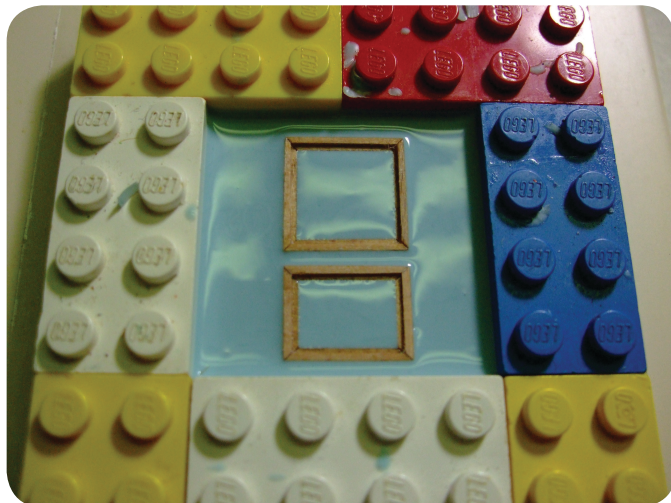


Photo 121 & 122. The first stages of building the molds for the window assembly.



Photo 123. The window frame assembly is shown in its early configuration on the plug.

not all of the casts are acceptable. **Photo 123** shows how the frames interlock. There is a requirement for filling once the frames are linked to hide the seams between each frame. **Photo 124** shows the results of the earlier filling. The seam was still visible, however, with subsequent efforts, the seam



Photo 124. The seams between each frame has been filled but needs more work.



Photo 125. The quality of filling leads to an undetectable seam.



Photo 126. The finished floor and interior walls of the salon.

became undetectable. Also, I used strip styrene to cover the outer edge of the bottom sill of the frame. **Photo 125** shows the more refined product. A word here about filler would be helpful. I used an acrylic paint and talc mixture with which to fill. It is easy to sand and dries quickly. I must disclose that this process was time-consuming since repeated applications were necessary. The assembled sash window is also shown in this photo. I decided that they should be opened as they then could give an unobstructed view of the salon interior. I believe that normally on a hot summers day they would be open to cool the dinning area.

The salon's floor was carpeted and to simulate this I chose to flock the surface. Flocking involves a base paint which acts as an adhesive while the fine fibers of the flock are shot out from a pump mechanism to land in the sticky paint. The fibers tend to land on their ends to give a uniform texture much like carpet. I chose green since the actual carpet was primarily green. I purchased the flocking kit from Lee Valley a "Fine Woodworking Tools" company. You can find them at www.leevalley.com. The Flocking Kit part number varies due to the color choice, for example, green was #98K10.03 at \$26.90 CDN. **Photo 126** shows the flocking in place. The interior surfaces of the window also needed to be built up with black cherry laminate and basswood panels were added to the lower portion of the wall as is seen in **Photo 126**. Note the addition of a baseboard trim that finished off the junction of the wall and deck.

The salon wall was ready for the next step toward its finished form. **Photo 127** shows the wall with its header added. This header provided the final height required and the slots for the ceiling beams. These beams were cut from three mm plywood to match the camber of the next deck as was described previously. The header was constructed on the plug as is shown in **Photo 128**. It was built as a lamination containing two outside layers of 0.010"- thickness polystyrene with a clear pine core. In the photo, one can see that the pine was relief cut to allow it to conform to the tight curve at the stern. If you look closely, you will notice that the header is being held up by spacers to allow a skirt piece of styrene to be attached. This skirt will cover the attachment line between the window frame and the header. A look back at **Photo 127** shows the skirt's success. Before the header could be installed, it needed to be slotted for the ceiling beams. **Photo 129** shows this process in progress. The location, angle of cut and dimension of each slot needed to be exact since each beam needed



Photo 127. The header for the salon is in place ready for the beam installation.

