The Queen of the North Atlantic

"The Schooner Bluenose 1921"

A 1/4"=1' Scale Plank-on-Frame Modeling Practicum

Based on the Plans of P.F. Eisnor

By Gene Bodnar Edited by: W.E. Scoville

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About the Author

Gene Bodnar retired as an accountant in 1991 and decided to devote his time to his two favorite pastimes: crossword construction and model shipbuilding. Since his retirement, he has published more than 2,000 crosswords in numerous newspapers and magazines around the country, including *USA Today, Superb Crosswords,* and *Collector's Crosswords*, to name a few. He has been scratch-building model ships for more than 55 years, building his first plank-on-frame model in 1963. Since that time, he has completed about 75 POF models, mostly of American and British sailing warships. He has sold almost every model he has ever built, with one -- the *U.S. Brig Eagle* -- residing in the Battle of Plattsburgh Museum in New York State. He lives in a rural area atop Sidney Mountain in the Catskills of New York with his wife, Levetta.

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Part 1
Introduction to Building the Bluenose

Reading and understanding ship plans is necessary, and even crucial, to building a plank-on-frame (POF) model. Without this understanding, a modeler, especially a novice to POF, will become frustrated and discouraged in the early stages of building such a model. How does one distinguish one line from another? How does one translate the mass of lines from the plans to the wood? How can one be certain that the model is shaped the way the designer intended it to be?

The purpose of this practicum is to teach the beginning ship modeler how to develop and convert the flat images on the plans into an accurate three-dimensional scale model of the original *Bluenose* schooner. More than likely, the beginning modeler will experience some difficulty and trepidation with these new concepts; however, with practice and perseverance, the modeler will eventually gain a good grasp of the processes involved and will be able to apply these same principles to almost any other model he will attempt to build in the future.

Tools You Will Find Useful

A. Drawing tools:

1. A pair of proportional dividers
2. 15-24” steel ruler
3. Sharp black pencils and perhaps one of a light color such as yellow
4. Grid paper (about 60 sheets of standard typewriter paper – a download of the grid will be made available

B. Cutting tools:

1. Jig saw or band saw.
2. X-Acto knives, especially a #11 blade.
3. Razor saw.
4. Single-edged razor blades.
5. Small chisels for cutting rabbets.
6. Small pair of sharp scissors.

C. Files and Sandpaper

1. A set of needle files.
2. Hand files.
3. Medium and fine grit sandpaper.
4. Sanding sticks.

D. Clamps

1. Spring clothespins.
2. "Bulldog" clamps

3. Rubber bands.

E. Boring Tools

1. Various common drill bits
2. #60-#80 set of drill bit.
3. Pin vise.

F. Miscellaneous Tools

1. Tweezers.
2. Miniature pair of pliers.
3. Soldering iron, with solder and flux.
4. Thread for sail and rigging.
5. Beeswax (for thread)
6. Masking tape.
7. Assortment of paint brushes.
8. Drawplate.

G. Supplies

1. Primer.
2. Paint.
3. Sanding sealer.
4. Stains.
5. Varnish.
6. White glue.
7. Cyanoacrylate (CA) glue
8. Wood filler.

The Hull Lines

First, the novice must understand the meaning of the various lines found on a typical set of plans. Let us examine Plan Sheet 1 – Hull Lines. It is important that you find everything discussed here on the Plan Sheet 1 in order to understand the various types of lines found on the plan. This Plan Sheet is the most important sheet for determining the shape of the hull itself. Many of you may be familiar with these lines already but it won't hurt to review.

It is essential that a good set of plans, like these, contain the three basic views, including the **Body Plan,** the **Sheer Plan,** and the **Half-Breadth Plan.** All three of these plans are required in order to build a three-dimensional model with any kind of precision, because each view shows the ship in a different perspective.

The Body Plan: The Body Plan is sometimes called the **Section Plan** or simply **Sections**. It is divided in half, with one half showing a stern view of the vessel and the other half showing a bow view. In your Body Plan, which is called Sections here, the bow view is on the right-hand side of the plan, with the stern view being on the left-hand side. The lines on this plan are comprised of four types that you will use to draw your own frames: waterlines, section lines, buttock lines, and the deck line, each of which will be explained momentarily.

The Sheer Plan: The Sheer Plan is sometimes called the **Elevation Plan**, or **Hull Profile**. It represents a view of the ship from its side. Note that it, like the Body Plan, contains waterlines, section lines, the deck line, and buttock lines. It also contains many other important pieces of information, including the locations of rails, the deck, and masts.

The Half-Breadth Plan: Sometimes, the Half-Breadth plan is simply called the **Plan View**. It is a view of the ship looking from the top downward. Only one-half of the plan is necessary because the other half will be a mirror image of the former. Like the Body Plan and the Sheer Plan, the Half-Breadth Plan also contains waterlines, section lines, and buttock lines.

Now that we know what each plan represents, let us discuss the individual kinds of lines found on each plan. Let's start with waterlines. **Waterlines** are horizontal lines that pass through the hull at each area shown on the plans. Usually, these lines are designated with numbers from the keel upward starting with 1, and every plan will show the same waterline number. Note that the waterlines are equally spaced horizontal planes. As you can see, the waterline near the midsection of the hull on the Half-Breadth Plan will be wider and slightly longer than the waterline below it. The Load Waterline (LWL), which corresponds with Waterline #4, is the place where the ship will rest at the water when it is fully loaded with cargo. The LWL is also a critical line necessary for lofting the frames of the ship. (**Lofting** means determining the shape of the various parts of the ship and then drawing them on paper.)

Section lines are lines that pass perpendicularly in a vertical plane through the hull. These lines define the basic shape of the hull much more graphically than other lines. In fact, the Section lines are the lines commonly used for developing a plank-on-bulkhead (POB) model, and they define the shapes of the bulkheads for such models. Section lines are especially important for building the frames for a POF model. Any given section line on the existing plan may be an exact placement for a frame, but you will be required to develop many more section lines yourself when drawing the frames for a POF. Usually, section lines on plans start with a centerline somewhere near the midpoint of the ship (in other words, at its maximum beam). Moving away from the centerline toward the bow, the section lines are labeled A, B, C, and so forth. From the centerline toward the stern, they are identified numerically. Of course, the Body Plan, the Sheer Plan, and the Half-Breadth Plan will all have the same identifying letters and numbers.

Next are the **buttock lines**, which are sometimes called **Sheer Lines** or **Profile Lines**. These are the lines that pass through the hull in a position that is parallel to the centerline. The Hull Profile Plan shows their true shape. On the Sections Plan, however, the buttock lines appear as

vertical straight lines, and on the Half-Breadth Plan they appear as horizontal straight lines. Although the buttock lines are rarely used in constructing the model itself, they will be quite useful in verifying the section line shapes.

Each of the above four major types of lines will be used in creating your own POF plans. Of course, there are a few other lines on a set of plans that are important to the scratch builder. They will be discussed as the need arises.

Each of these four types of lines is intimately related. If the hull lines are drawn properly, all of the lines must check with one another (we will expand on this topic later). If one line is changed minutely, a corresponding change must be made to all the other lines. The point is that the modeler cannot look at a single type of line and expect to find a true shape of the hull. Of course, the Body Plan shows the true shape of the hull of each section of the hull, but it is the combination of the three types of lines that give us the whole picture.

Hull Framing

Now let us open Plan Sheet 6 – Hull Framing and Plan Sheet 7 – Hull Frames. Both of these plans are closely interrelated and should be viewed and studied concurrently. Since many of the terms found on the plans may not be familiar to you, especially if this is your first POF build, a list of terms and their definitions is provided below:

Keel: This is the “backbone” of the ship. It runs fore and aft at the base of the ship, and along with the frames, it defines the basic shape of the hull.

Deadwood: The deadwood at the stern serves two purposes. It provides a surface for installing what Eisnor calls “cant” frames but are more accurately called “half frames,” which are frames that are abutted directly onto the deadwood rather than resting upon the keel. The deadwood also serves to strengthen the sternpost.

Stern Post: A timber mounted on the aft end of the hull. It is usually tenoned into the keel and provides a place for the rudder to be hung.

Horn Timber: A timber extending aft and upwards from the keel. It forms the main structural member of the counter.

Counter: The part of the ship’s stern under the transom.

Transom: It consists of the planking across the sternpost to receive the after end of the deck. It provides the form of the stern of the ship.

Spider Leg: A timber bolted to the horn timber. The aftermost frames are attached to it.

Shelf: A fore-and-aft timber fastened to the inside of the ship’s frames as a support for the deck beams.

Mast Step: A wood fitting which takes the heel (base) of a mast. There are two on the *Bluenose*, one for the foremast and one for the mainmast, with both being mounted on the keelson.

Keelson: An internal keel mounted over the floor timbers of the frames and immediately above the main keel. It provides additional structural strengthening.

Bilge Stringer: Longitudinal member of a ship’s structure that runs fore and aft across the frames.

Rabbet: A groove or channel into which planking is recessed. It extends from the top of the stem, then down and along the keel, and finally up the sternpost.

Stem: A timber at the fore end of the ship resting on the keel. The bowsprit rests on the upper edge of the stem.

Square Frame: A frame that rests directly upon the keel and stretches all the way across the vessel from port to starboard. Note that all square frames are perpendicular to the base line of the plans, not the keel.

Cant Frame: A half frame (the way it is used in these plans). A half frame is attached to the deadwood of the vessel, with the other half of the same frame resting on the opposite side of the vessel. (A true cant frame is one that installed at an angle other than 90 degrees to the keel.)

Sister Keelson: A keelson that fits along the inside of the bilge on each side.

Shoe: A thin timber running below the lowest keel timber – one that can be easily be replaced if damaged.

Stanchion: Small pillar supporting the bulwarks and rails. The *Bluenose* employs the top edges of the fore side of its double frames as stanchions.

Floor Timber: The lowest section of a frame that is placed immediately across the keel.

The following discussion will provide a general idea of the kinds of information you should keep in mind when reviewing any set of plans. Analyze and try to understand what you will need in order to construct your model. You may not understand exactly what you are looking for at first, but you will as your experience grows. Is there sufficient information? If information seems to be missing, can it be derived elsewhere on the plans? If it can, what do I need to do in order to get it?

Plan 6 shows the general layout of the structure of the hull. Both drawings on this plan contain vital information about the internal structures, including the deadwood, the keel, the location of the deck, the rails, and other items as well. Note that all frames are actually double frames, which means that each frame is constructed of two layers of wood. The layer on the fore side extends all the way up to the main rail, but the layer on the aft side extends only up to the bottom edge of the deck planking.

Observe the keel on Plan 6. It consists of multiple lengths of wood and also contains a few scarf joints. In addition, it shows the rabbet, which is drawn as a line sketched all the way from the bow to the sternpost.

Look at the deadwood at the stern. Multiple pieces of wood are used in creating it, and this will need to be duplicated in the model. Note, too, the keelson extends from the deadwood all the way to the bow with a wide-curving arc.

Now take a look at Plan 7, which concentrates mainly on showing us the method used to construct the frames. First, note that all square frames rest directly on the keel and that each one – at least on the side we can see -- is constructed of at least four pieces of wood. However, as you approach the bow, the square frames cease and become half frames. Thus, the half frames abut directly against the deadwood instead of the keel. In addition, fewer pieces of wood are used in half frames; in fact, the last couple of frames nearest to the bow only contain two lengths of wood. As you approach the stern, the half frames abut against the deadwood, but go a little further and you can see that the deadwood disappears, and now the frames are attached to the spider legs.

The method of installing the rails and the exterior planking is also shown on this framing diagram.

Another important point to note on Plan 7 is the rabbet, which is shown as a notch in the keel where the planking fits. In the center of the top diagram, it shows a bit of planking fit into the notch. Observe that there is a slight gap between the square frame and the planking.

In the diagram that displays the "forward framing," again you can see square frames and half frames and how they are installed. The method of installing the mast step along with the foremast is clearly shown also.

The "Partial Plan of Stern Frames" provides a large amount of information about the internal structure of this area, including how to construct and install horn timbers, floor timbers, stringers, and the transom.

In conclusion, Plan 6 shows us the general layout of the various structures that form the hull, and Plan 7 illustrates in a fair amount of detail for the method of building and installing these structures. It is clear that the actual plan for each of the frames is not given anywhere on the seven sheets. Plan 7 shows only the method of designing and installing them. Although they appear to be usable, there is neither an indication as to their exact placement on the keel nor is there any indication of the precise structure of each individual double frame. Furthermore, the keel assembly onto which the frames will be installed is only shown in general structure but is not intended to be a precise replica of its construction. For example, compare the rabbet line on Plan 6 with the rabbet line shown on Plan Sheet 1. You will find a considerable variation between the two, however slight. While you are reviewing Plan Sheet 1, pay particular attention to the note entitled "Reference Notes on Model Construction," which suggests that a first-time POF modeler should obtain Mr. Harold Underhill's book *Plank-on-Frame Models*. In his book, Mr. Underhill spends the first half of Volume 1 describing how to loft your own plans for a POF model.

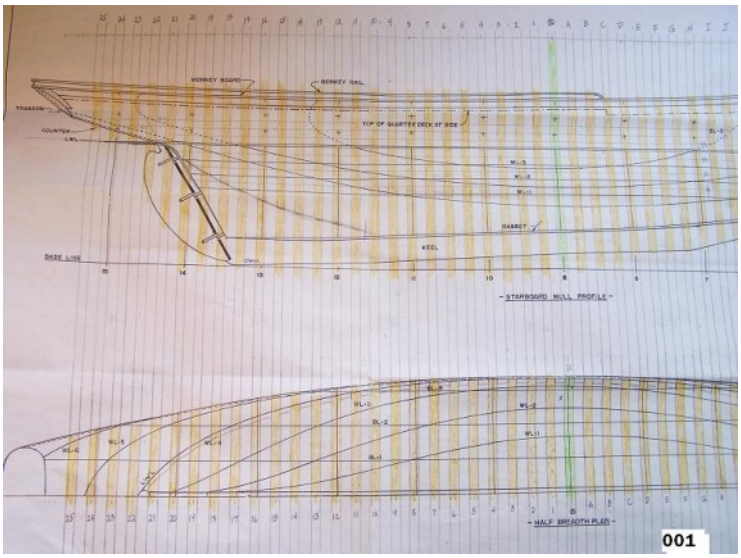
There is no need to purchase Mr. Underhill's volume, although I do highly recommend it as being one of the long-standing classics in the field for POF modelers. In any event, the method he describes for lofting your own plans is the same method that will be described here, with a few variations that are applicable directly to the *Bluenose.*

Part 2
Lofting Your Own Plans for the Bluenose

A. Lofting Frames

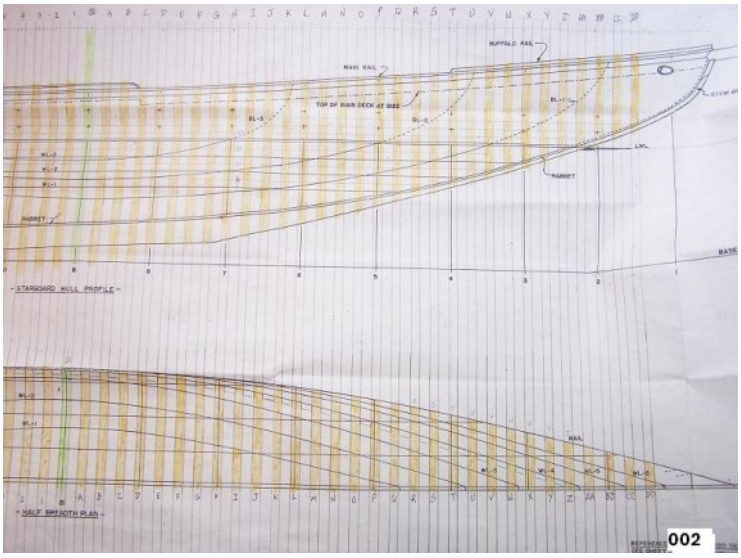
Step 1: Plotting the Location of the Frames

The starting point for lofting plans for any ship is the Hull Profile and the Half-Breadth Plan. The first thing we must do is draw the precise location of every frame on these two plans. Where to we start? Always start at the **Midship Frame,** which is the frame located at the widest beam of the ship. It is usually designated on the plans by a circle with an "X" drawn in it. Note that the Midship Frame is also shown on the Half-Breadth plan just below the centerline.



Profile and Half-Breadth Plans – Stern view

From the original specifications for the *Bluenose,* we know that all frames were spaced on 27" centers, which means that the center point of each frame was spaced 27" apart from the center point of each adjacent frame. Now 27" translated into our scale equals 9/16". At a point about 2" or so above the top rail on these plans, starting at the center of the Midship Frame, mark 9/16" intervals all the way to the transom, and do the same thing from the Midship Frame all the way to the hawse hole at the bow. Repeat this same task at a point an inch or so below the Half-Breadth plan. Be very careful because it is easy to make a mistake.

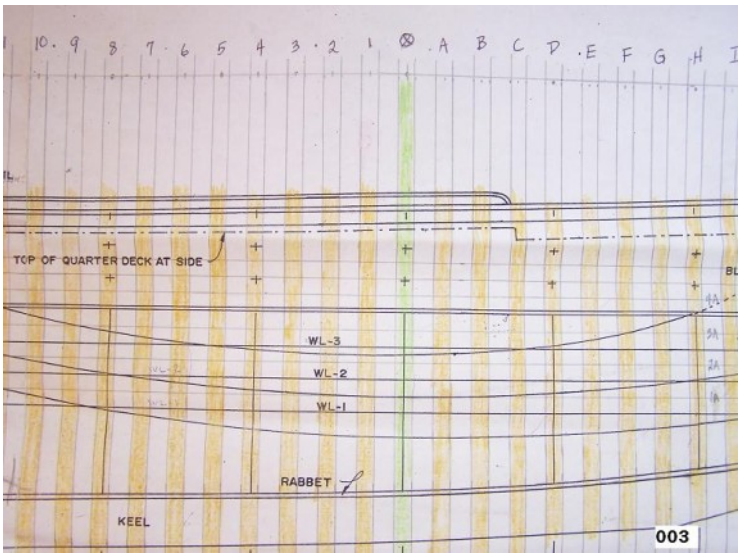


Profile and Half-Breadth Plans – Bow view

We will be constructing each double frame from two layers of 1/8" wood, which means that each frame will have a total sided dimension of ¼". The **Sided Dimension** is the measurement you see across the face of the frame -- the side you see in the Profile Plan. Now return to the plans and mark 1/8" on either side of your frame center markings. This represents the width of each frame as well as its precise location. Another way of stating these markings is that you will have ¼" frames spaced 9/16" apart all the way from the bow to the stern. Plot these same points along the bottom of the Half-Breadth plan.

Using whatever drafting tools you have in your possession, such as a long steel ruler and sharp pencils, connect the frame lines together by drawing lines from the top of the Hull Profile plan to the bottom of the Half-Breadth line. Make sure all are perfectly parallel and spaced precisely apart. If your lines don't mesh perfectly with the section lines already shown on the plans, don't worry about it. You will be using your own lines for all measurements from now on.

After you have completed this task, I suggest that you color each frame in both plans will a brightly colored pencil, such as yellow or some other lively color. This will greatly assist you in identifying the lines of the frames when you start lofting them on paper.

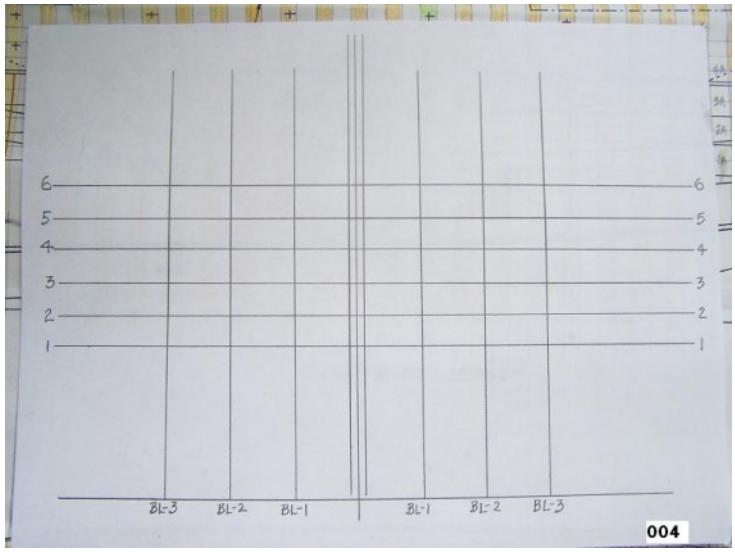


Profile and Half-Breadth Plans – Detail view

Finally, identify each frame by giving it a label. Starting at the Midship Frame, it is customary to label each frame going toward the bow with letters: A, B, C, and so forth. When you run out of letters, then use AA, BB, etc. Starting at the Midship Frame and going sternward, label each frame numerically: l, 2, 3, and so forth. Your last frame at the bow should be DD, and your last frame at the stern should be 25.

Step 2: Creating a Grid

In order to begin lofting your frames, you must first create a grid on which to make your frame drawings. The grid will be used to create ALL of the frames; however, we will start by lofting only the square frames. Every sheet of grid paper will use the exact same grid lines throughout the project, so you can draw a single grid and make copies of it as you use them, or you can keep drawing individual grids. If you do copy them and if you're using standard blue-lined grid paper, I advise that you re-draw the thin blue lines on the graph paper with a dark pencil, because copiers don't handle the light blue color very well.