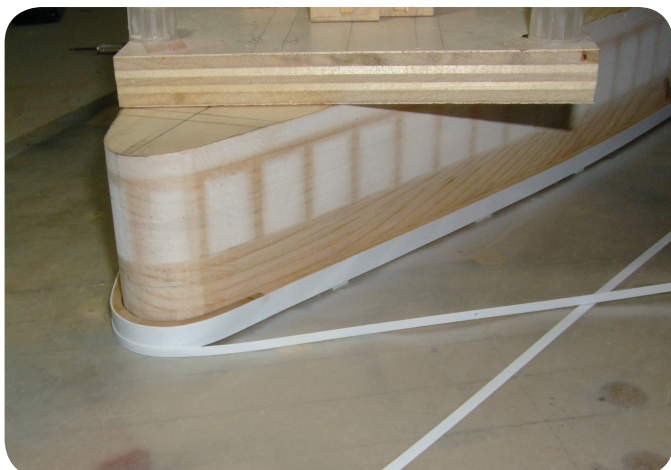


Photo 128. The plug was used to build up the laminated header. Note that a skirt was being added while the header was supported by spacers.

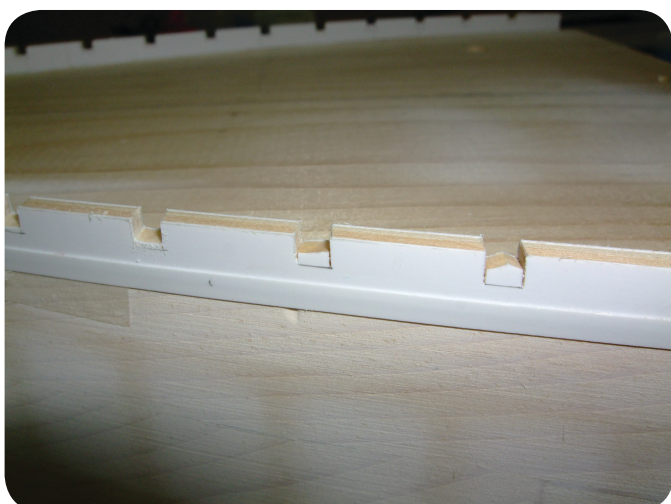


Photo 129. Slots were carefully added to the header.

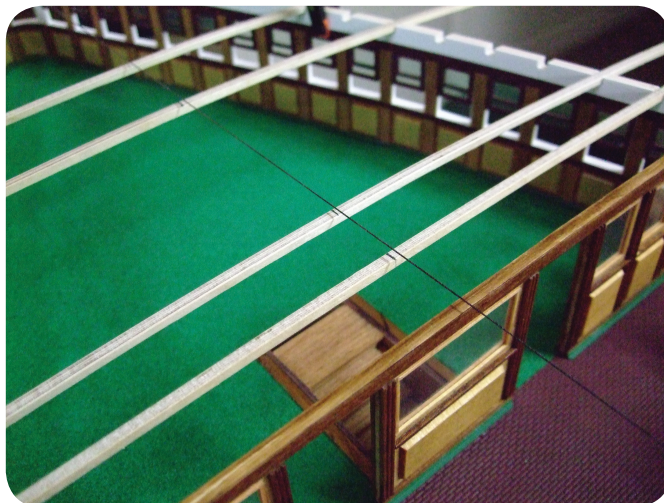


Photo 130. Cambered beams are being centered in their place while the ends are being marked for cutting to length.

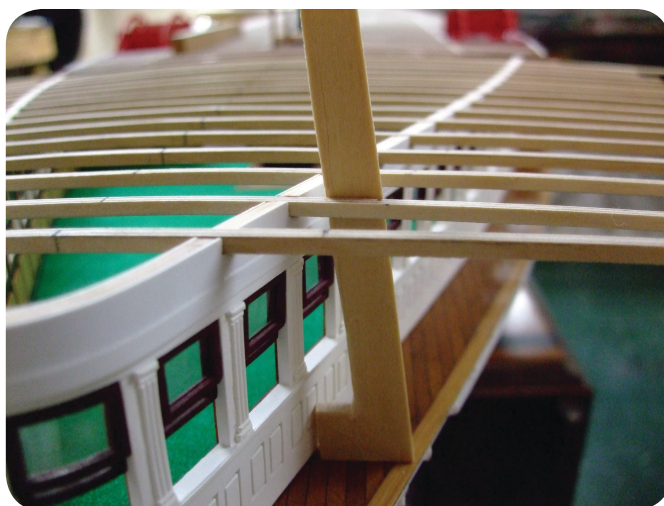


Photo 131. Shows the method for measuring the length of the beam protruding.

to interface at both sides of the salon space.

Photo 130 shows some beams being set in place. Note that there was a black center line set to guide the location of the center of the beams. The length of the beam needed to be measured so that at each end could be marked for cutting. **Photo 131** shows the method used to establish the length of the protruding ceiling beam. The “square” resting on the planked walkway is not quite square. The angle is less than 90 degrees since the device needed to rest on the cambered deck and the outer edge of the “vertical” needed to line up with the outer edge of the next deck. As I have mentioned before the design of this ship involved the layering of three decks of descending size which means that I had to incorporate that calculation into the device seen in **Photo 131**. Each cut of the beams needed to follow the horizontal angle of the next deck's outer

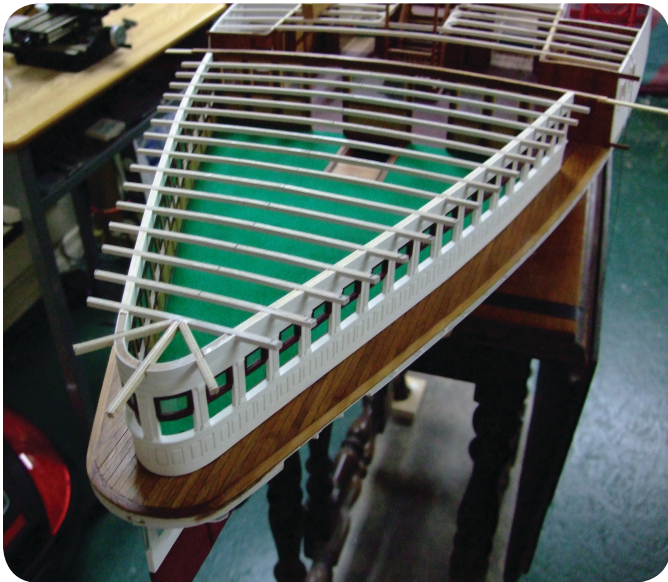


Photo 132. The finished beam system in place.

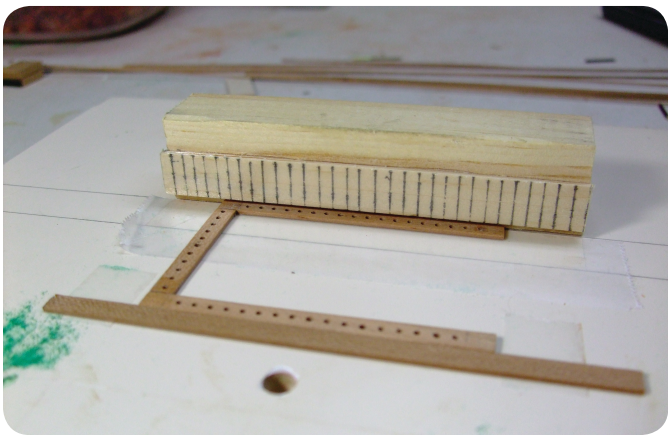


Photo 133. The cherry wood base has been drilled to accept the spindles.

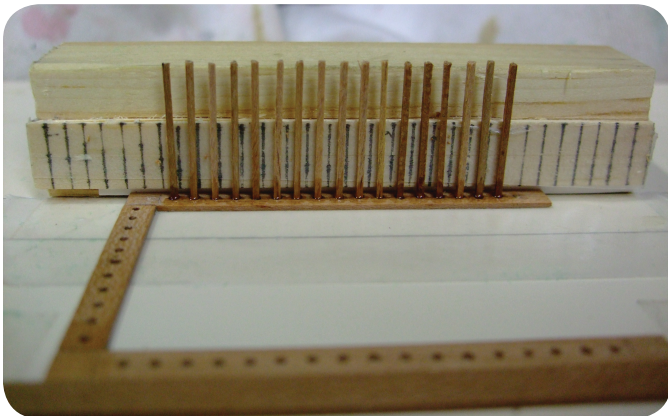


Photo 134. A jig was used to ensure that the spindles were aligned vertically.

edge as well. The finished beam system is shown in **Photo 132**.