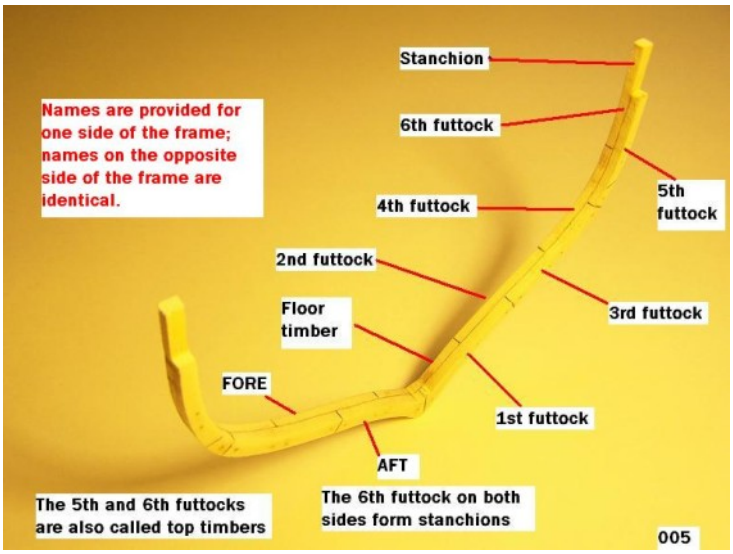
Framing Grid Sheet

The grid you will need to create consists of an exact copy of some of the lines shown on the Sections plan of Plan Sheet 1. Using a plain piece of typewriter paper, duplicate all of the following lines precisely: Base Line; Centerline, Keel Lines, Waterlines, and Buttock Lines. You do NOT need to duplicate the sheer lines or station lines. You will need about 60 copies of this grid, one for each frame plus a few extra copies, just in case you make a few errors. When you are finished, your grid should look like what you see in Photo 004.

Alternatively, you could print the grid paper (Appendex A). Due to variations in printers it is important however that you print out a test page and confirm the dimensions. If there is one thing that a model shipwright should be obsessive about, it is the accuracy of his measurements. Always confirm your measurements, because the accuracy of the finished model depends on the accuracy of your drawings.

Step 3: Lofting Square Frames

It is imperative that you understand the method of constructing a frame for the *Bluenose* before you attempt to loft a plan of it. A typical frame for the *Bluenose* is illustrated in Photo 005.



A Typical Frame

The *Bluenose* frames consist of two layers of wood, with each layer containing multiple pieces of wood butted adjacently. Their names are shown in the photo. Note that the butts of each layer alternate in spacing so that no two butt joints are in the same place on both layers. The two layers are drift-bolted together, with a drift bolt installed on each side of every joint (in the model, bamboo is usually used for the drift bolts) all the way through both layers. Finally, the layer on the fore side of the ship extends to form a stanchion, but the aftermost side ends at the bottom of the deck level. Each of these points is important for lofting the plan of a frame.

Another piece of information we need in order to loft a frame is its moulded dimensions. The **Moulded Dimension** is the height or width as seen in the Sections Plan of a vessel; it is the dimension that is opposite from the Sided Dimension. In the case of the specs of the *Bluenose,* all frames have a moulded dimension of 10” at the keel which tapers gently to 6” at the deck. In 1:48 scale, this means the frame will start with a little over 3/16” at the keel and taper to 1/8” at the deck. Now we are ready to loft frames.

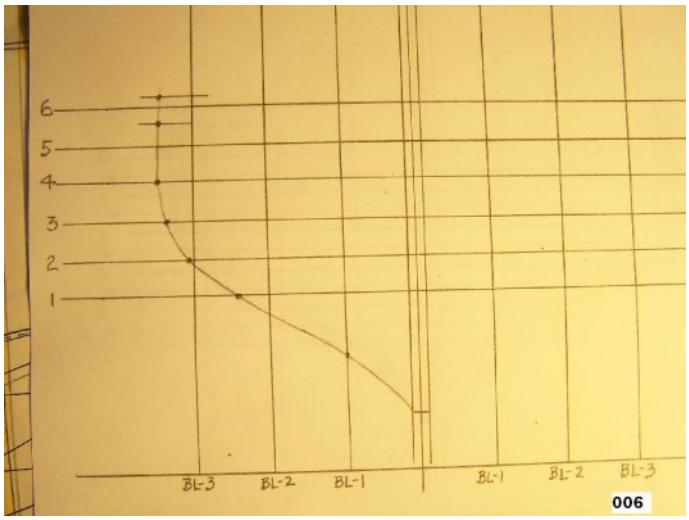
The square frames extend from Frame U at the bow to Frame 9 near the stern. The Bluenose has two types of square frames: those that extend across the beam from port to starboard and that contain no bevels, and those that extend the same way but contain bevels of varying degrees.

You will need sharp-pointed pencils, preferably soft-leaded, about 2B grade is fine. You will also need a good pair of proportional dividers. Finally, you will need one sheet of your grid paper for each frame. You should expect to consume at least 20-30 minutes lofting a single frame. Since accuracy is extremely important in this stage, I suggest that it be attempted only when you are fully rested and have lots of time on your hands.

Now, using the Half-Breadth Plan, place one end of your proportional dividers on the centerline of the keel and at one side of the Midship Frame. Then stretch the dividers open until they reach Waterline #1. Transfer this measurement to your grid by placing one point of the dividers at the intersection of the centerline and Waterline #1. Then place the other end of the dividers firmly on the same Waterline #1. Press the point of the dividers down, and then mark this point with a pencil. Now return to the Half-Breadth Plan, place your dividers on the centerline right at the same side of the Midship Frame. Then stretch out the dividers to Waterline #2. Transfer this measurement to your grid by placing one point of the dividers at the intersection of the centerline on the grid with Waterline #2 and the other point of the dividers right on Waterline #2. Press down, and then mark a point with your pencil. Repeat this procedure until you have exhausted all the waterlines.

This same procedure can be used to find points along the Buttock Lines. However, in this case, the points are derived from the Hull Profile Plan, not the Half-Breadth Plan. As an example, to find the Midship Frame point at Buttock Line 1 (BL-1), place one point of your proportional dividers at the base line of the Hull Profile Plan and stretch the other point open to BL-1. This measurement is transferred to your grid by placing one end at the Base Line of the grid at BL-1 and marking the other end at the point at which is touches that Buttock line. Usually, you don't need to use all the Buttock lines in drawing your grid, because the Waterlines alone are sufficient. However, this does assist you in certain areas, especially at Buttock Line 1, as you can see.

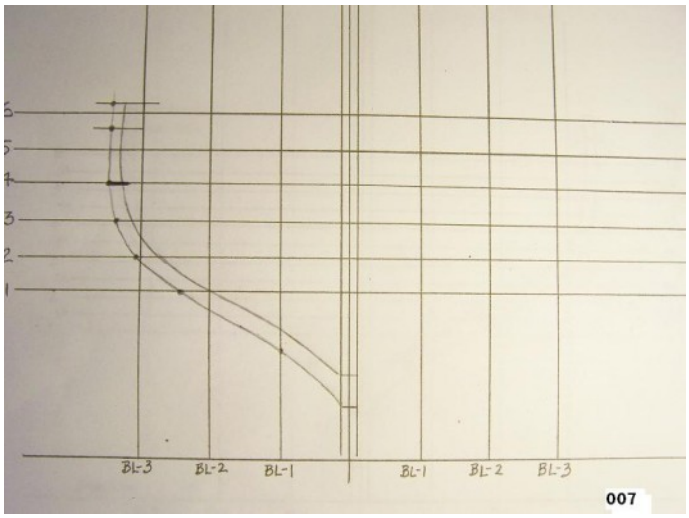
Now we must find the height of the rail for the Midship Frame. At the Midship Frame, place one point of your dividers on the baseline of the Hull Profile Plan and extend them open to the point just under the main rail (do use other rails). Now transfer this width to your grid by placing one end of the dividers on the baseline of the grid near Buttock Line 3 (near where the rail will be). Press down to make your pinpoint. Mark a short line horizontally at this point. Now go back to the Half-Breadth Plan and place your dividers back on the centerline of the keel and stretch them open to the rail line. Transfer this measurement to your grid by placing one point at the centerline of the keel about where the main rail is and then press your point here.



Lofting the Mid Ship Frame—The Start

Follow this exact same procedure for the line that represents the top of the main deck.

Now mark the bottom edge of the keel on your grid, which is found by placing the dividers on the Hull Profile Plan at the baseline at the Midship Frame and extending the dividers open to the bottom of the keel. Transfer this measurement to your grid by placing one end of the dividers on the baseline at the center of the keel and extending the other end to mark the keel. Draw a line across the keel to indicate this. It is important to note that as you progress further and further toward the bow, the bottom edge of all the frames are installed on a slight angle or slope. This angle should be noted on your grid by measuring both sides of the frame at the keel and drawing in both lines on your grid. The difference between these two lines represents the slight angle at which you must bevel the frames in order to have them rest properly on the keel. Likewise, you must do the same thing for the height of the frame from its base to the point at which the keelson will rest upon it, and there will be two lines here, too, which will define the bevel at this point.



Lofting the Mid Ship Frame—The Start

Now connect all the dots with a smooth line. Drawing this line will take

a little practice, and you might be finding yourself erasing it and starting anew every now and then. Follow the dots precisely, while still keeping a smooth line, making a nice smooth curve where necessary. So far, your grid should look like the one shown in Photo 006. The dots are much enlarged to clarity - they should be mere pinpoints on your grid.

Another important point: Darken the Waterline #4 line a bit – this will be our Framing Jig reference line. The Framing Jig will be explained more fully in a later part of this tutorial. At this point, it is sufficient to know that, during the construction of the ship, all frames will be placed in a Framing Jig as they are being built. The jig holds all frames in place, ensuring that they are perpendicular to the base line and are perfectly square with it. The Framing Jig Reference Line remains in its same position for all of the frames. When a constructed frame is inserted into the Framing Jig, the Framing Jig Reference Line on each grid will be precisely located with the top edge of the jig itself. You will be in a better position to understand this as we progress further. The Framing Jig Reference Line should always be parallel to the base line of the ship, no matter what ship you are building.

So far, our grid only shows the exterior portion of the Midship frame. Now the inner frame lines must be determined and lofted. Earlier, it was mentioned that the moulded dimension of the frame at the keel is a little more than 3/16” and at the rail it is 1/8”. Use a piece of card to mark a measurement slightly more then 3/16” and keep it handy for all frames. Now draw the inner shape of the frame as smoothly as you did for the exterior portion. This, too, will take some practice, and your will erase and redo some lines until you are satisfied. Remember that every square frame will have basically the same dimensions, no matter what their shape.

Next, we must identify this frame clearly in placing its name directly on the frame itself. If you will be building a fully open framed model, I recommend that you place the label somewhere where it will be inconspicuous. For the Midship frame it is customary to use the symbol of a circle with an "X' in it. For other frame you should use its number or letter designation. If you don't label it, you will lose track of it, which is the last thing you want to do, because you have a total of more than 55 frames by the time you're finished. Each one will be very slightly different from each of its adjacent frames.

You have completed only one-half of the grid drawing. The best way to complete the other half is to use the following procedure, which ensures that all of your frames will be perfectly symmetrical.

1. Using a steel ruler and a sharp-pointed X-Acto knife or a single-edged razor blade, gently score a line directly down the centerline of the grid. This scoring line must be precise, because the goal is to make both halves of the grid perfectly symmetrical. Do not cut all the way through the paper; instead, score just enough to be able to fold the grid sheet in half.

2. Crease the grid drawing right at the fold you just scored with the black side of the grid INWARD.

3. Now turn it so you can see the grid you drew.

4. Place a sheet or carbon paper (or graphite paper) under the entire folded sheet but FACE UP.

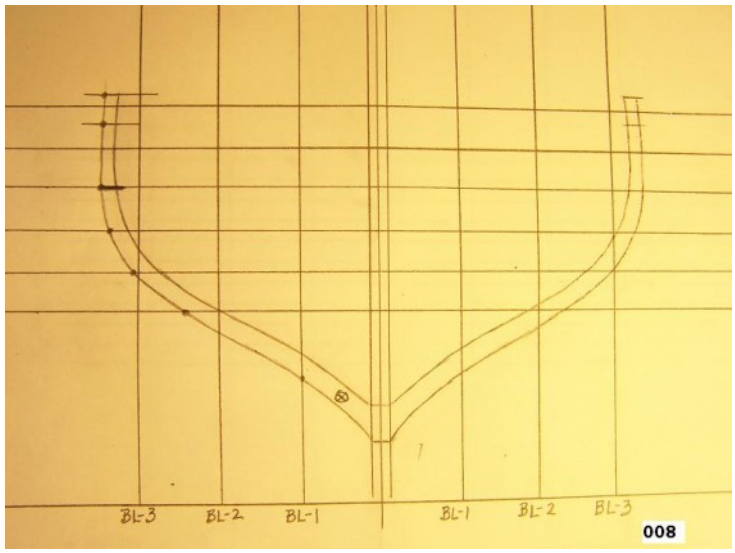
5. Using a sharp-pointed pencil, trace over all the lines you lofted.

6. Open the grid and you can see that all the lines you traced have completed the other half of the grid.

7. You are now finished with the Midship Frame.

You will be repeating this procedure for every frame you loft. Of course, our more computer-

oriented readers can find a better way to complete the other side of the grid. The grid could be scanned and opened in a program that creates a mirror image, and then printed out as one completely whole and symmetrical frame. The goal is to create a completed, symmetrical frame, and whatever way you choose to do this is perfectly acceptable as long it achieves your goal. Your finished Midship Frame will look like that shown in Photo 008.

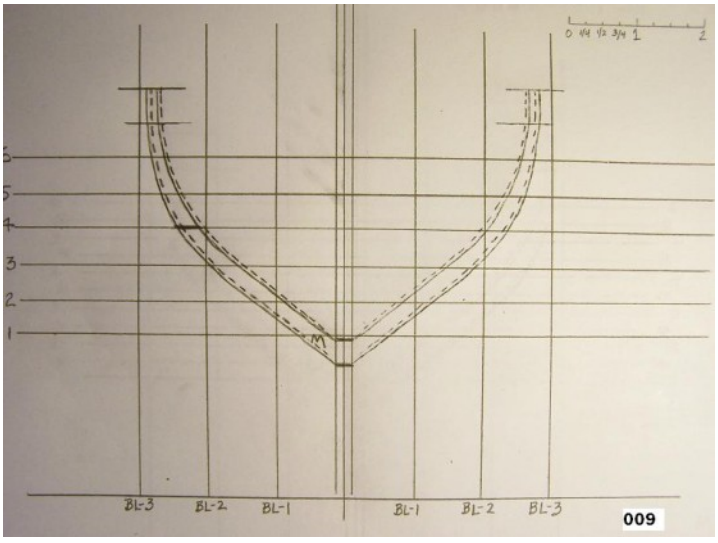


Lofting the Mid Ship Frame—The Finished Frame

Step 4: Lofting Square Frames with Bevels

As I pointed out earlier, the Midship Frame is the reference point for all other frames. Moving away from the Midship Frame toward the stern, frames are designated by a sequence of numbers. Moving away from the Midship Frame toward the bow, frames are designated by a sequence of letters. The further apart you move in either direction away from the Midship Frame, the bevels on those frames will increase more and more. As an example, let's look at Frame M on the Hull Profile Plan. Note that the Waterlines for this frame veer off on a slant, far from being parallel to the base line of the ship. The same observation can be made on the Half-Breadth Plan for the Waterlines of Frame M -- they form significant angles to the keel's centerline.

The angles shown for the Waterlines on these two plans represent the angle of the bevel to be drawn on your grid for Frame M, which will be cut on the frame when you construct it for the model. The bevel is the angle at which planking on the external side of the model will rest perfectly at that point. It is important that the bevels be accurate, because any significant variance from the plans will result in constructing a frame on which the planking material will not rest properly.



Lofting the Mid Ship Frame—The Finished Frame

IMPORTANT: As you loft the plans for each and every frame, keep the following information strictly in mind. Of course, every frame has two sides. All frames moving away from the Midship Frame toward the stern (all numbered frames) MUST be drawn as follows: The front on the frame will be lofted from the right-hand side of the frame, and the rear of the frame will be lofted from the left-hand side of the frame. The opposite holds true for all frames going away from the Midship Frame toward the bow (all lettered frames). In this case, the front side of the frame will be lofted from the left-hand side of the frame, and the rear of the frame will be lofted from the right-hand side of the frame.

This rule will be clear when you understand this: The bevel on the numbered frames (those going sternward) will taper at a northwestward direction (toward the upper stern), while the bevel on the lettered frames (those going toward the bow) will taper at a northeastward direction (toward the upper bow). Thus, when you construct the actual frames from you grids, the beveled side of the frame will be placed in position so that the bevel is in its proper location on the ship.

Now let us loft Frame M, which will face toward the bow. Frame M is being used as an example because it contains a very noticeable bevel and is fairly easy to display in an illustration. Other frames will contain miniscule bevels, especially those adjacent to the Midship Frame, and still others contain greater bevels.

Start lofting Frame M by drawing the frame, remembering to use only the left-hand side of the frame from the Hull Profile Plan and Half-Breadth Plan. To summarize:

1. Find and mark the Waterline points on your grid, using the Hull Profile Plan
2. Find and mark the height of the Rail on your grid, using the Hull Profile Plan
3. Find and mark the rail line from the Half-Breadth Plan.
4. Find and mark the deck line.
5. Mark the bottom edge of the keel
6. Darken Waterline #4.
7. Connect all the points with a pencil by drawing a smooth line.
8. Loft the interior line of the frame, using the same measurements in your Midship Frame

Now, stop at this point. Next, you will loft the beveled side for Frame M, which will correspond to the right-hand side of the frame on the Plans. Repeat all the steps mentioned above for all the lines required to connect the dots, with one difference: Use a dashed line for drawing the beveled side of the frame. This will distinguish it from the face side of the drawing, which is extremely important during its construction.

You will discover that the bevels differ widely from frame to frame, and you will also find that a single bevel can vary widely on each individual frame. Generally, it will start very small at the keel, get wider near the larger curve of the frame, and perhaps get thinner at the upper part of the frame. It is important to loft this line as carefully as possible.

Now loft the inner part of the beveled side of the frame. This can be done by sight; just make sure that the same distance of the bevel appears on the outer side of the frame as well as the inner side of the frame. Again, use a dashed line.

Now mark the identification letter directly on the frame. Then complete the grid by making a mirror image of the grid, as described above. Your finished Frame M will look like Photo 009.

Now, repeat this process for every Square Frame. Square Frames for the *Bluenose* run from Frame 9 near the stern to Frame U near the bow – a total of 30 Square Frames.

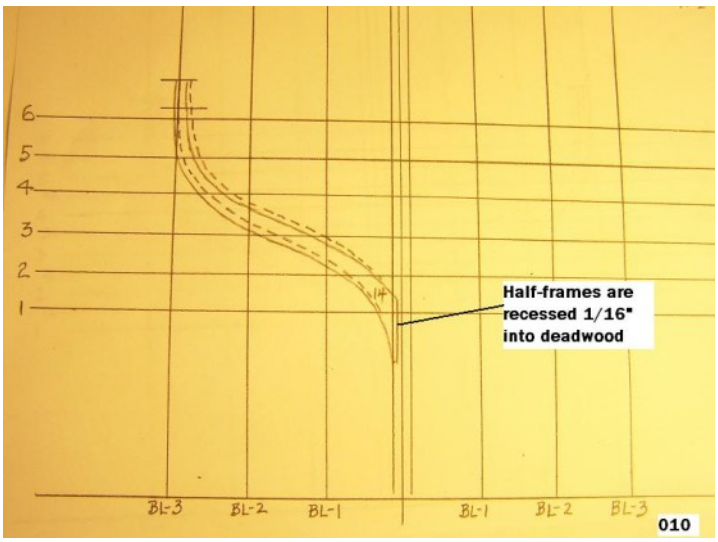
Step 5: Lofting Half-Frames

Half-frames extend from Frame 10 to Frame 20 at the stern and from Frame V to DD at the bow, making a total of 20 pairs of Half-Frames. They are called half frames because they are built in two halves, with one half lying on one side of the deadwood and the other side lying on the

opposite side of the deadwood.

All Half-Frames are lofted in the exact same manner as the Square Frames, with two differences. Only half the frame is lofted. Furthermore, when you attach the frame to the deadwood area in building the ship, you will cut a 1/16"-deep groove into the deadwood so it has a firm resting place. Since this groove is cut on both sides of the deadwood, this means that both sides of each of the Half Frames should be extended by 1/16" into both sides of the keel line on your grid in order to fit into the cut groove. Thus, loft each Half-Frame on the same grid sheet, but incorporate the depth of the deadwood groove on your grid as well.

The second difference is that you should also note the angle at the base of each frame, which is rather slight but important when you install it in the deadwood groove.