Look back at **Photo 110**, and you will see that there is an entrance way for a stair case going down into the galley. It is situated abaft of the salon

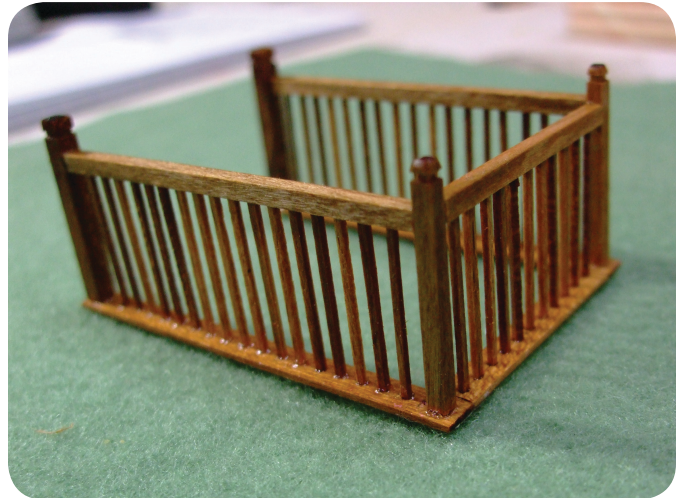


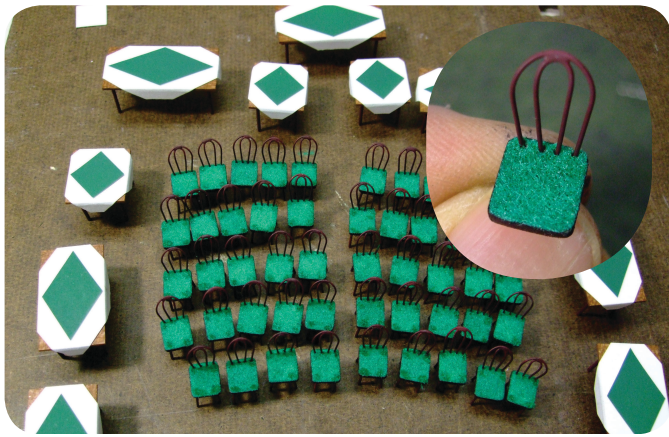
Photo 135. The finished railing assembly is ready to be attached at the stairway.



Photo 136. Banisters have been added once the stairs were set in place.

partition between the two doorways. I needed to build up a railing system. Four newel posts formed the corners of the “u” shaped structure with top rails reaching between them. **Photo 133** shows the cherry wood base of the structure which has had holes drilled to accept the spindles. I used a vertical reference jig while setting in the spindles. **Photo 134** shows one side of the railing set. The finished railing seen in **Photo 135** is ready to be installed around the stairway. After the stairs were added the railing system was attached, and banisters were installed as is shown in **Photo 136**.

The salon needed furniture to give that space authenticity, so I began to research the images of this space. I found a limited number of these, but with the calculations of table sizes required for different seating patterns, I was able to calculate the number of chairs and tables required. Fifty



Photos 137 & 138. Chairs and tables with a close-up of a chair in the inset.

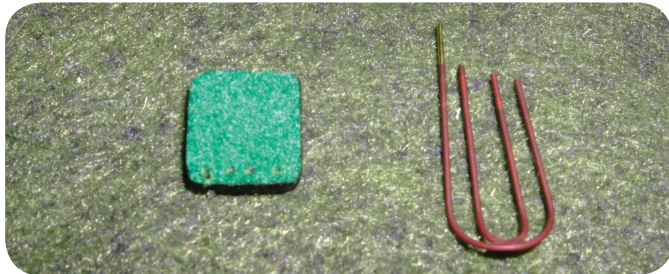


Photo 140. Painted finished parts.

chairs and 11 tables were built to meet this need. **Photo 137** shows the finished products. The chairs were made in the bow back style. **Photo 138** shows an example of the bow back. To build these, I needed a jig which is shown in **Photo 139**. I used 0.8 mm brass rod that had been annealed to soften its resistance to bend. The jig was made from a scrap piece of cherry wood that had been shaped by a router. The "bead" shape allowed the correct bend in the chair back. I carved grooves for both of the wires that would fit together so that each set would consistently settle into the desired shape. A 1.0 mm "L" shape rod was fitted to the two blocks of cherry shown in the foreground, by threading it through a passage that was drilled. This rod held the lower portion of the back in the carved grooves. Once this was set up, I carefully soldered the two wires together where they met at the top of the bow back. **Photo 140** shows the painted finished product. The seat shown here has been prepared for the insertion of the back and the legs of the chair. This process required a number of jigs shown in **Photos 141, 142** and **143**. In **Photo 141**, a brass jig has been placed over the seat blank for drilling of the seat back holes. It was held in place with pins that had been fitted into preset holes. **Photo 142** shows what was under the brass jig. The seat blanks were held securely for this process. The drill holes required for the legs needed to be done on an angle as chairs

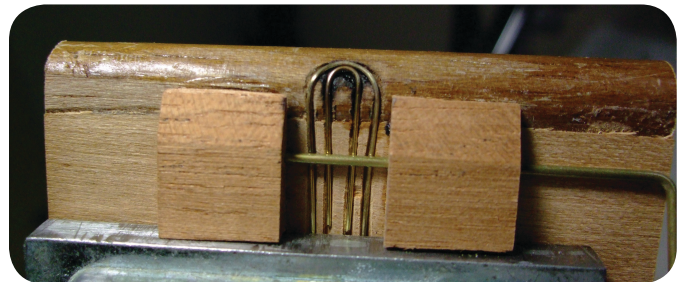


Photo 139. The jig used to build the bow backs for the chairs.

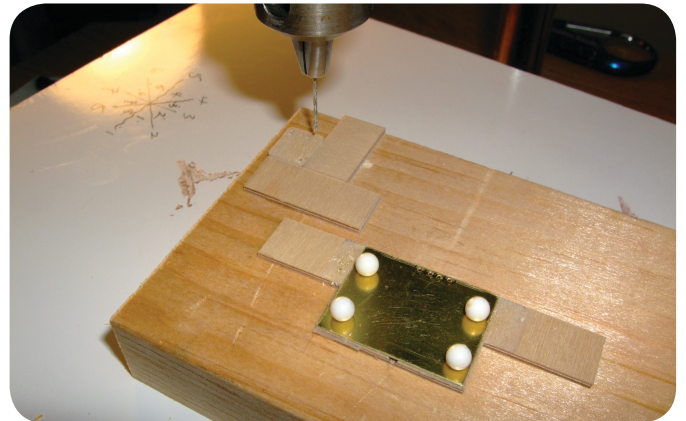


Photo 141. Brass jig placed over the seat blank for drilling the seat back holes.

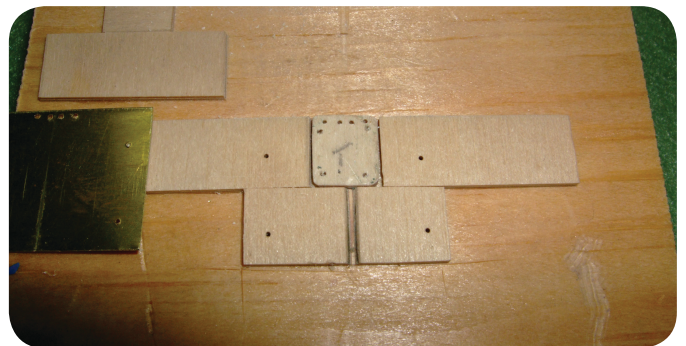


Photo 142. The seat blank exposed after the drilling completed and the brass plate removed.