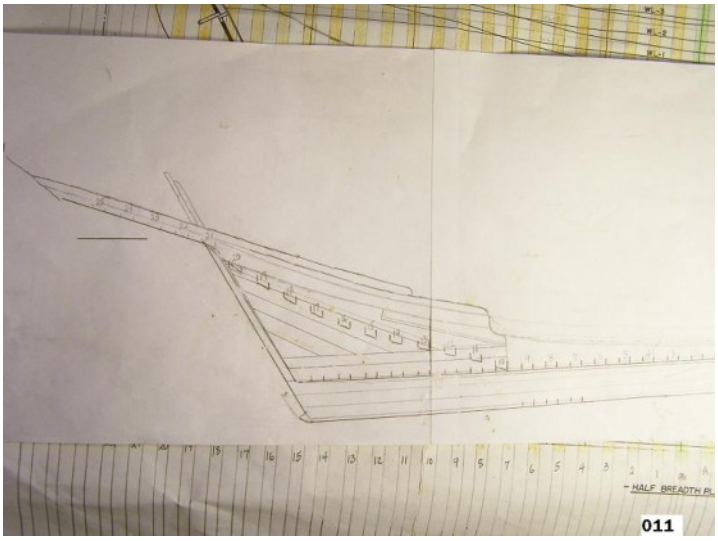
Lofting a Half Frame

B. Lofting the Keel Assembly

The purpose of lofting the Keel Assembly Plan is to develop a pattern for laying your keel for your model. It includes the keel itself, the sternpost, and the cutwater at the bow, as well as the deadwood area, along with the location of all frames. The **cutwater** is the foremost part of the stem, forming a curved leading edge at the top. It parts the water as the ship advances

It is suggested that you create a separate drawing that is a duplicate of the Hull Profile Plan, which we've already decided is our main reference diagram. Do this by making a carbon copy of the Hull Profile; we will name this carbon copy the Keel Assembly Plan. Rubber-cement 4 pieces of plain typewriter paper lengthwise together, so that it is the same length at the Hull Profile. Place 4 sheets of carbon paper on top this length of paper, and then place the Hull Profile Plan on top of this, centering it, and perhaps pinning it in place so it doesn't shift.

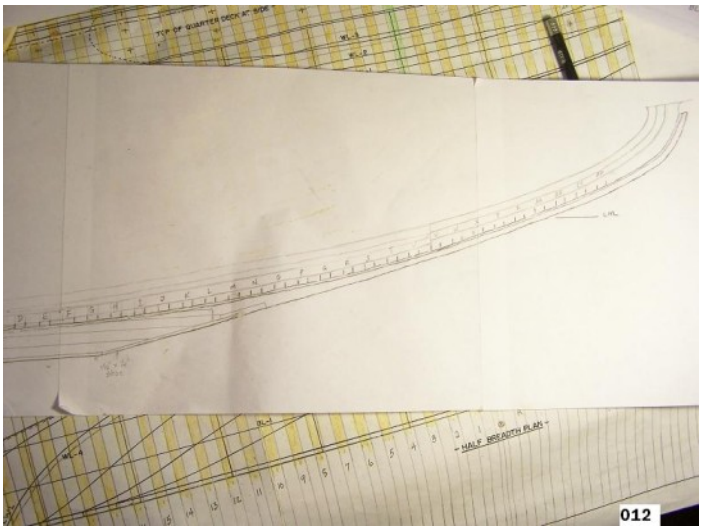
Now duplicate the Baseline, the Keel from the bow to the stern, the sternpost, the Counter, and the edge of the Transom. This will be an open outline of the vessel. Then plot all the frame locations and identify them with either their number or letter. It is very important that your frames be in perfect position at all times, and that the lines you use to indicate them be perfectly perpendicular to the Baseline.



Lofting the Keel Assembly—Stern Area

Next, go to Plan Sheet 6. Our intention is to duplicate all the in-

formation shown on both of these Hull Structure drawings. The keel begins with a 1/16" shoe. Draw this on your Keel Assembly Plan, noting the approximate place where it should stop. It is important to continue with these facts: The first, second, and third keels on the original *Bluenose* were timbers that measured 12" by 12", which translates to ¼" by ¼" on our scale. Therefore, draw these three keels on your keel assembly plan immediately above the shoe, as they are shown on Sheet 6, but measure each one ¼" up from the shoe.



Lofting the Keel Assembly—Bow Area

Another important fact is that the sternpost on the original *Bluenose* was precisely 12" x 12" square, which translates to ¼"-square on our scale. Thus, draw the sternpost ¼" inward from the outer edge of the existing sternpost on your Keel Assembly Plan. Also note that the sternpost extends about 1 ¾" above the deck – draw this on your plan.

Next, as closely as possible, duplicate the deadwood pieces shown on Plan Sheet 6. Use your proportional dividers to make measurements as precisely as you can. Note that the deadwood ceases just below the line of the horn timber. Therefore, along the sternpost measure from the base of the third keel up to but not including the horn timber; the result is the maximum height of the deadwood that is shown on your own Keel Assembly Plan. Fill in all the deadwood pieces on your own Keel Assembly Plan. Also note that the deadwood stops at the fore side of Frame 10. No deadwood will be shown beyond this point on your plans.

Now draw in the bottom edge of the rabbet line – this line appears to be sketched in on both Hull Structure plans. However, the bottom edge of the rabbet line should be placed 11/16" up from the base of the keel at the sternpost. It continues straight forward until it reaches Frame G, where it veers off to about 1/8" to 3/16" away from the base of the keel. Draw the rest of the bottom line of the rabbet, and stop just below the bowsprit, where the front end keel (called the cutwater) ends. The forward edge of the sternpost already *is* the rabbet at this point.

The top edge of the rabbet is somewhat different. First of all, observe on the lower Hull Structure diagram on Plan Sheet 6 that the bottom edges of Frames 10 through 20 rest at a progressively higher and higher position as they approach the sternpost. The imaginary line that connects the lower edges of these half frames is called the **Bearding Line**, which is the top edge of the rabbet at these points. This line will be shown on your Keel Assembly Plan, so draw it in place, carefully measuring up from the base line with your proportional dividers. The space between the top and bottom edges of the rabbet is the area upon which the exterior planking of the ship will rest.

The rabbet on all other areas of the ship will be 1/16" wide. So draw in the top edge of the rabbet 1/16" higher than the bottom edge you already drew; this includes 1/16" into the deadwood at the stern, and 1/16" above the first line you drew all the way to the bowsprit.

Now, turning to the deadwood at the bow, note that Frame V is the starting point for our deadwood. Here, it is really a continuation of the keelson, as shown on the diagrams on Plan Sheet 7. Draw in the two extra layers as shown on Plan 6. They will provide much greater strength for the bow area. Make sure all frame positions are marked perfectly.

Next, draw in the keelson, which appears as the lines above the square frames on the dia-

grams on Plan Sheet 6, and is also shown 3-dimensionally in the diagram on Plan Sheet 7. Try to space it the precise distances above the third keel as shown in the Hull Structure diagrams on Plan Sheet 6.

If you haven't done so already, make sure you have drawn in the precise location of all frames, ensuring that all frames lines are perfectly perpendicular to the base line, and perfectly parallel to each other. These lines on the deadwood represent the areas you will be removing from the wood for the Half-Frame grooves.

Now draw in the horn timber and spider leg as it is seen on the Hull Structure diagrams on Plan Sheet 6. Make sure you've also included the exact location of Frames 21 through 25 on these items.

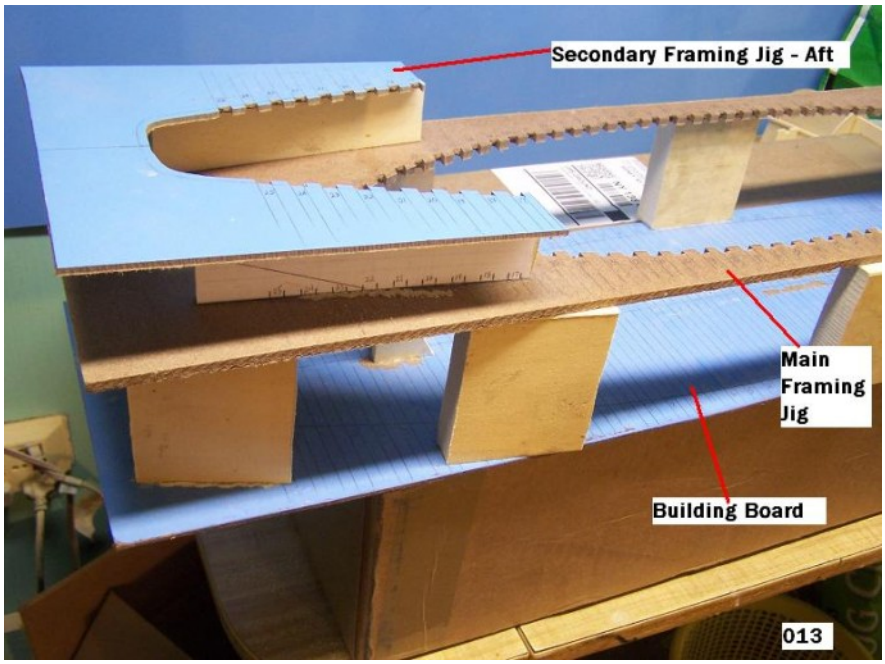
Finally, review your drawing, looking for things you might have missed. Now mark the locations of the mast steps and all scarf joints.

C. Lofting the Building Board Plan

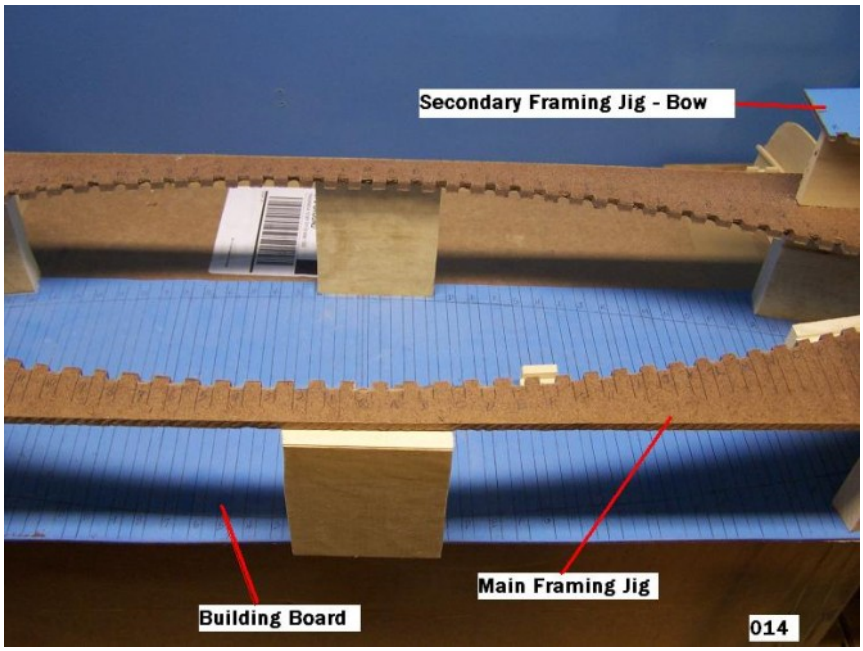
The Building Board is a piece of wood or Masonite upon which you will be attaching a Framing Jig that will be used in constructing your model of the *Bluenose*. Use a piece of plywood or Masonite that measures 8" wide by 36" long, and it should be at least ¼" in thickness.

Draw a centerline directly down the length of the Building Board. Now you will be duplicating the Half-Breadth Plan on top of this board, centering it in place. Of course, the Half-Breadth Plan only shows one-half of the ship. Your goal is to duplicate both halves on your Building Board, so that your have the outer shape of the entire ship drawn on the board. Use the outer Rail Line shown on the plan for the shape of the ship. Include the transom as well, and also the stem at the bow. Finally, draw all frames lines and label them on your Building Board.

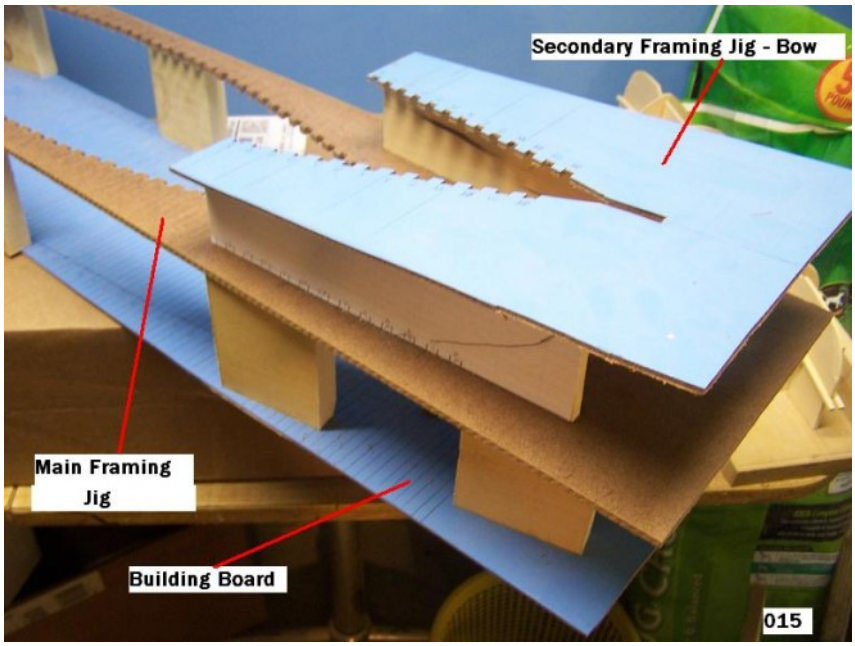
The finished Building Board appears at the bottom board shown in Photo 013, 014, 015, and 016.



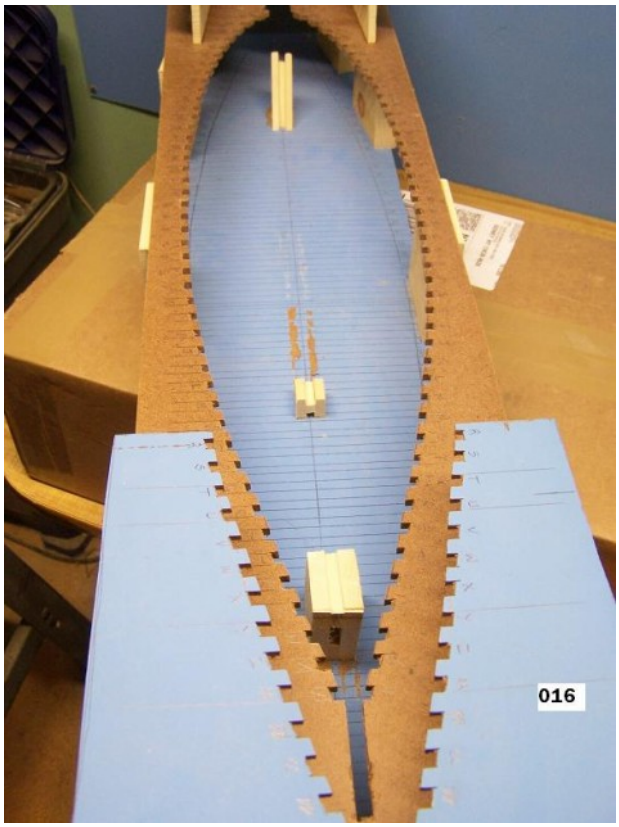
Building Board and Framing Jigs—Stern



Building Board and Framing Jigs—Mid Ship Area



Building Board and Framing Jigs—Bow Area



Building Board and Framing Jigs—Top View

D. Lofting the Framing Jigs and Assembling Them on the Building Board

Let's start by explaining the purpose of Framing Jigs and how they will be used. When we start to build our model of the *Bluenose*, we will use the Framing Jigs as the supporting framework for the entire ship throughout a major part of its construction. Their purpose is to ensure that the keel and the frames are always aligned properly. They will hold every frame in a perfectly upright position as the building progresses. They also allow the modeler to check the accuracy of each stage of the framing process. Furthermore, a POF model cannot be built without Framing Jigs. Three Framing Jigs are required for building the *Bluenose*, and they are illustrated in Photo 013, 014, 015, and 016.

The Framing Jig is essentially a piece of 1/4" plywood cut out with notches for the location of all the frames. It is set at a certain height to hold the frames perfectly in position. For the *Bluenose*, this height will be Waterline #4 on the Half Breadth Plan, which is precisely 3 55/64" above the Base Line. This is our Main Framing Jig, and it encompasses most of the frames.

We will also need two other secondary Framing Jigs, one at the stern that captures the frames from Frame 17 to the transom, and one at the bow that captures the frames from Frame R to the bow. These two jigs are required because our Main Framing Jig fails to capture most of the frames located at the bow and stern.

Lofting the Framing Jigs is a relatively simple process. However, it is very important that it be lofted as accurately as possible, because the perfect alignment of all frames depends on the accuracy of the model. If something is even slightly out of alignment on your Framing Jigs, this misalignment will be carried to the model itself.

Step 1: Lofting the Main Framing Jig

To loft the Main Framing Jig, you will need a piece of ¼" Masonite the same width and length of your Building Board. Draw a centerline down the center of the Masonite. Align the two boards together so that the Midship Frame will be located in the same position.

Now you will loft the Main Framing Jig onto this piece of Masonite. Remember that Waterline #4, which is also the Load Waterline, is our reference point for the Main Framing Jig. Draw all the positions of the frames all across the board. Next, USING ONLY WATERLINE 4 ON THE HALF BREADTH PLAN, plot points for both sides of each frame. Do this with your proportional dividers by setting one point on the centerline and extending the other point to Waterline #4. Transfer this to your jig. Repeat this for the other edge of the frame. Remember that all bevels must be taken into consideration, just as you did in lofting the frames themselves. Repeat this process for port and starboard sides for every frame.

Now use a jigsaw to cut out the Main Framing Jig. You will need a larger starter hole in the jig in order to insert the jigsaw blade. The sides of the notches can be cut with a jigsaw, and the outer edges of the notches can be cut with a hammer and chisel, and then broken out with a pair of pliers. Sand the notches smooth with a square-sides file.

Step 2: Attaching the Main Framing Jig to the Building Board

The next step is to attach the Main Framing Jig to the Building Board. Remember that the TOP EDGE of the Main Framing Jig will be precise 3 55/64" above the TOP EDGE of the Building Board. If you used ¼" Masonite for the Main Framing Jig, cut and glue blocks of wood that measure precisely 3 39/64" in length to the base of your Building Board. Glue them in place OUTSIDE the framing area, as shown on your Building Board, so they won't get in the way when you build the frames.

Now glue the Main Framing Jig on top of these blocks. Use a slow-drying glue so you will have a lot of time to align the jig properly in place. Use a carpenter's square and pieces of wood inserted into the frames at various points along the jig. Make sure the centerline of the Building Board matches the centerline of the Main Framing Jig. Make sure each frame notch aligns with its corresponding frame position of the Building Board. Make sure every frame edge on both pieces align perfectly.

Step 3: Lofting the Secondary Framing Jigs

There are two secondary framing jigs, and both of them should also be Masonite: one at the stern that measures 8" by 3 ½", and one at the bow that measures 12" x 8". Loft the details on both of these jigs just as you did for the Main Framing Jig. The stern jig should start with Frame 17, and the bow jig should start with Frame R. Cut them out with a jigsaw and finish them as you did for the Main Framing Jig.

Step 4: Attaching the Secondary Jigs to the Main Framing Jig

Instead of using blocks of wood to hold the secondary jigs in place, you must cut blocks of wood from a pattern picked up from both ends of the ship. The stern jig blocks (one for each side) make a single pattern that should be measured, starting at Frame 17, from Waterline #4 up to the top of the Main Rail, which is found on the Hull Profile Plan. Mark all the frame locations. Now deduct the thickness of your material from the top of the Main Rail, and this will be

the shape of the blocks to use at the stern.

Make another pair of blocks by making a similar pattern for the bow, starting at Frame R. Mark all the details. Deduct the thickness of your material from the top of the Main Rail.

Glue the secondary jig blocks in place, aligning them with the frames, at both ends of the Main Framing Jig.

Now glue the secondary blocks in place on top of the blocks, using a slow-drying glue to allow you plenty of time to align them in place with your carpenter's square. Check and recheck to make sure every thing aligns perfectly in every direction. Test with pieces of wood inserted in the frame notches.

We are now ready to begin building the *Bluenose*.

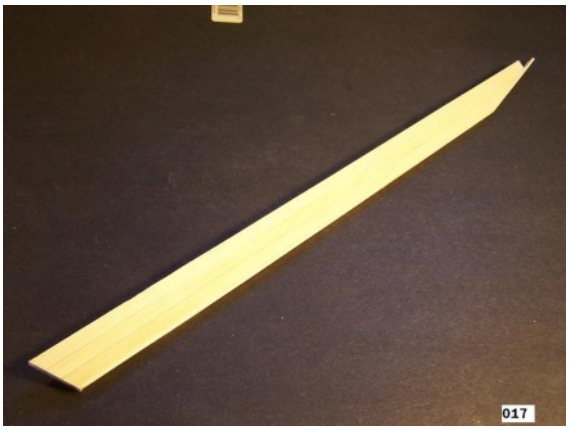
Part 3
Building the Keel Assembly
and
Installing in the Framing Jig

The keel assembly is the “backbone” of your model. It is essential that it be constructed so that it is perfectly straight from stem to stern; otherwise, your ship will not be in alignment. Throughout its construction keep it on a table or board that you have found to be perfectly flat.

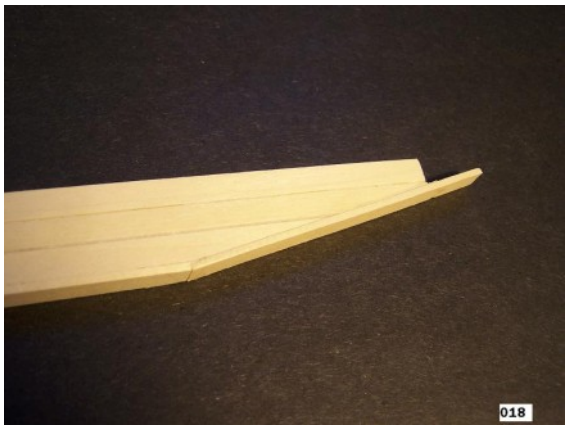
For this stage of the build, you will use ¼” wood for every part of the keel assembly. It is recommend that you start with one sheet that measures 6” by 24” and cut the pieces from it as needed. Most of this sheet will be consumed.