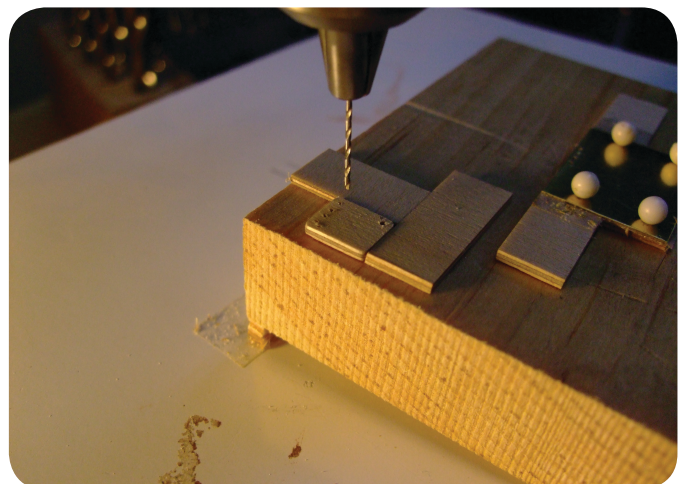


Photo 143. Jig used for drilling the leg holes at the proper angle.

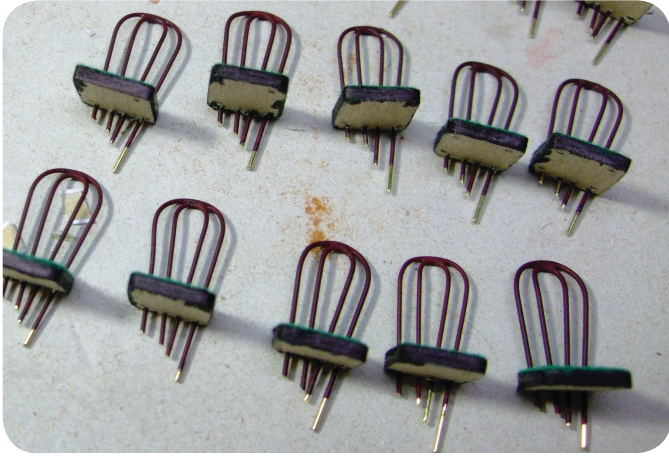


Photo 144. Close-up of the seat cushions.

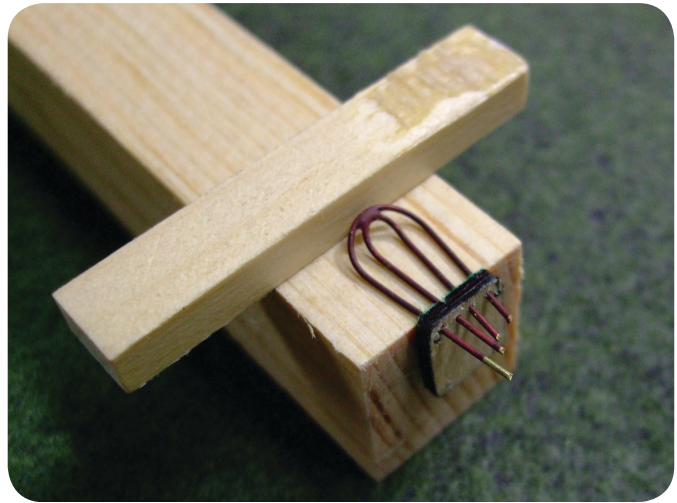


Photo 145. Jig used to obtain consistent back heights.

with this design are more stable. **Photo 143** shows the jig for this purpose. Note that the block holding the alignment braces is raised on one side by a spacer. The seat blank could then be rotated for the front and back sets of holes. I used flocking to simulate the seat cushion and then inserted the seat backs as is seen in **Photo 144**. The consistent height of the back about the seat was a concern, so I built a jig shown in **Photo 145**. Once set into the jig the wires were glued in place using thin Cyanoacrylate glue since it could penetrate and wouldn't present problems with detection. The furnished salon is shown in **Photo 146**. The tablecloths were made from paper.