Step 1: Cutting Out and Test-Fitting All the Pieces of the Keel Assembly

Use your Keel Assembly Plan as a guide for cutting out all the pieces. Start with the keel itself, which consists of the shoe and the first, second, and third keels, with two of the keel pieces containing scarf joints. See Photos 017, 018, and 019. Note that the sternpost should be tenoned to the keel. Also cut out the three parts of the bow end of the Keel Assembly. Finally, cut out the nine pieces that comprise the stern deadwood. Test-fit all pieces to make sure all the parts fit together properly.

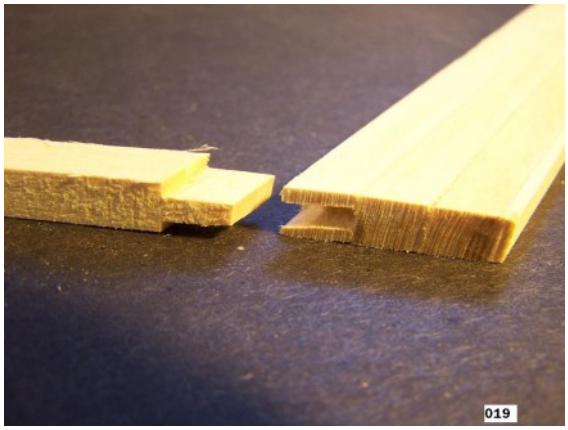


Keel Assembly—First, Second and Third Keels



Keel Assembly—First, Second and Third Keels

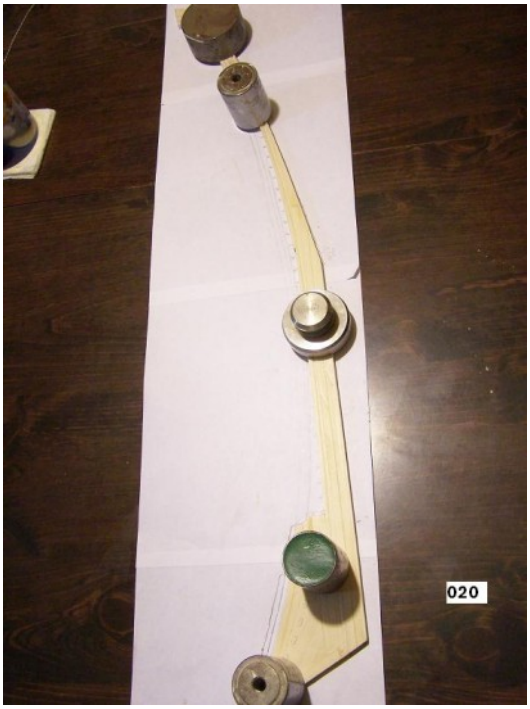
You can use whatever saw you prefer, whether it be a table saw, jig saw, or band saw. Sand each piece smooth. After you have cut them out, place them in position directly on top of the Keel Assembly Plan for a good test-fitting. Make sure they all fit snugly together and lay perfectly on the plan itself.



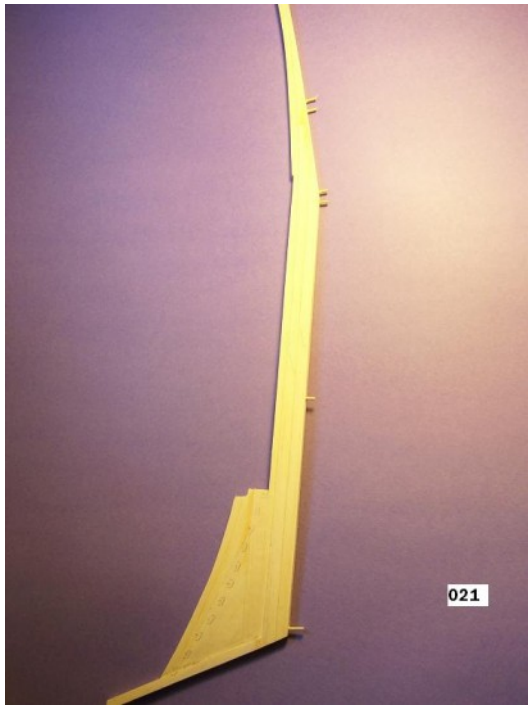
Tenoning the Keel and Stern Post together

STEP 2: Gluing All Pieces of the Keel Assembly Together and Doweling at Appropriate Locations

Use Elmer's Carpenter's Glue to glue all pieces together; many other kinds of glue are also suitable. It is suggested that you glue all the pieces together right on top of the Keel Assembly Plan. Make sure that you place the entire assembly on top of a perfectly smooth and flat surface -- this is very important because you don want any curvature whatsoever in the Keel Assembly. Place weights on top all along the whole assembly to keep it perfectly flat. Let the glue dry well before any further handling. See Photo 020.



Keel Assembly glued together and weighted down

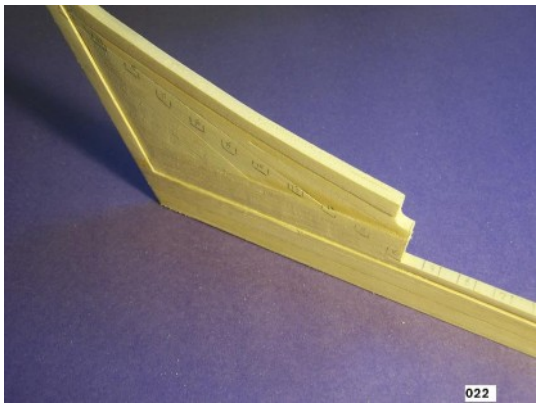


Keel Assembly doweled at key points

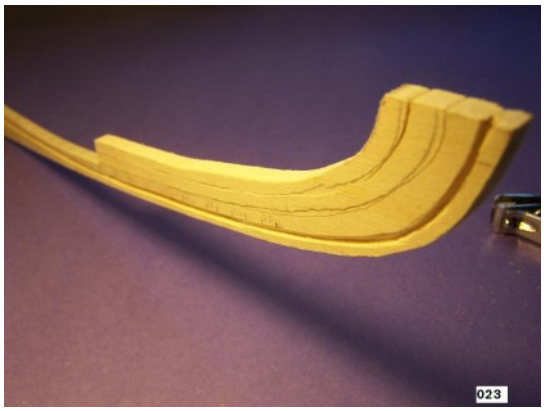
To ensure that joints do not loosen over time, dowels should be inserted at appropriate joints. Toothpicks are recommended. After you've drilled holes for the locations of your dowels, clip off the ends of toothpicks to remove their points, dip them in glue, and insert, wiping off excess glue. After the glue has dried, cut off the excess portions with a razor saw or toenail clippers, and sand smooth. See Photo 021.

Step 3: Cutting the Rabbet in the Keel Assembly

The rabbet should be cut about 1/16" wide and 1/16" deep. The Keel Assembly Plans shows its precise location. You can use a steel ruler and an X-Acto knife for part of the length of the rabbet. Cut it carefully. Use a flat-shaped miniature file to clean it out. Note that at the stern the bearding line is also part of the rabbet, so cut this out smoothly as well. This can be done by shaving a very slight amount of wood off, starting at the bearding line, then tapering it to a maximum depth of 1/16" at the bottom edge of the rabbet at the keel and sternpost. Sand smooth



Cutting the rabbet—stern area



Cutting the rabbet—bow area

until you are satisfied.

Step 4: Marking the Placement of All Frames on the Keel Assembly

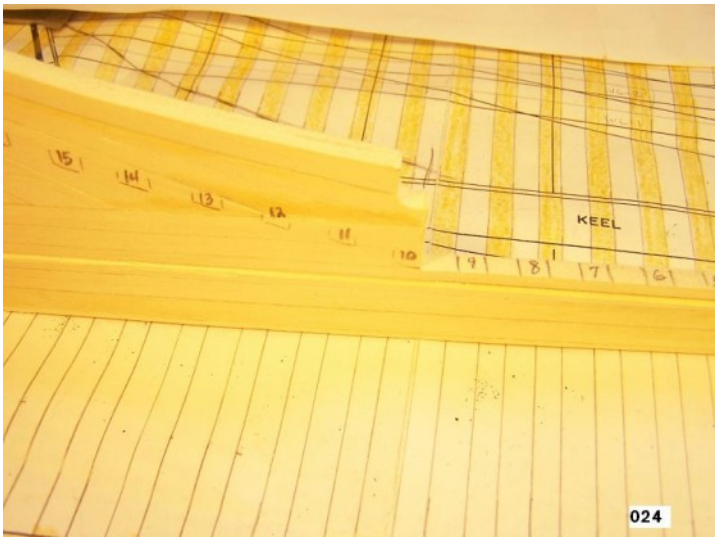
Using the Keel Assembly Plan, align your Keel Assembly with this plan. Very carefully and precisely mark the location of every frame. Make your markings as inconspicuous as possible; mark them where they won't be seen after the frames are in place. See Photo 024.

Step 5: Cutting Grooves in the Deadwood for the Half Frames

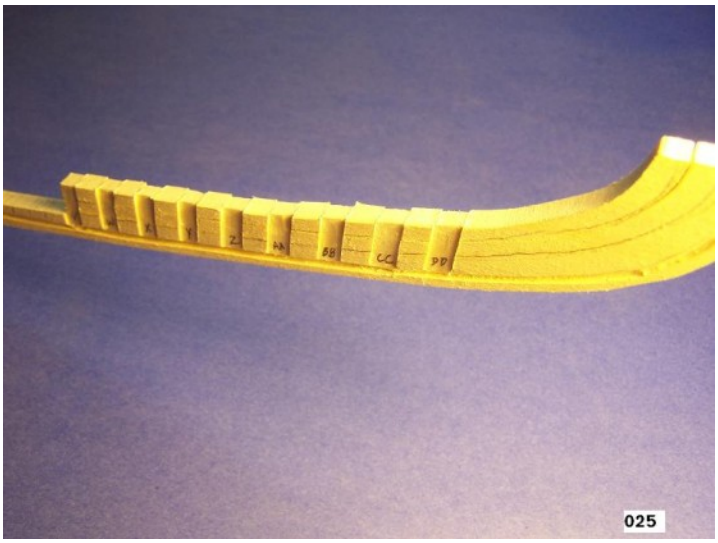
Cut grooves in the deadwood for the half frames at the bow and stern. Note that at the stern the grooves start at the bearding line. The grooves should be 1/16" deep and ¼" wide for each frame location. An X-Acto knife and a steel ruler works well for this job in the beginning, but then use a wide carving X-Acto blade to trim out the grooves, taking a little wood at a time. Miniature files may also be used. See Photo 025 and 026.

Step 6: Installing the Keel Assembly in the Framing Jig

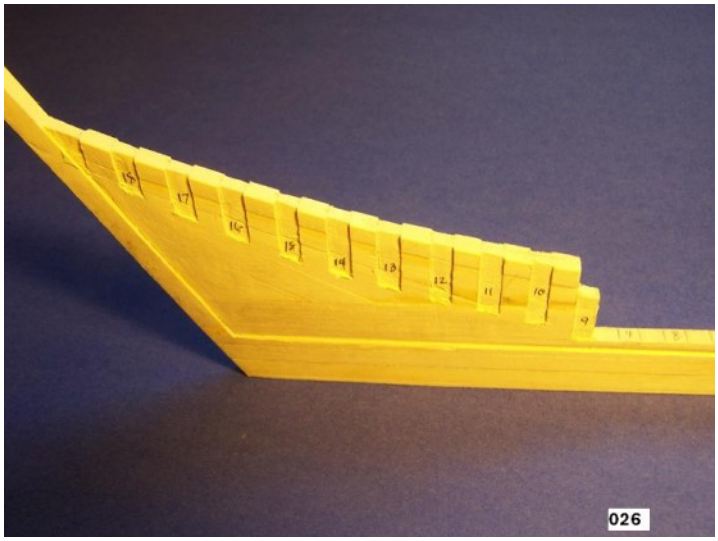
To install your Keel Assembly in the Framing Jig, first you will need to make a few small keel holders and glue them permanently to the Building Board. The object is the keel holders is to provide a perfect resting place for the Keel Assembly, such that you will easily be able to lift it out and put it back with ease, without disturbing this perfect alignment when the Keel Assembly is replaced. Be especially careful to place them so that they do not interfere with any of the frames. I highly recommend that you build a couple of the Frames so you can test-fit the Keel Assembly in place perfectly before you permanently install the keel holders. The Waterline reference points on your Frames must



Every Frame location labled

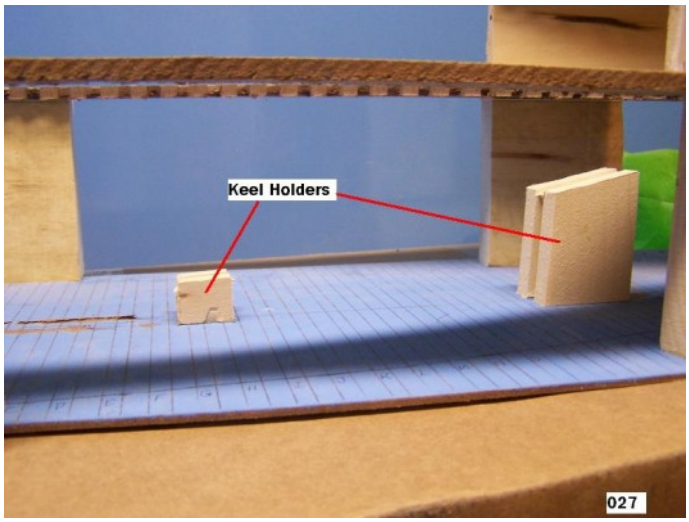


Grooves cut into half-frames—bow



Grooves cut into half-frames—stern

sit precisely level with the top edge of your Main Framing Jig.



Keel Holders

However, let's explain the process here. To locate the placement of the keel holders, which must be perfectly aligned, set your keel assembly in the Framing Jig directly on the centerline of the Building Board. Then align the frame locations on the Building Board with those on your Keel Assembly. Now on your Building Board, mark the place where the aft end of the keel meets the Building Board. Make the keel holder and glue it in place with slow-drying glue. Make another keel holder at about the midpoint of the ship – note that the keel slopes upward, and so should your keel holder. Place the Keel Assembly back into the first keel holder and place the new one in position, gluing it in place with slow-drying glue. Again, check for proper alignment. Also make sure than the end of the bow sits properly in its place in the Framing Jig. Finally, make a third keel holder. Test that it fits properly. Recheck until the Keel Assembly is perfectly aligned in all directions.

When it's installed properly, you will be able to lift the Keel Assembly out with ease and replace it in its exact same position with ease, all the while keeping everything perfectly aligned. However, as already stated, install them permanently only after you've built a couple of the Frames, which will be explained next. See Photo 027. Keel holders can also be seen in Photo 016 shown earlier.

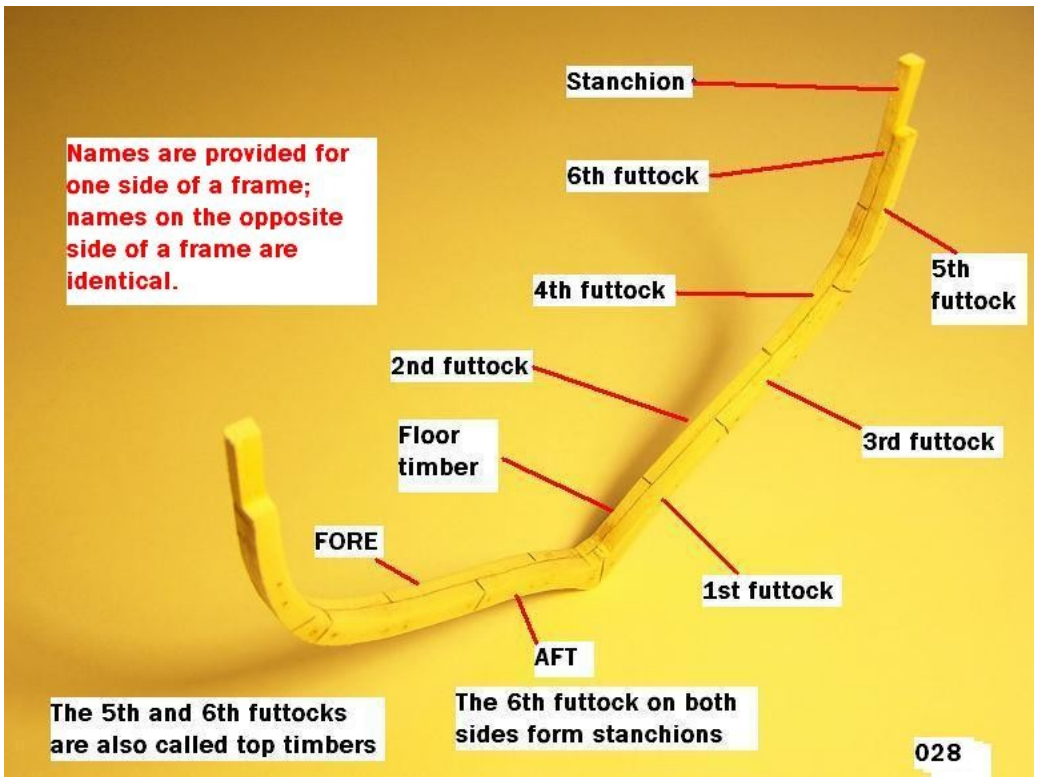
Part 4
Building the Frames

This stage is divided into four parts: building square frames, building half-frames at the bow, building half-frames at the stern, and building half-frames attached to spider legs. Each part will require a somewhat different approach, so they will be discussed separately.

All double frames are constructed of 1/8" wood. You will use about 6 to 7 sheets of 6" by 24" wood. To make all pieces for all frames, it is best to band-saw your wood into ½" or 5/8" strips, which you will use for most of the frame pieces. You will also use a few strips that are a little wider, perhaps ¾" wide. As you begin to piece your frames together, you'll get a better feel of what your will need as your work progresses.

A. Building Square Frames

Let us return to the picture of a typical square frame, which is shown in Photo 028. Remember that it consists of two layers of 1/8" wood. The fore layer of all square frames – those running from



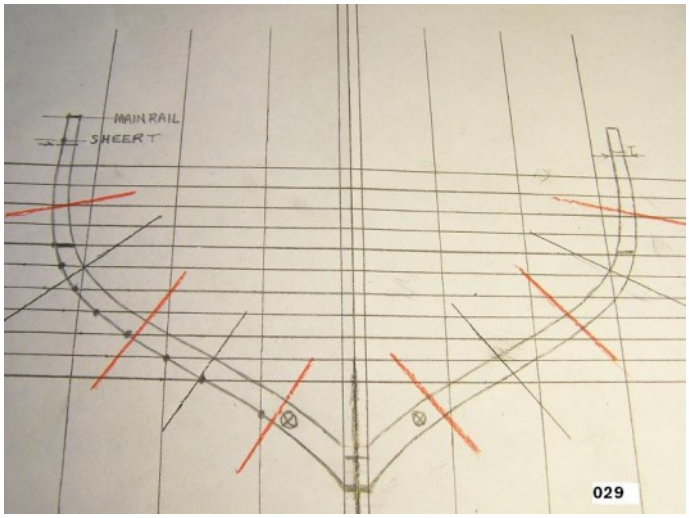
A typical frame

Frame 9 through Frame U – will be constructed of 7 pieces of wood, including the floor timber, two second futtocks, two fourth futtocks, and two sixth futtocks or top timbers, with the top edges of the sixth futtocks representing the stanchions. The aft layer of all square frames will be constructed of 6 pieces of wood, including two first futtocks, two third futtocks, and two fifth futtocks or top timbers. Thus, each square frame will consist of 13 pieces of wood.

Now let us construct a square frame, starting with the Midship Frame, which contains no bevels and therefore is relatively easy to describe.

Step 1: Marking the Positions of Futtocks on the Frame Grid

In Photo 029, you can see the futtocks marked out on the grid. A red pencil is used for the foreside of the frame, and a black pencil is used for the aft side of the frame. All butt joints should be spaced equally apart, but this need not be done with precision. Using a colored pencil, mark the floor timber first, then approximate the 3 futtock on each side of the frame. Then use a black pencil to mark the aft side, placing your marks about half-way between the colored-pencil lines.



Futtocks marked on the frame grid

Step 2: Cutting out the pieces necessary for each layer of the frame

Now cut out small pieces of wood for each of the pieces that make up the fore frame layer. Cut the wood wider than necessary so that it will cover all of the width of the frame and then some. Also leave a little extra wood at the top of the top timbers, which you can trim later. The grain of each piece of wood should be cut so that it roughly follows the curvature of the frame. Sand each butt joint smooth so that it fits snugly together with the one next to it. Place all the pieces on top of your grid and test-fit them together snugly. Make sure all the pieces cover the outline of the grid generously.

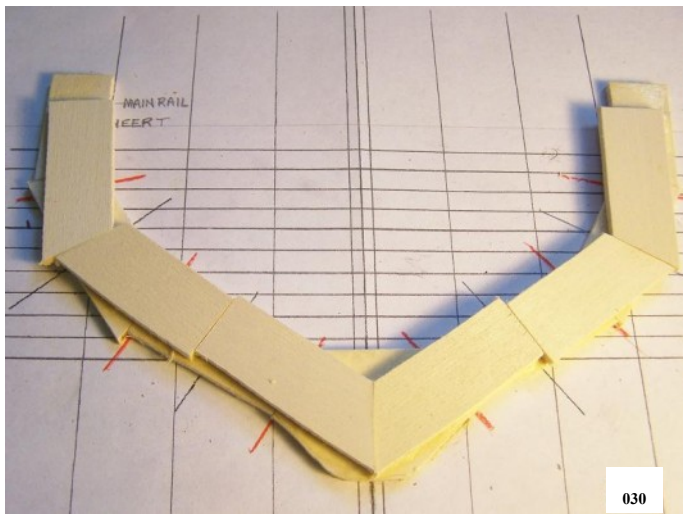
Step 3: Gluing the pieces together; then gluing the layers together

Now glue all the pieces of the layer together, making sure each butt fits snugly to the next one. Do this right on top of your grid, but don't put so much glue that your grid sheet sticks to the wood pieces.

Make the second layer of the frame similarly. Again, fit all the pieces together snugly on top of your grid sheet. Since the aft layer contains the exact point where the stanchion on the fore layer appears, make sure you mark and cut this point precisely.

Finally, glue both frame layers together. Make sure they are placed so that there won't be any gaps in the wood; in other words, you want to be able to saw out the entire frame with both frame layers wholly intact. See Photo 030.

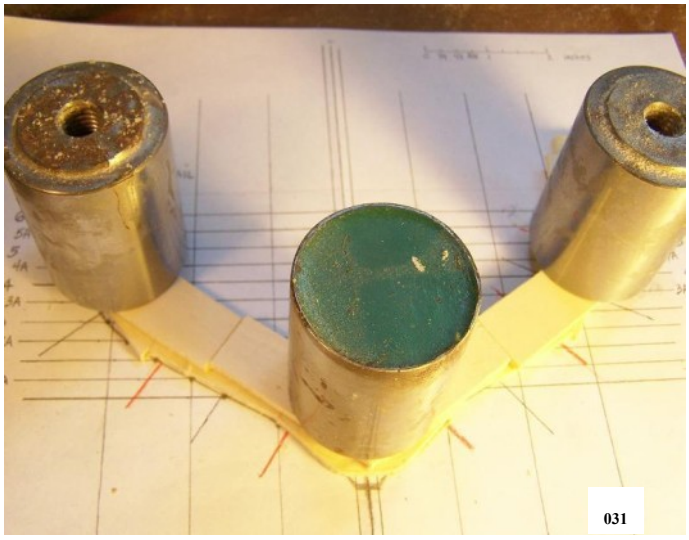
Place weights on top of the two layers to ensure that they dry completely flat. See Photo 031.



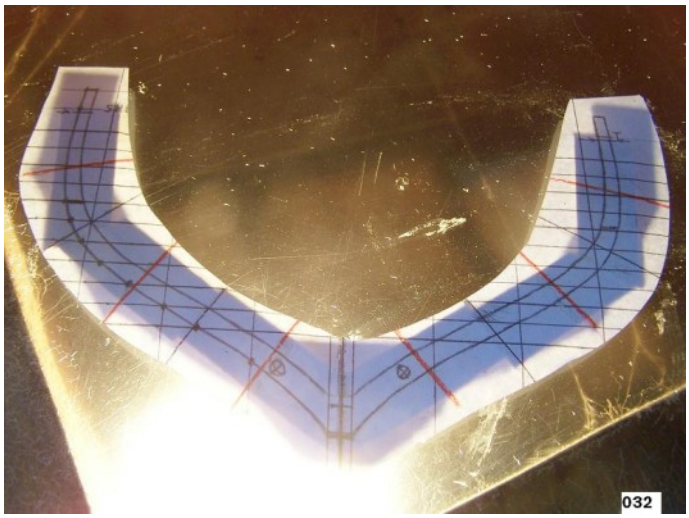
Both frame layers glued together

Step 4: Rubber-cementing the grid to the double frame layers

Always remember that the stanchion side of the frame will always face forward on the ship. For all frames going forward of the Midship Frame, this means that you will rubber-cement the grid sheet to the side with the stanchion. Apply an ample amount of rubber cement to the stanchion side of the frame. Using a light source behind the double layers of frames, place the grid sheet on the frames and align it properly before the glue dries. Make sure you have aligned the deck line of the back frame with the lines on your grid, too. When you are satisfied, let the rubber cement dry. See Photo 032.



Weights used to ensure both layers are flat



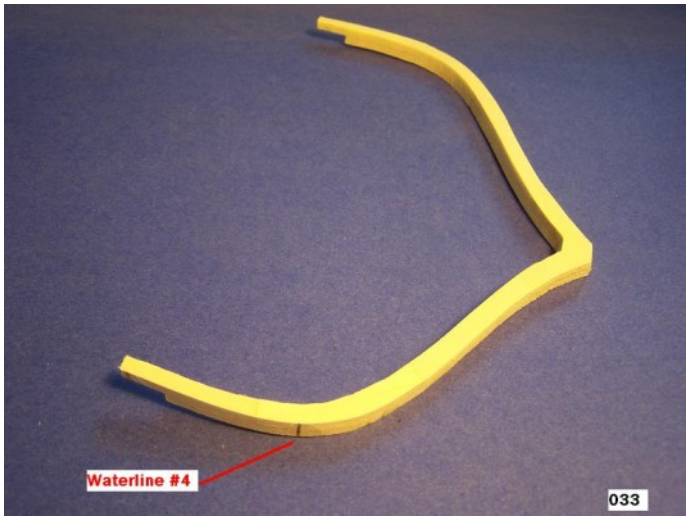
Light source used behind grid sheet

Step 5: Cutting out the frame, sanding it smooth, and marking the LWL

Very carefully, use a band saw to cut out the frame. A jigsaw will work, too. Stay on the OUTSIDE of all lines. Leave a little extra length wood at the stanchion area – it will be trimmed off later.

Now sand the entire frame smooth. You may need to use a variety of different sanders, including a disk sander for the outside edges, a Dremel drum sander for the inside edges, and a simple sanding stick to finish the job all around the frame.

Before removing the grid paper, mark the LWL (Waterline #4) on the edges of the frame. This will be your reference point for installing each frame in the Framing Jig. Then remove the remaining grid paper, which can easily be peeled off. See Photo 033.

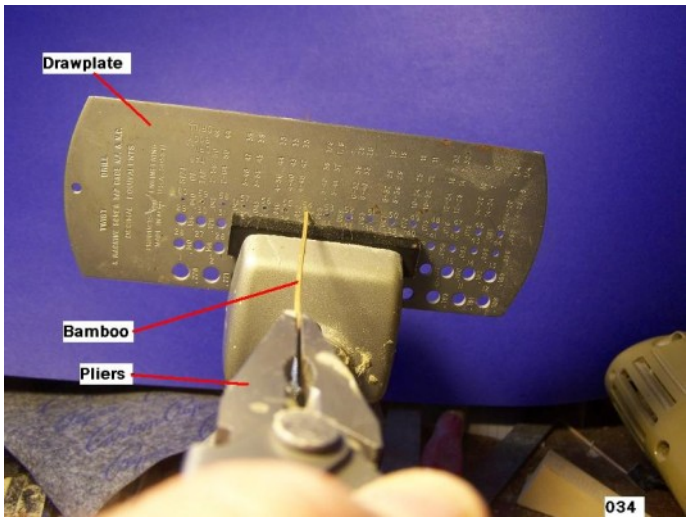


Frame sanded smooth marked with LWL

Step 6: Trenailing all butt joints

Trenailing all butt joints serves two purposes: 1) It joins both layers

of the frame securely together, and 2) It simulates the drift bolts employed on the real ship. As you know, each square frame consists of 11 butt joints. Since a drift bolt is used on each side of each butt joint, this means that each frame will contain 22 trenails.



Making Bamboo Trenails

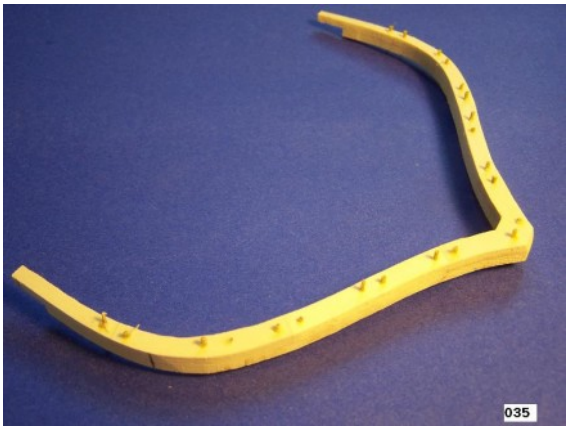
To make trenails you will need a vise, a drawplate, a pair of pliers, a sanding stick, and a length of split bamboo. A drawplate is simply a flat steel plate that has a series of successively smaller and smaller holes drilled through it. A simple drill gauge will work just fine; however, some drawplates are specifically made for creating trenails – each hole is slightly countersunk to make the job of pulling bamboo a little easier. A large pair of needle nose pliers works perfectly for pulling the bamboo through the drawplate. The sanding stick is used to sand a point on your sliver of bamboo, if necessary.

There are several common sources of bamboo. Bamboo placemats that can be purchased wherever you find dining room accessories are ideal, especially those made with tiny square lengths of bamboo about a foot long. A bamboo fishing rod is another inexpensive source; you just need to split off slivers between two of the knuckles.

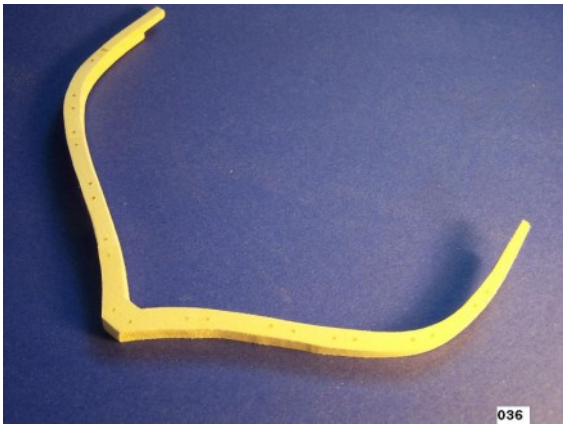
To pull your own trenails, place the drawplate in a vise. Split off a piece of bamboo and sand it to a point. Place the bamboo in a hole where it fits all the way through. Then put it in the next smaller hole. Use your pliers to grab hold of the bamboo and pull it all the way through the hole. See Photo 034. It's best to grab tightly and pull without stopping in a hole – make it a smooth, continuous pull. Keep on doing this until you finish with a hole with the size of a #57 drill bit. This is the size we need for our drift bolts.

Now, drill a hole with a #57 drill bit on each side of every butt joint on both sides of the double frame. Dip your length of bamboo in a small amount of carpenter's glue, and then push it into one of the holes on your frame until it's all the way through. Snip off the bamboo with toenail clippers. Repeat for the remaining 21 holes. Let the glue dry.

After the glue has dried, trim off the trenails with toenail clippers and then sand both sides of



Install 22 trenails in each square frame



The finished Mid-Ship Frame

the frame until smooth. The finished frame will look like Photos 035 and 036.

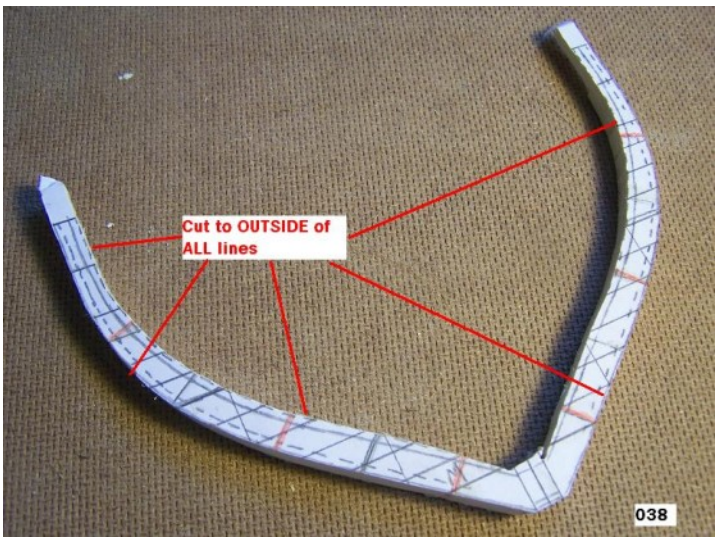
Finally, mark a label on the frame. The best place to mark is the center top of the floor timber, which will eventually be covered by the keelson. See Photo 037.

Mark label on each frame

Step 7: Making square frames with bevels

As you will soon discover, most square frames contain bevels. The ones near the Midship Frame are slight bevels, but the further away you get from the Midship Frame, the greater and more complex the bevels become.

Frames with bevels are made precisely like the Midship Frame. The important point to remember with beveled frames is, when you are band-sawing out the frame, to cut on the *outside* of *all* lines, including dashed lines. See Photo 038, which illustrates Frame M as an example.



Cut on the OUTSIDE of all frames

If you overcut, do not be satisfied with such a mistake – make a new frame. Otherwise, you will see a glaring gouge, especially if you intend on leaving some of your frames exposed on your final model.

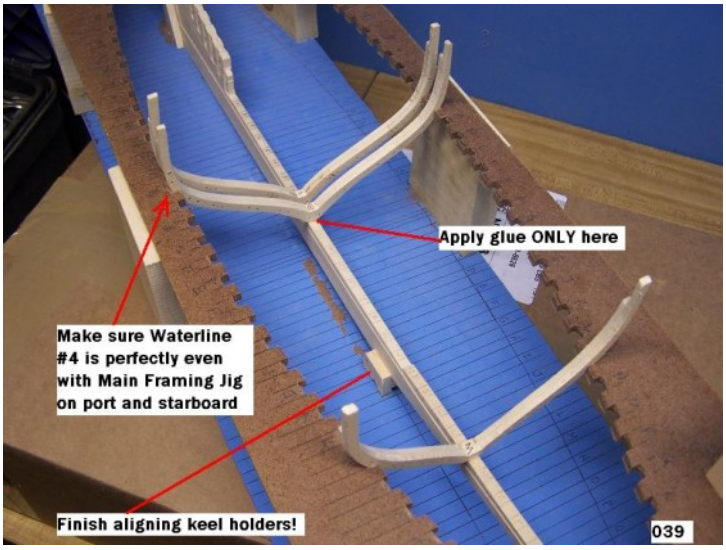
Use a small drum sander chucked in your Dremel to sand the bevel, which will run from your dashed line on your grid paper to the edge already formed by the back frame layer. It's best to sand up to the dashed line first, and then flatten it out toward the back frame. Finish with a sanding stick.

Step 8: Finishing installing the Keel Holders

Now is a good time to install the remaining keel holders, as was described earlier. Make sure the keel assembly is perfectly aligned in all directions. You must use at least two frames, such as the Midship Frame and Frame M to ensure good alignment – the more frames you use, the better the alignment. All keel holders may now be made permanent on the Building Board.

Step 9: Installing square frames in the Framing Jig

First, test-fit the frame in your Framing Jig. Is there a proper bevel at the point at which the frame rests on the keel? Does the frame fit perfectly in its port and starboard notches in the Framing Jig? Do your marks for Waterline #4 fit perfectly level with the top edges of the Framing Jig on both port and starboard? If you answered no to any of these questions, it's time to make minor adjustments, if you can. If minor adjustments don't solve the problem, you've made some incorrect measurements or you lofted something incorrectly on either your jig or your frame. Whatever you do, do not proceed further until you've solved the problem. Ask yourself these questions for every frame you install another frame, because it is imperative that they be answered in the affirmative. The accuracy of your model will be contingent upon the accuracy of every frame you install.



Cut on the OUTSIDE of all frames

Once you are certain that the frame is okay to install, place a small amount of carpenter's glue at the base of the floor timber of the frame (where it meets the keel). Place the frame back in place, aligning it perfectly. Let the glue dry thoroughly. See Photo 039.

After the glue has dried, drill two holes with a #57 drill bit – one on each edge of the base along the centerline. Insert bamboo dowels in both holes. Let dry. Snip off excess doweling. See Photo 040. This provides very little support right now, but as our model progresses, more and more additions will be made to further strengthen the frames at the keel.

Frames attached to the keel

You now have enough information to complete all square frames extending from Frame 9 through Frame U. Note that Frames R through U will be fit into the Main Framing Jig and the Secondary Framing Jig as well. Complete all square frames as your time permits.

Step 10: Installing deck clamps

While your model is still in the Framing Jigs, install three deck clamps, as shown in Photo

041. All three clamps run the full length of the deck; however note that there is a drop in the deck of 3/16" at Frame C.

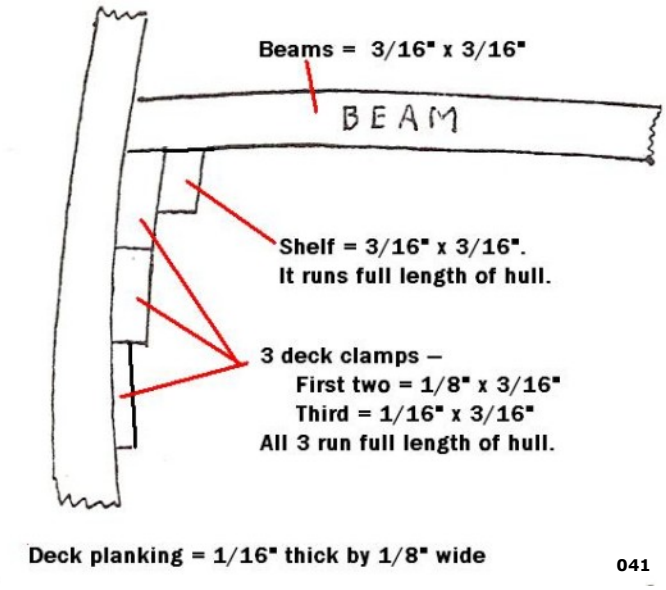
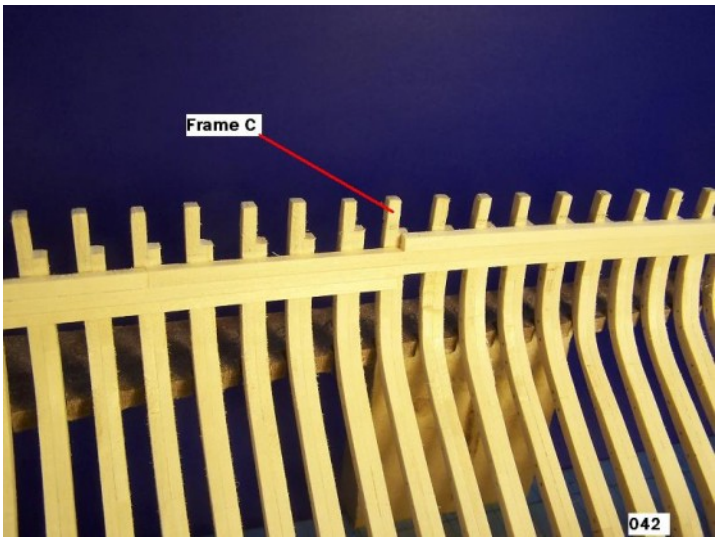


Diagram of deck clamps, shelf, and deck beams

Note that all deck beams will measure 3/16" square and our deck planking will be 1/16" thick. Therefore, the top edge of the upper deck clamp will lie ¼" (3/16" + 1/16") below the deck line shown on Hull Profile Plan on Plan Sheet 1. There are several ways of locating these points on your frames, but the one that is highly recommended because it's foolproof is to insert strips of ¼" wood between every 5th or 6th frame. The precise height of each strip of wood will vary. To measure the height of each particular piece, measure from the top edge of the Framing Jig to ¼" below the deck line shown on the Hull Profile Plan. Cut each strip so it extends all the way across from port to starboard. Once all your strips are in place (they need not be glued anywhere – just let them rest in their proper spaces), you are ready to install your deck clamps.

Now, cut out a length of deck clamp 1/8" by 3/16". Its length is your own choice, but it should be at least 6" long, and any joint should end at the exact center of any given frame. Run a bead of glue down one side of the clamp. Press it against the frames, and push down onto your temporary strips of wood, making sure that the deck clamp comes in contact with every temporary strip of wood. Clamp the deck clamp in place with small clamps, making sure every frame is glued onto the deck clamp. As you can see, the slight curve of the deck is automatically taken care of by the temporary strips of wood.



Installing Deck Clamps

The second deck clamp should be installed as follows: From Frame C (see Hull Profile Plan) going aft, install a deck clamp ABOVE the one you already installed. From Frame C going forward, install a second deck clamp BELOW the one you already installed.

Finally, the third deck clamp (only 1/16" thick) will be installed below the two deck clamps you already installed fore and aft. See Photo 042.

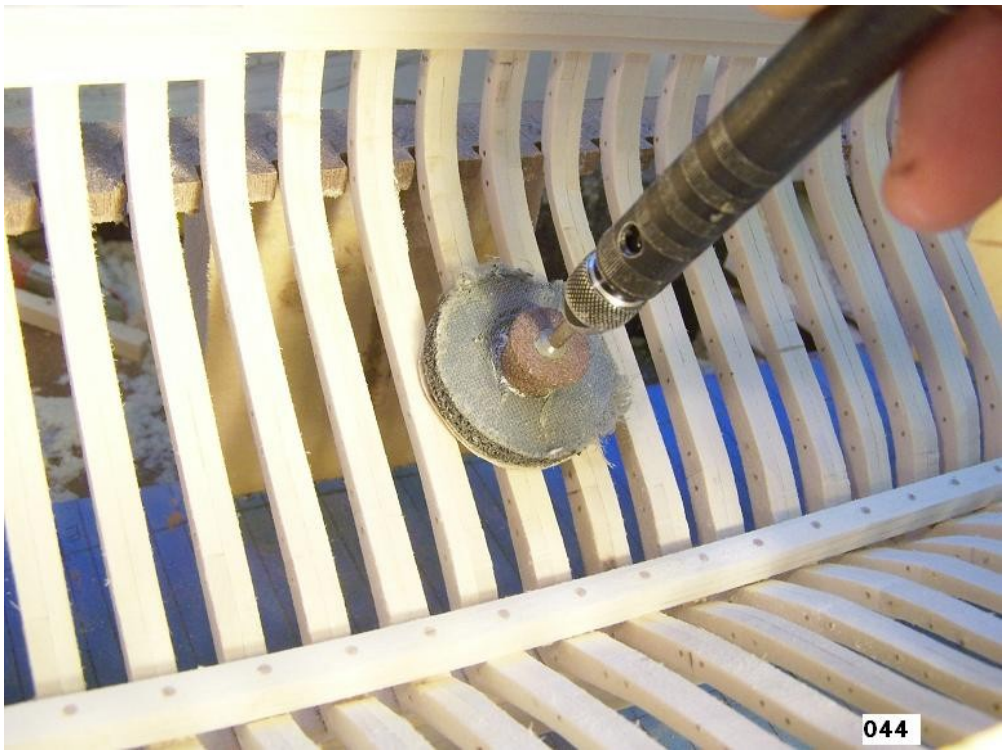
Now is a good time to trim your stanchions where necessary. Make sure they are cut evenly.