Once I had reached this point in the build I had one more problem to solve to finish off the end of the vessel on this deck. This would be the installation of the bulwarks that surrounds the planked walkway. Next time I will begin with this part of the build. I will also share a method of building up doors that allows for a scale thickness and an easy way to add glazing. My overall goal for Part 6 is to finish off the discussion about the first deck. In the mean time enjoy your modeling challenges.

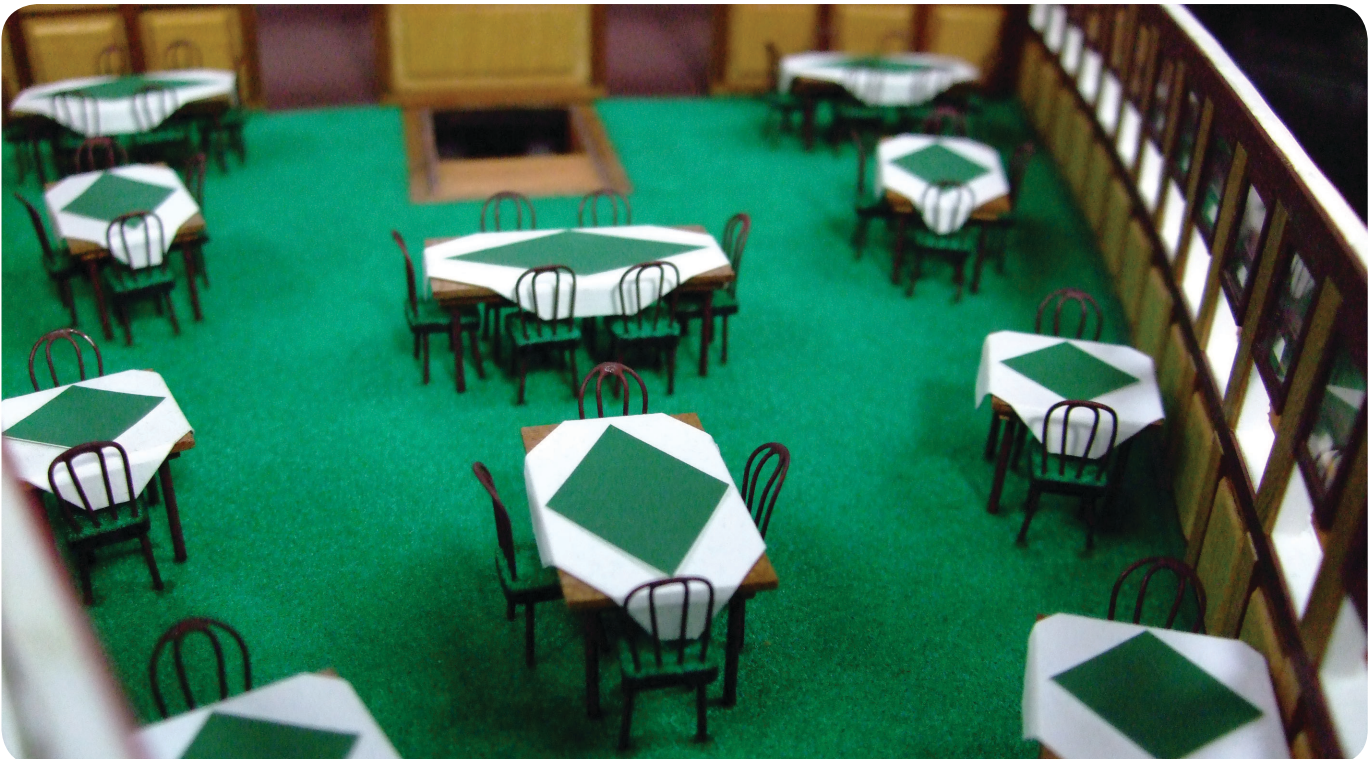


Photo 146. Finished salon. The tablecloths were made from paper.