Step 11: Sanding the interior of the frames

While the model is still in the Framing Jig, sand the interior of the frames smooth. The best device for this task is a homemade sanding disk, which can be made from cutting out a 2" circle from a flexible computer mouse pad. Glue a piece of sandpaper onto one side of the pad. Then glue this onto one of those Dremel grinding stones you never have used. See Photo 043.

Homemade sanding disks

Chuck your homemade sanding disk into your Dremel. Then sand the interior of all the frames from the deck clamp down to the floor timbers. The object here is to make them as smooth and as even as possible. Do not apply too much pressure; let the disk do its work. See Photo 044.

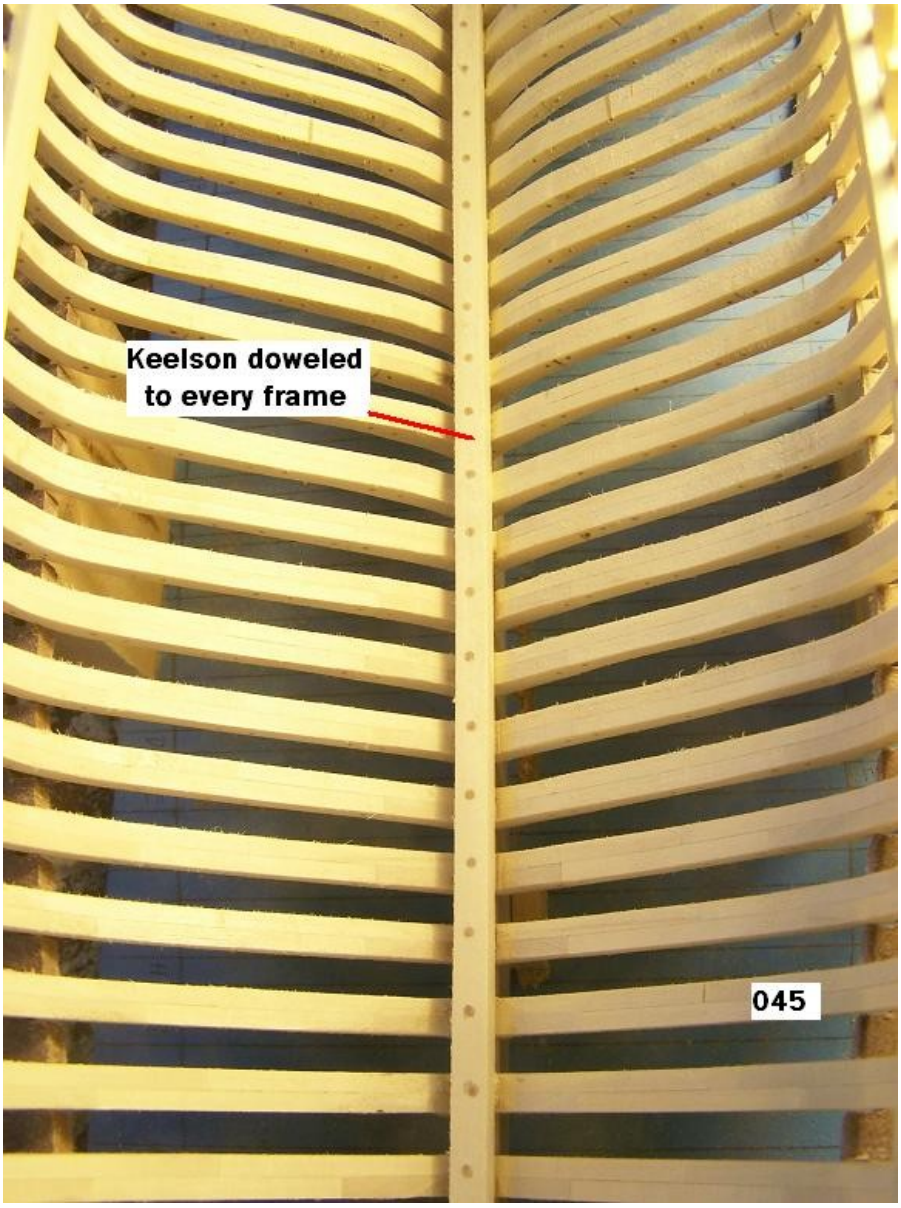


Sanding frames on interior

Step 12: Installing the keelson

On your own Keel Assembly Plan, you have a pattern for the keelson. Draw this pattern onto ¼" wood; then cut it out on a band saw. Test-fit the keelson in place all along the floor timbers to make sure it fits snugly and comes in contact with all frames. When you are satisfied that it fits properly, glue the keelson in place with carpenter's glue.

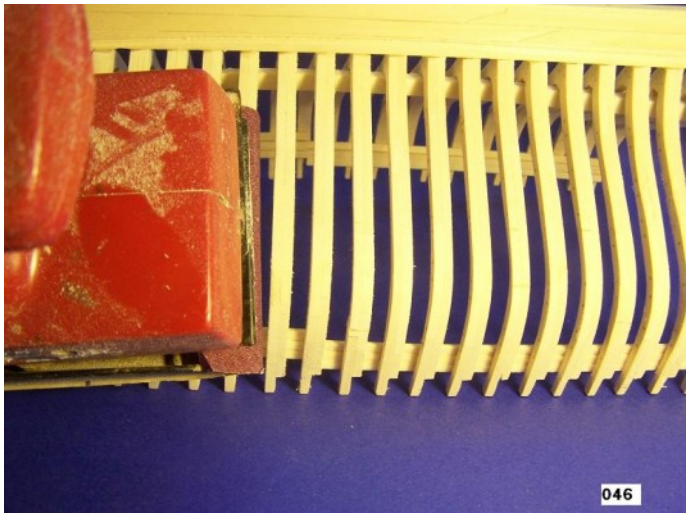
Next, you want to dowel the keelson in place at every frame. Toothpicks make fine dowels for the job. Drill holes just into the first keel at every frame. Place a small amount of glue on your toothpick and drive it home with the tap of a hammer. Snip off excess doweling with toenail clippers. See Photo 045.



Installing the Keelson

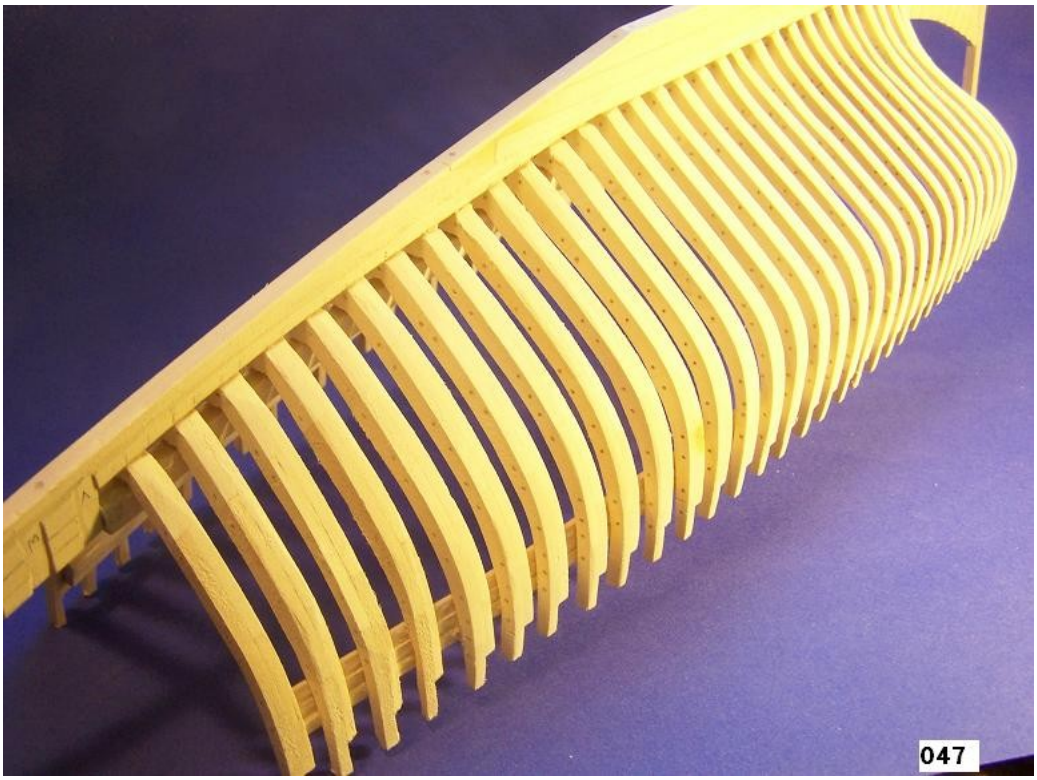
Step 13: Sanding the exterior of the frames

You are now ready to remove the model from the Framing Jig. It will be replaced in the Framing Jig after this step is finished. The model is now sufficiently strong enough to withstand a goodly amount of exterior sanding, which will make the frames smooth and uniform. You can use whatever means of sanding you are comfortable with. An ordinary pad sanding works well as long as you keep it in motion constantly. A Dremel drum sander works well at the places the floor timbers come in contact with the keel. A sanding block can also be used. See Photo 046

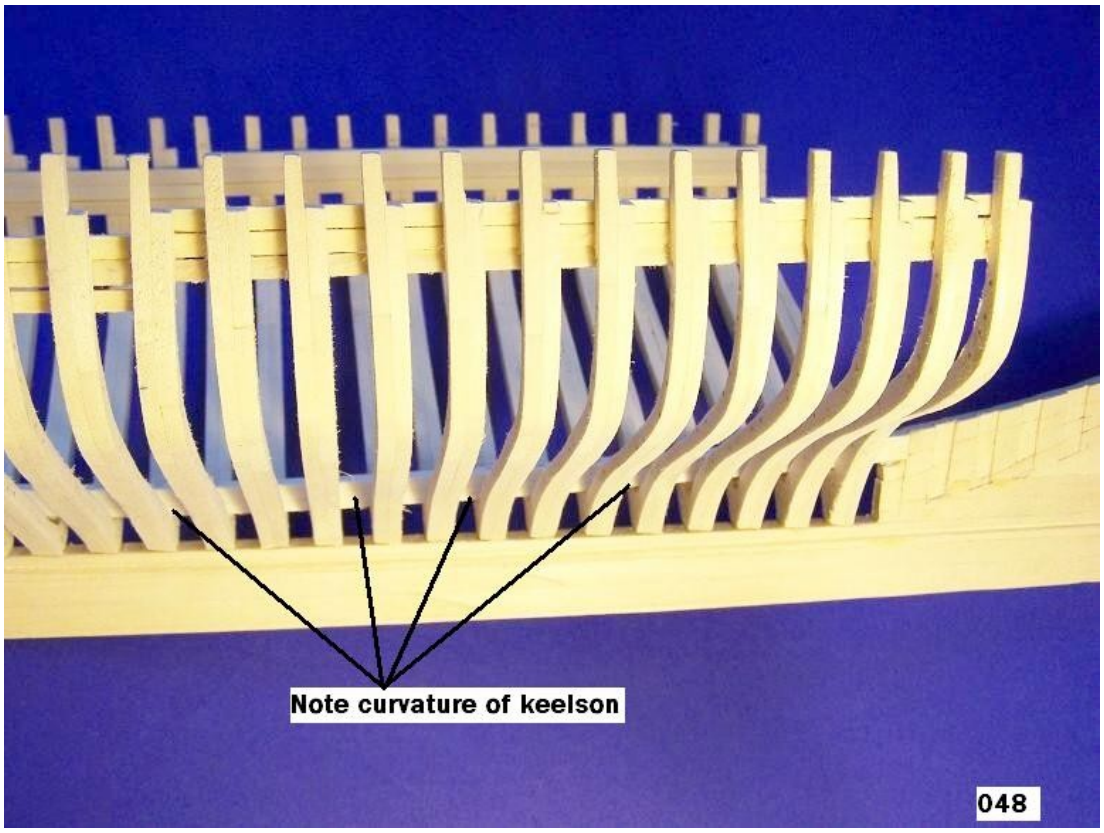


Light source used behind grid sheet

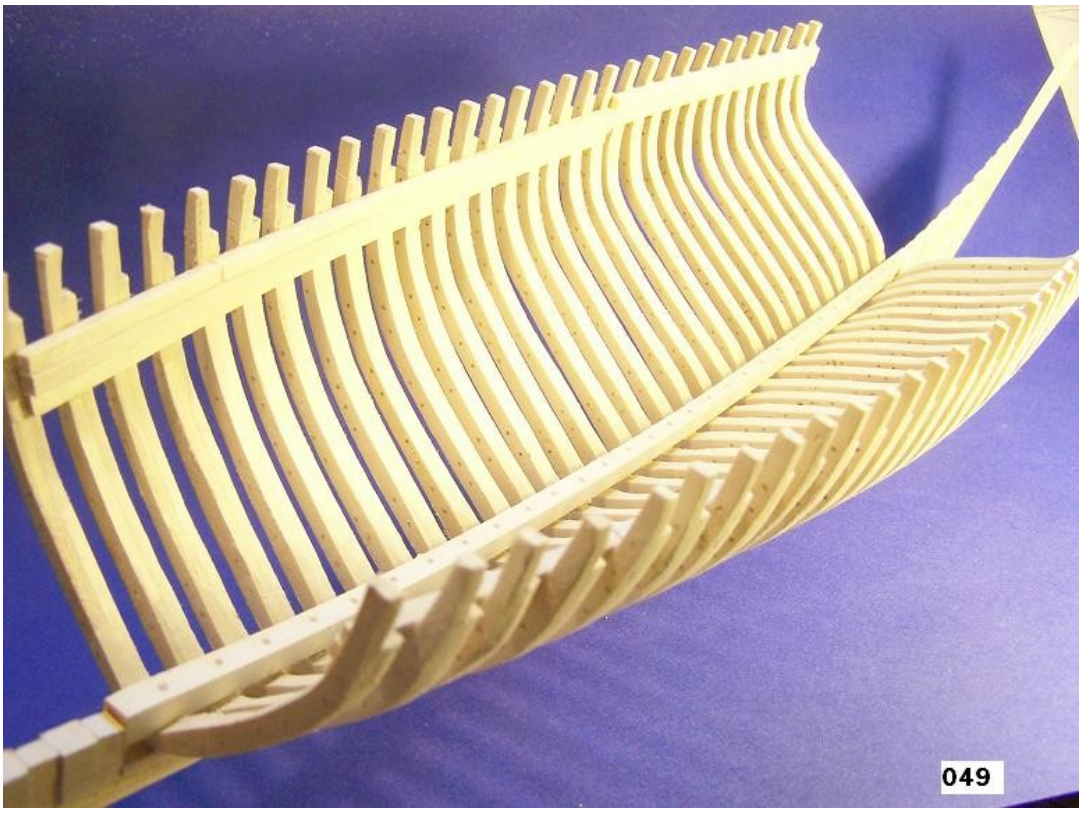
Thus far, your model should look like Photos 047 to 051.



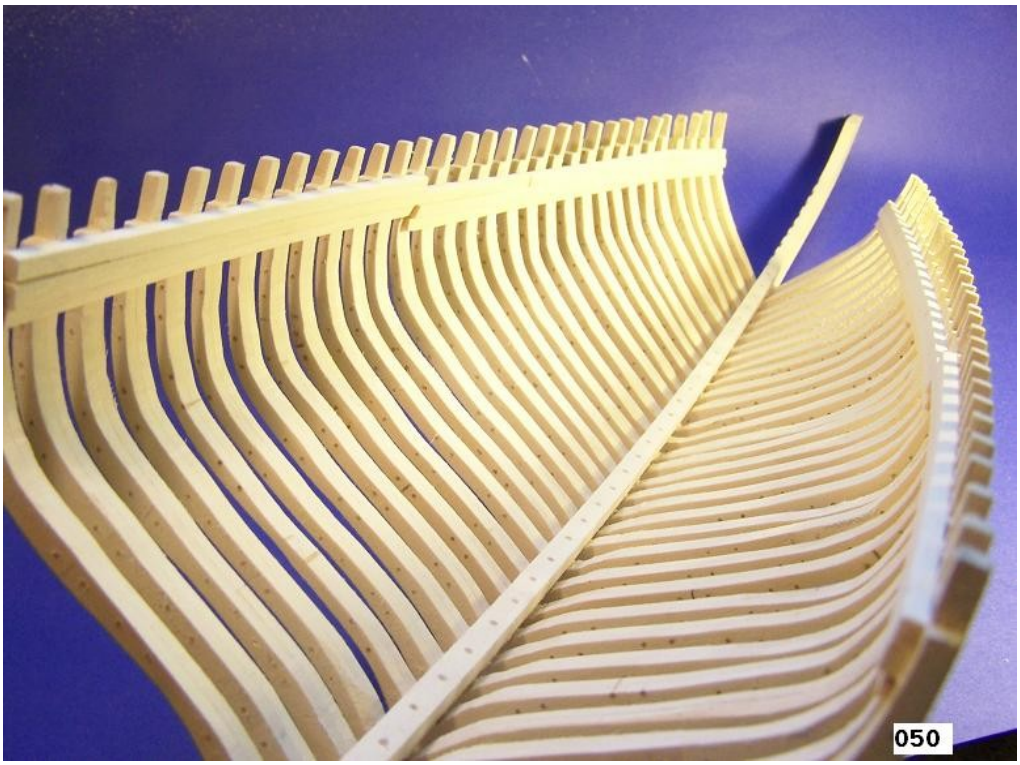
Side view of square frames



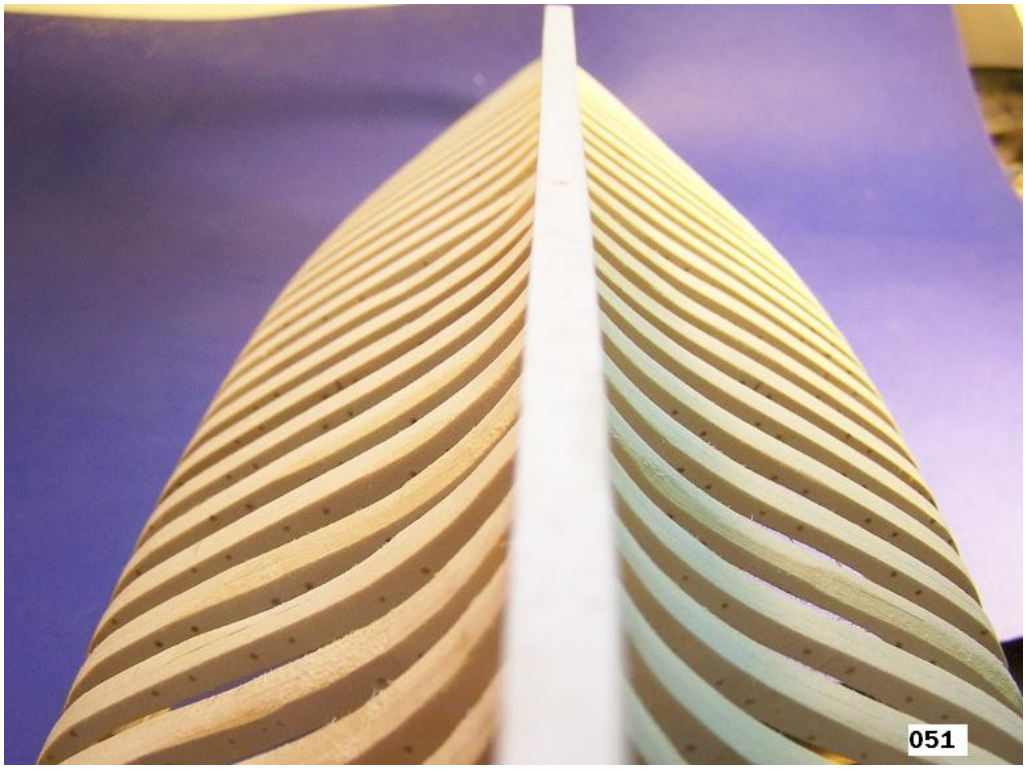
Finished frames—curvature of keelson



Finished frames and deck clamps



Finished frames and keelson



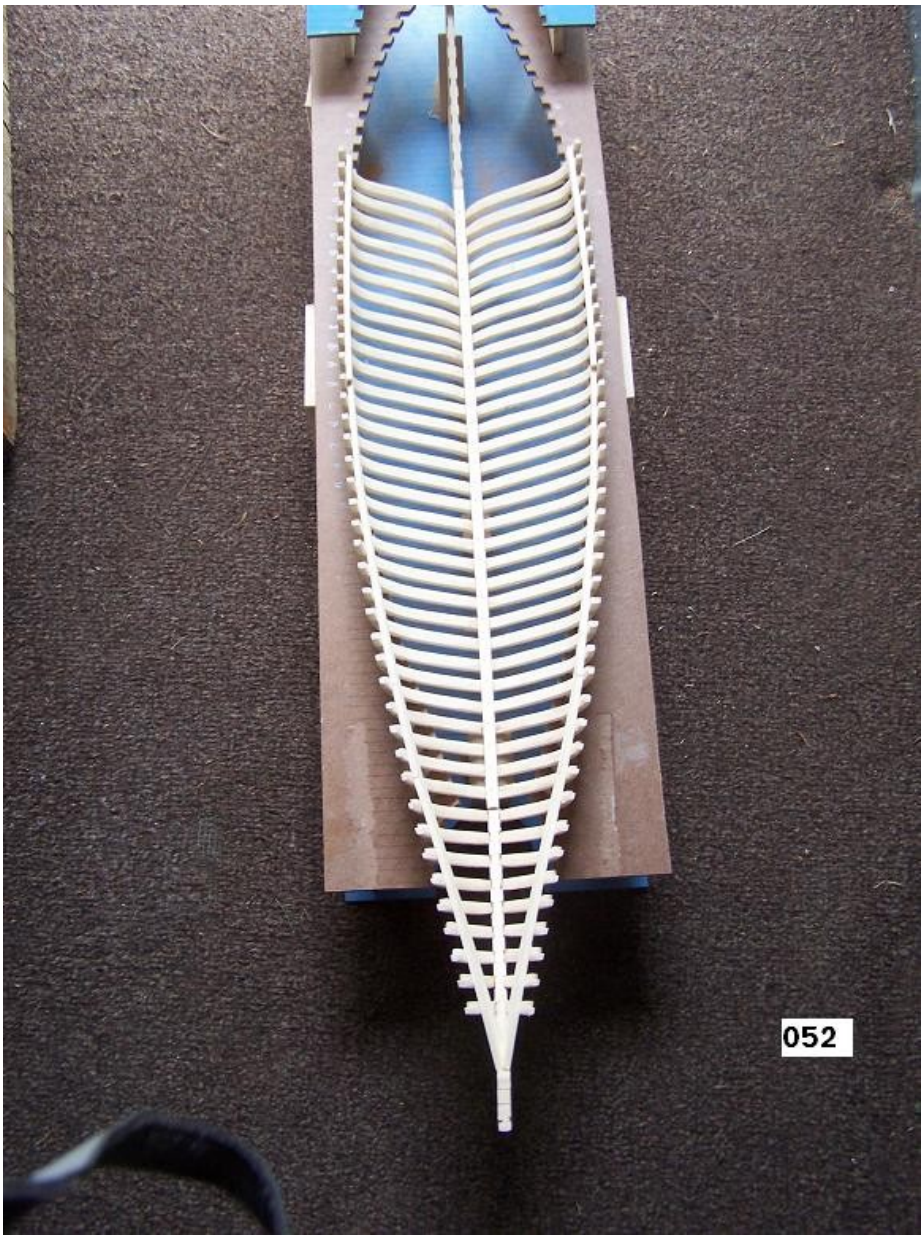
Finished frames bottom view

B. Building Half-Frames at the Bow

There are nine half-frames at the bow, running from Frame V to Frame DD.

The Half-Frames are built in the same manner as square frames, with the exception that they are glued into the grooves you previously cut into the deadwood when you built your Keel Assembly. Of course, when you lofted the plan of the frame, you allowed an extra 1/16" at the base of the frame so it can fit snugly into each groove. As you install each frame, install it just slightly above the rabbet.

You may find that your Main Building Jig interferes with the installation of a couple of the frames. Enlarge the notches in the jig where necessary. Be sure that each frame fits into the Secondary Building Jig as well, because you want these frames aligned perfectly, just like all the others.

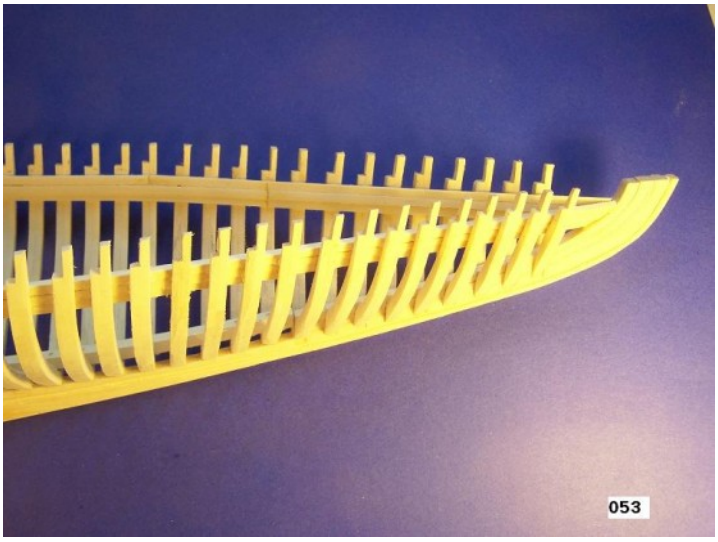


Removal of the bow jigs

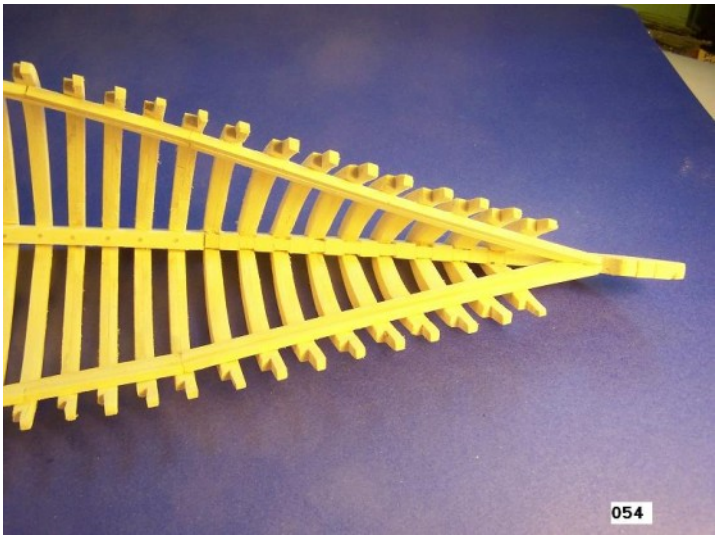
While the model is still in the jig, install the deck clamps in exactly the same manner as you have already done for all the square frames.

Let all the glue dry thoroughly before attempting to remove the model from the jig. You will probably find that the model is very difficult to remove from the jig at this point; in fact, you might find it to be impossible. If this occurs, simply cut the bow end of the Secondary Jig off in any way you can, removing it as carefully as possible – once these frames are in place permanently, the jig is no longer needed. In fact, once you are able to remove the model from the jig, you can cut off the entire bow end of the Building Board, Main Framing Jig, and Secondary Jig. You will find that your model will rest perfectly in its proper position when replaced in the Keel Holders and frame notches. See Photo 052.

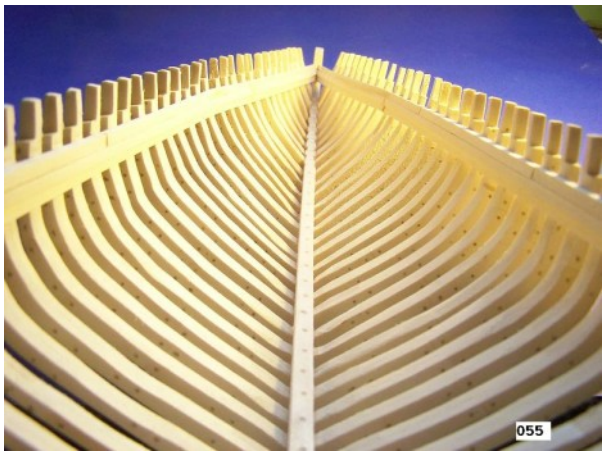
Right now, the Half-frames are only secured to the deadwood with a bit of glue. To provide greater strength for the Half-frames, it is recommend that you drill two #57 holes in the base of each half-frame directly into the deadwood, and dowel the frames with bamboo doweling.



Half Frames at the bow—side view



Half Frames at the bow—top view



Half Frames at the bow—interior view looking foreward

The nine half-frames at the bow, when completed, should look the Photos 053 to 055 below.

C. Building Half-Frames at the Stern

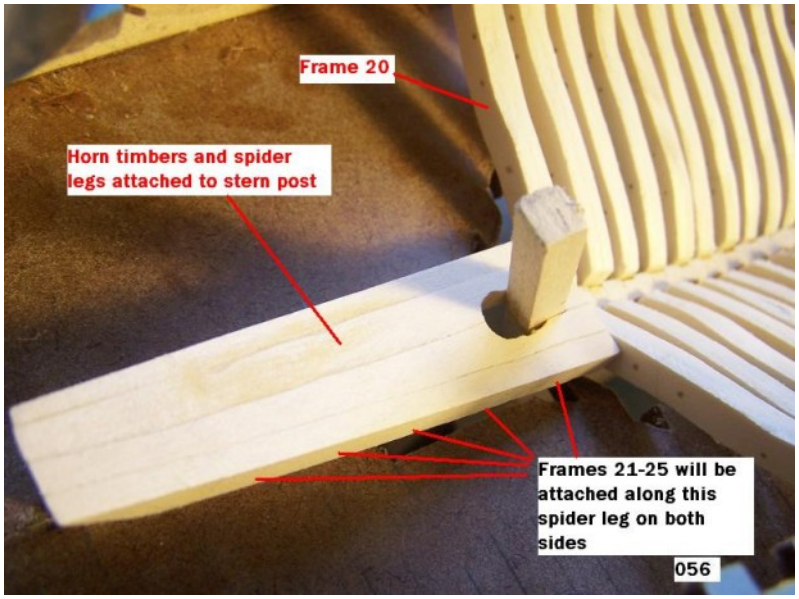
There are eleven half-frames at the stern, running from Frame 10 to Frame 20.

These half-frames are built the same way as the half-frames at the bow. They are installed in the grooves of the deadwood so that they follow the bearding line. Remember to align your reference lines up with the Framing Jigs. Glue each frame in place, and later, after the glue has dried, add a couple of bamboo dowels at the base of each frame, as you did for the bow half-frames. Note that there is a very small area for Frame 20 to fit onto the deadwood, which is okay.

D. Building Half-Frames attached to Spider Legs

There are five half-frames that are attached to spider legs, running from Frame 21 to Frame 25.

Before making these frames, you must first build the horn timber and spider leg assembly, which is shown in Photo 056. Note that the assembly in the photo is somewhat simplified from that shown on Plan Sheet 7. Using ¼"-thick wood, make the assembly by tapering the individual pieces of wood, as shown on the "Partial Plan of Stern Framing" on Plan Sheet 7, and gluing them together.



Horn timbers and spider legs

Observe that the aft edge has a steep angle where the transom will rest, so cut it as shown on the plans. The fore edge also has an angle where it will rest against Frame 20. Cut this angle, too. Drill out the rudder port at the required angle, noting that the hole is oval-shaped where the rudder fits, so it should be finished with a rattail file. Now, test-fit the assembly over the top of the rudder post. Make adjustments, if required.

Note the angle at which this assembly rests above Waterline #4 at the aftermost point, as can be found on your lofted plan of your Keel Assembly. Cut a piece of scrap wood to this height and glue it to your Main Framing Jig. See Photo 057. Now glue the assembly in place by

gluing two areas: the foremost end to Frame 20 and to the stern post with carpenter's glue. Let the aftermost edge of the assembly rest on the piece of wood that you glued to the Main Framing Jig until the glue has dried. Do not attempt to add the frames until the glue has dried completely. This will ensure that the spider leg assembly will be built at its proper angle, and that the counter will be shaped correctly.

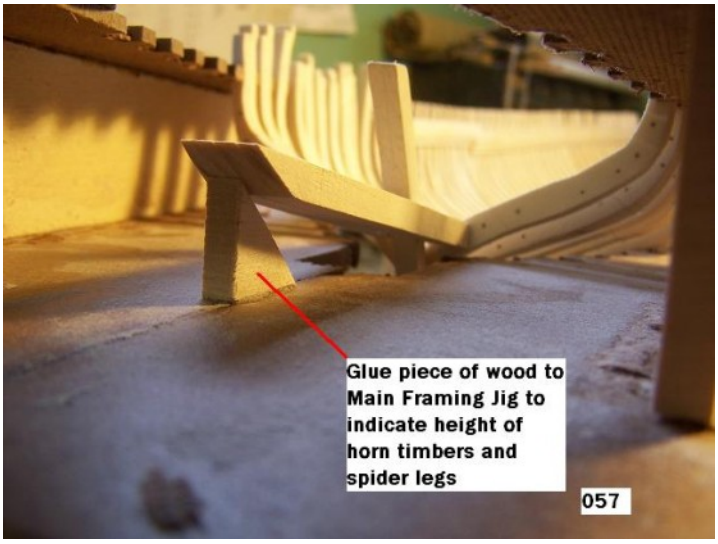
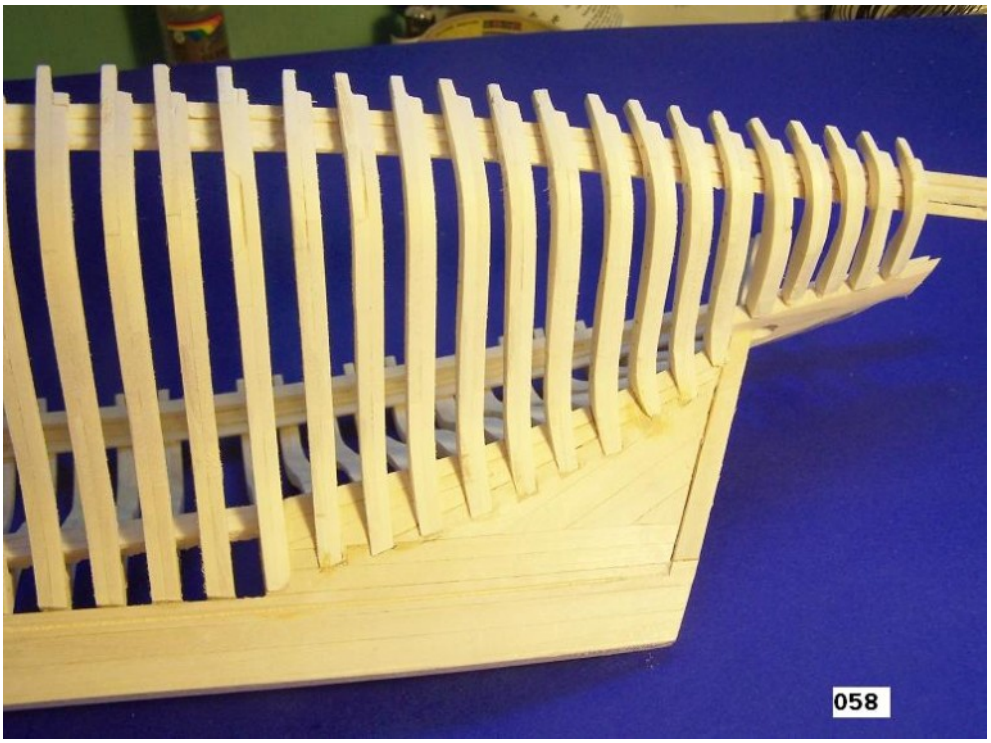


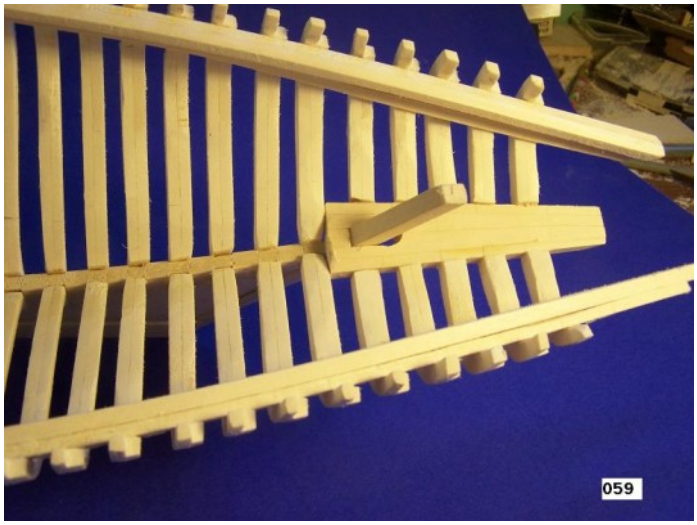
Diagram of deck clamps, shelf, and deck beams

Now cut out Frames 21-25. Remember to cut off each frame on a slight angle at its base, and make sure it is short enough to meet the spider leg assembly. Use CA glue to install each of these frames in place. Make sure that you space them appropriately apart, just as you did for all other frames, with 9/16" spaces between each frame. Apply the CA glue to the base of each frame and set it in the Secondary Framing Jig. Hold it until the glue sets. After the glue has dried, it is recommended that you install at least one bamboo dowel in each half-frame for a little more security.

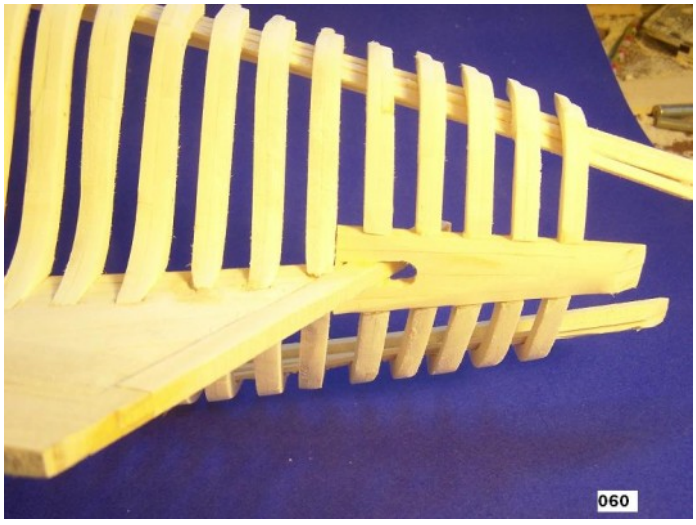
All the stern framing is shown in Photos 058 through 061, which should clarify the narrative.



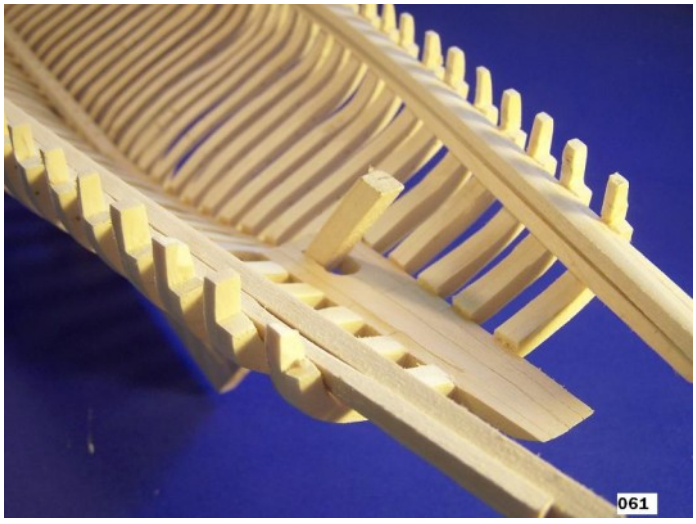
Stern area framing—side view



Stern area framing—top view



Stern area framing—underside



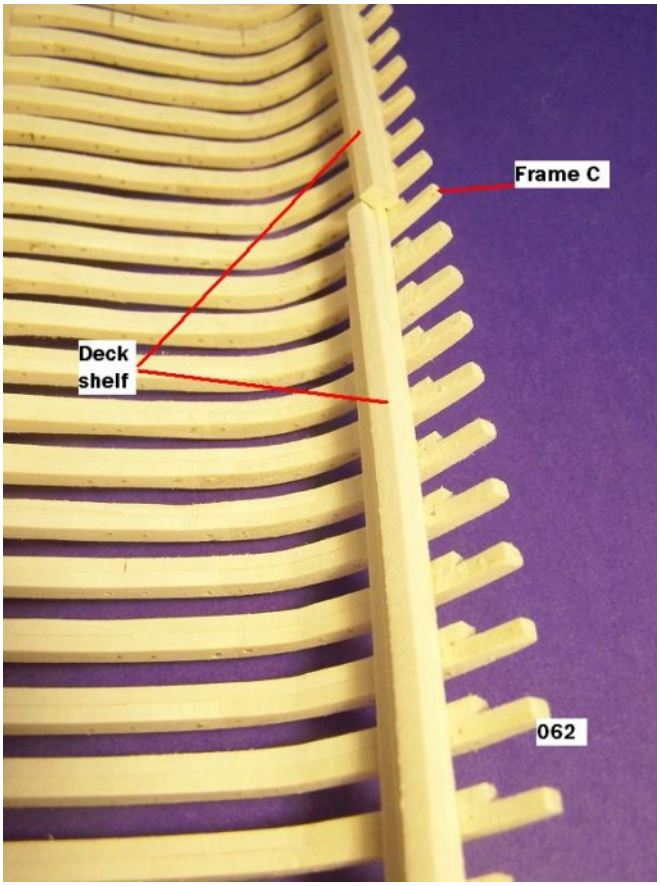
Stern area framing—close-up of interior

Part 5
Interior Structures

Eisnor's plans show several interior structures, which are items that are installed below the main deck, including mast steps, keelsons, and two lower decks, plus the main deck beams and carlings. These structures are discussed below.

Deck Shelf

The deck shelf is a length of 3/16"-square wood that is attached even with the top of the uppermost deck clamp, and runs the full length of the hull on both port and star board. Its purpose is to provide support for the deck beams, which will be installed later. Glue it in place with carpenter's glue and hold it securely with clamps spaced a couple of inches apart down it full length on both sides.



Deck Shelves

Mast Steps

There are two mast steps on the Bluenose – one for the main mast and one for the foremast. Mark their location as you have determined from your lofted Keel Assembly Plan. Make them from ¼"-square wood, and taper the top edges down to about 1/8", as shown on Plan Sheet 6. Glue them in place on the keelson.

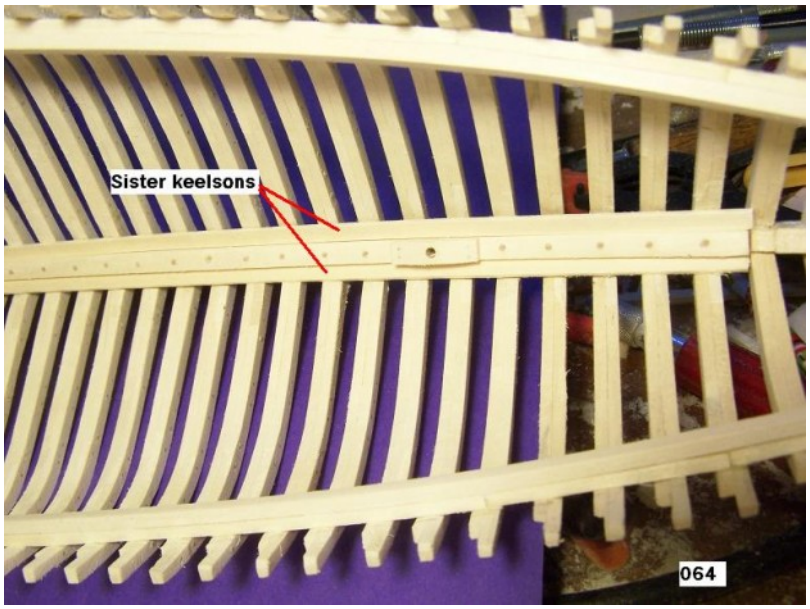
Drill #57-size holes in the four corners of each mast step, Dip bamboo dowels in carpenter's glue, and install the dowels in the four corners, trimming off as necessary.

After the glue has dried, drill a 1/8" hole in the center of each mast step. The heel of each mast will fit directly into these holes. See Photo 063.

Mast Steps

Sister Keelsons

The sister keelsons are lengths of wood installed onto all the frames adjacent to the keelson, and they run the full length of the keelson. See Plan Sheet 7. Cut lengths of 1/16" by 3/16" wood, apply glue, and hold in place with pins until the glue has dried. See Photo 064.



Sister Keelsons

Lower-Deck Deck Beams

Plan Sheet 6 shows that there are two decks situated below the main deck, with the deck at the stern being higher than the one that extends from about midship and going toward the bow.

The deck beams are shown for both, and the corresponding deck planking is also shown.

The deck beams must have been installed on top of at least a deck clamp or a deck shelf, although it is not shown in the plans, so we will install the deck shelves next.

Step 1: Finding and marking the location of the deck shelves

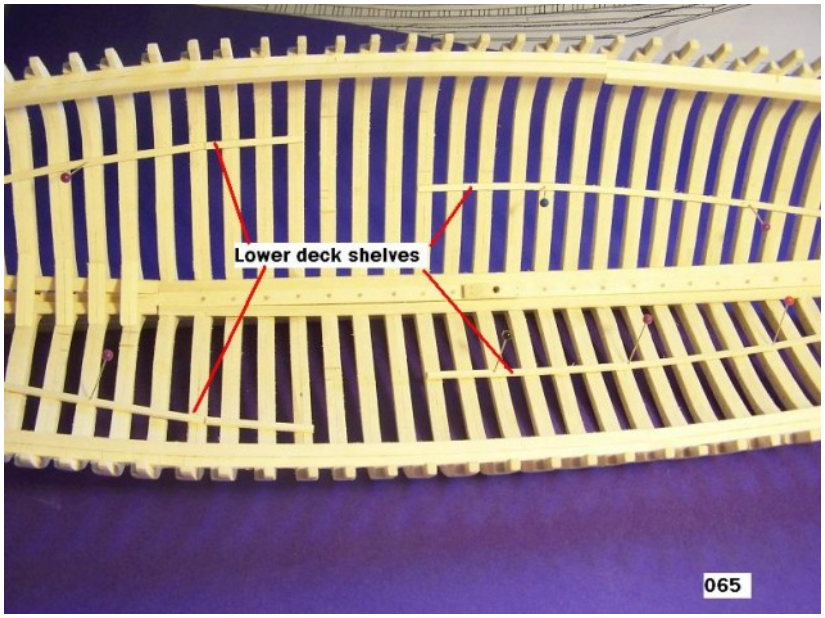
Our goal here is to find the correct location of the lower decks and install the deck shelves to that they are perfectly level on both sides of the interior, so that the deck beams will be fitted in place onto the frames with no lopsidedness when viewed from any angle. There are many ways to do this, but the one described here is perhaps the simplest.

Let us start with the lower of the two decks, which extends from Frame S at the bow to Frame 2 near the Midship Frame. Cut a piece of flexible cardboard ¼" wide with its length measured from the underside of the 1/8"-thick deck clamp to the point where the lower deck will meet Frame S. Press the cardboard to the curve of the frame as you cut its length. This represents the length that the lower deck should rest below the 1/8" deck clamp. For all frames from Frame D to Frame S, abut the cardboard under the 1/8"-thick deck clamp, hold the cardboard around the curvature of that frame, and then place a pencil mark on the frame at the other end of the cardboard. Add an additional 3/16" to this mark for all frames from Frame 2 to Frame C to adjust for the upward step of the main deck clamps. The result will be a smoothly curved line that represents the top edge of your deck shelf for this deck. Using the same piece of cardboard, repeat this procedure for the other side of the ship.

For the deck at the stern, note that it extends from Frame 6 to Frame 20. Repeat the above procedure again with a new measured piece of flexible cardboard, which will be a little shorter because this deck will be situated a little higher than the other deck.

Step 2: Installing the deck shelves

Cut out 1/16" by 1/8" strips of wood the length you will need for the deck shelves. Apply carpenter's glue to the underside of the deck shelf and pin it in place onto the frames, with the top edge of the shelf place right against your marks. See Photo 065.



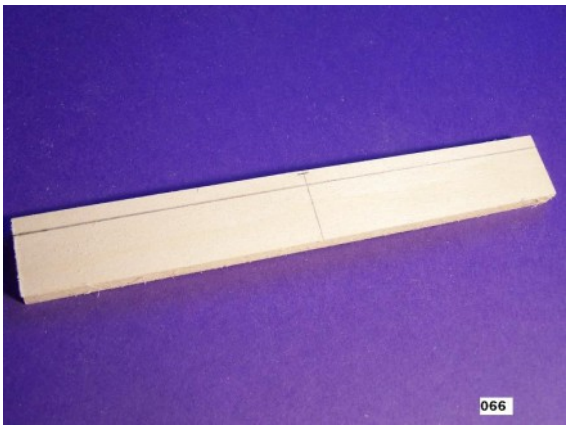
Deck Shelves for Lower Decks

Step 3: Determining the deck camber for all deck beams

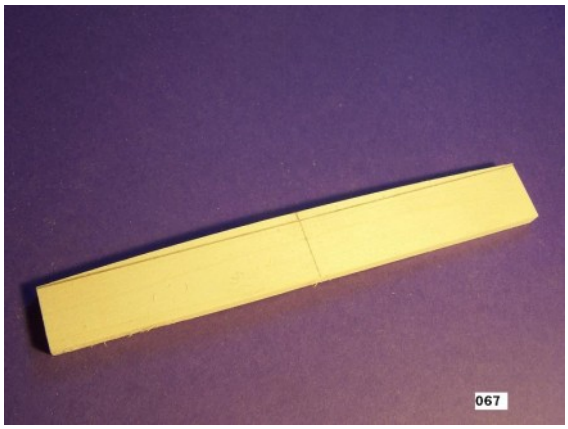
The **Deck Camber** is the amount of curvature applied to a deck to ensure that water does not form pools on the deck, but instead the water runs off the deck into scuppers. Deck camber is always an arc of a large circle. Unfortunately, the deck camber for the *Bluenose* is not provided on any of the plan sheets. However, a good rule of thumb for determining deck camber is ¼" for each foot of the ship's beam. We know that the deck beam of the *Bluenose* is 27 feet. Thus, ¼" x 27' = 6 ¾". This means the deck at the centerline of the ship will be 6 ¾" higher than the deck at the bulwarks of the ship. On our scale, this becomes slightly more than 1/8". This figure will be used for all deck beams on the *Bluenose*.

Step 4: Making a deck camber template

Since you will be cutting dozens and dozens of deck beams, it is best to make a deck camber template that can be used over and over again through the building of your model. Use a ¼"-thick piece of wood that measures 1" by 6 ¾", with the grain of the wood running longwise. Draw a line exactly ¼" down from the long edge, ensuring that the line is perfectly parallel to that edge. Measure and mark an exact centerline between both ends. Then mark a point very slightly more than 1/8" above the long line. See Photo 066.



Making a Deck Camber Template



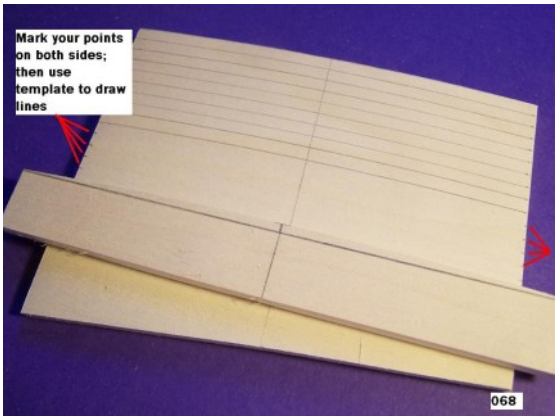
Deck Camber Template Completed

Use a disk sander to sand an arc that extends from the edge lines to the centerline mark. It should be a smooth curve – the arc of a large circle, as shown in Photo 067. This is your deck camber template. Keep it handy, because you will be using it regularly.

Step 5: Making and cutting out lower deck beams

Now take a piece of ¼" wood a little wider than the longer beam you need, and as long as the number of deck beams you expect to cut out. Draw 3/16" intervals along both edges of the wood, spacing them perfectly on both sides.

Now use your deck beam template just like a ruler to mark the arc of all the deck beams you will be cutting out in a session. See Photos 068 and 069.



Preparing to cut Deck Beams

It is recommended that you cut out one deck beam at a time. Then sand the top edge of the rest remaining on your piece of wood. Then cut out another, and so forth.

Marking to cut off Deck Beams

Step 6: Installing lower deck beams

To install your lower deck beams, place a deck beam adjacent to the frame where it will be installed. Press down to that both sides of the deck beam rests firmly on the deck shelf. Now mark the shape of the frame on your deck beam with a pencil.

Cut off both ends of the deck beam where you have made your marks. Test-fit the deck beam, making sure that it fits properly. Sand a little more, if necessary. Apply carpenter's glue on both sides, and press into place on the frames and align it properly. Be sure the bottom edge of the deck beam rests firmly on the deck shelf. Repeat this procedure for all the lower deck beams. Note that deck beams located at mast position should be omitted. Your finished lower deck beams should look like those shown in Photos 070 and 071.

Lower Deck Beams Looking Aft

Lower Deck Beams Looking Forward

Main Deck Beams

The main deck has the same arc of deck camber as the lower deck beams, but their other measurements are somewhat different. Most of the deck beams will be 3/16" wide and 3/16" in height at their centers. However, the 3/16" height only applies to the center of the deck beam; it then tapers to 1/8" at each edge where it rests on the deck shelf.

A further detail to complicate matters is that deck beams that come in contact with openings in the deck should be slightly wider, increased to a width of about 7/32" instead of 3/16". This applies to all five openings in the deck of the *Bluenose*, including the main cabin, the aft hatch, the main hatch, the skylight, and the foc's'le companionway. All other dimensions of these deck beams are the same; only its width is increased.

Step 1: Marking the location of deck openings on the deck shelves

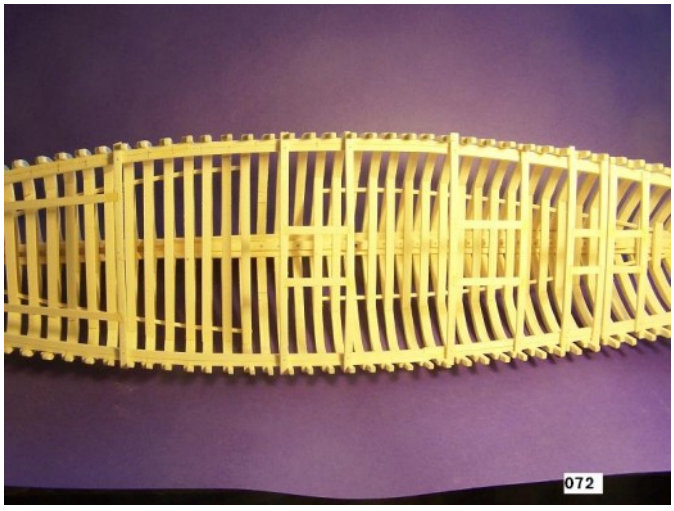
Use Plan Sheet 3 for this task. Observe the five deck openings described above. It is recommended that you use the center of both masts as reference points for determining the location of all deck openings. You are interested in marking only deck beam locations; therefore, you're only looking for measurements that run across the beam of the ship.

Starting with the main mast, place one end of your proportional dividers into the center of the main mast, and stretch the other end of the dividers to one edge of the aft hatch. Transfer this measurement to the deck shelves on both sides of the model by placing a pencil mark on both sides. Repeat this procedure for the other side of the aft hatch, and then transfer this to both sides of the deck shelves. Repeat this procedure for all five openings (ten deck beams). Make your measurements very carefully.

The pencil marks you made represent the locations for all deck beams adjacent to deck openings. Of course, when you get ready to install your deck beams, each deck beam will installed on the outside edge of this line (you don't want to cover any part of the opening with a deck beam).

Step 2: Installing the larger deck beams

Now cut and install these larger deck beams, remembering that they are 7/32" wide, tapered to 1/8" thick sided dimension at the deck shelves. Extend the beams all the way across the beam of the ship. If the beam fits into a space between the stanchions, extend the beam out to the exterior side of the hull. If it fits wholly against a frame, all well and good. If a part of the beam will fit against a stanchion and a part can be extended to the outer hull, do this cut cutting the required notch.



Deck Beams adjacent to Deck Openings—top view

Apply carpenter's glue at each end of a deck beam. After the glue has dried, drill a hole into the end of the deck beam right down into the deck shelf with a #57 drill bit. Then install a bamboo dowel. The ten larger deck beams are illustrated in Photo 072.

Step 3: Drawing a centerline on the deck beams

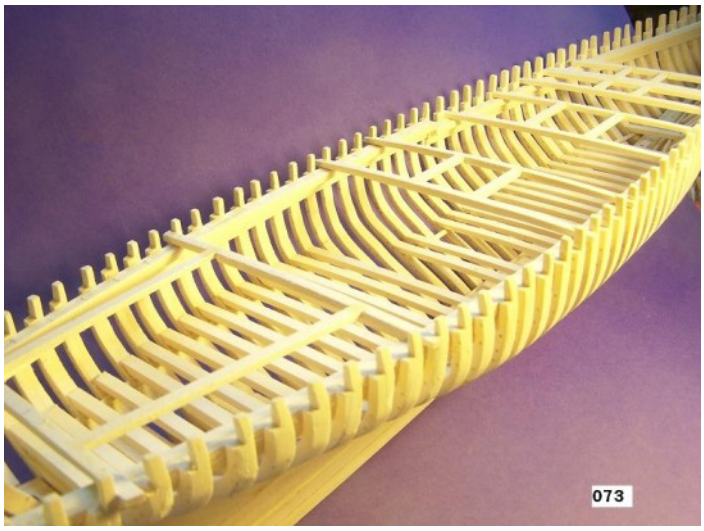
There are several ways to find the centerline. One way is to use your proportional dividers. Set your dividers on "2" and then open them to extend across the beam of the ship. The other side represents half that distance – the centerline. Mark this point at each of your installed deck beams. If everything has been built properly, your centerline can now be drawn with a ruler that connects all the points.

Another way to find the centerline is to attach a length of string from the stem to the rudder post, centering the string at both ends.

Step 4: Finishing the openings in the deck

Now that you have established a centerline on your deck beams, you can now determine the precise location of the width of each of the five deck openings. Mark these points on the deck beams.

Use a length of wood that measures 7/32" by 1/8" to enclose the deck openings. These parts of the deck beams should be installed with a mortise and tenon joint at each location. See Photo 074. Cut the mortise 7/32" wide about half way into the deck beam on both edges. The two sides of the mortise can be cut with a razor saw, and the remaining edge can be popped out with a #11 X-Acto knife. Do this carefully to ensure that your joints present a good appearance. Cut out a length of 7/32" wood, fit it into the two mortise ends, cut off with a razor saw, and install with carpenter's glue, ensuring that the top edges are even with the deck beam. See Photo 073.

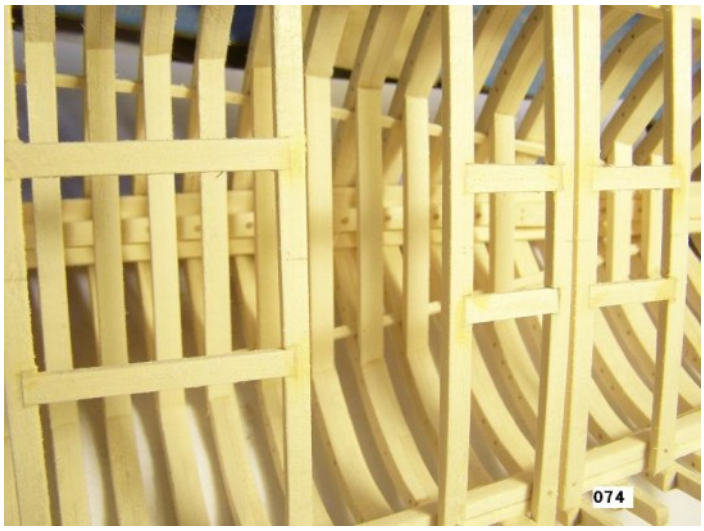


Deck Beams adjacent to Deck Openings—side view

Step 5: Installing all other deck beams

All other deck beams are identical in shape and installation as the larger deck beams you've already installed. The only difference is that they are 3/16" wide instead of 7/32".

To install these deck beams, first mark their location. They should be spaced at approximately ¾" centers all along the remaining gaps. Use your best judgment here. This is also true in areas that have deck openings. For example,



Mortise and Tennon joints in Deck Beams

there are five more deck beams that will be mortised and tenoned to the side of the main cabin. See Photo 074.

Another point to mention is the point where the two decks meet at Frame C. Place a deck beam at each edge.

Finally, use #57-size bamboo dowels to dowel each deck beam to its deck shelf. You will use 80 bamboo dowels for all deck beams.

When you have completed the deck beams, they should look like what you see in Photos 075 thru 077.

Deck Beams finished—stern section

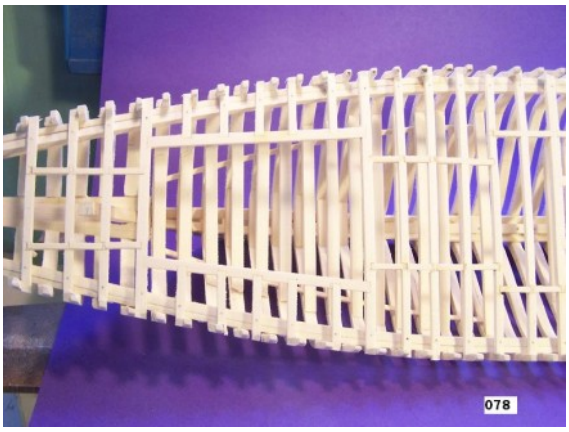
Deck Beams finished—mid-ship section

Deck Beams finished— forward section

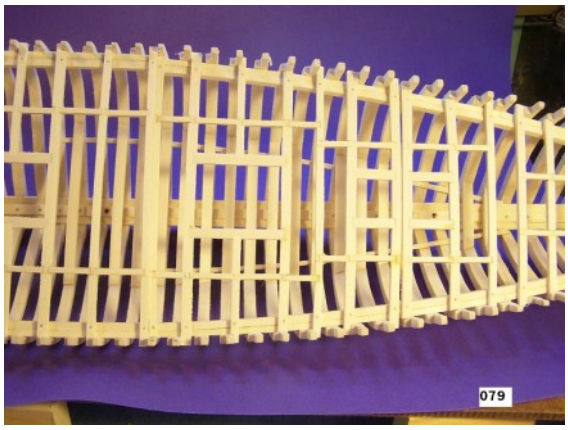
Carlings

Carlings are short pieces of timber ranging fore and aft between deck beams. They strengthen the beams as well as the deck. On the real *Bluenose*, the carlings had a sided dimension of 8". For our model we will use 5/32" in width by 1/8" in depth, with each carling joined to deck beams with a mortise and tenon joint at each end.

The locations of carlings are not included in Eisnor's plans, but use the pattern shown in Photos 078 and 079. This is a generally accepted method of distributing carlings throughout the vessel. Note that there is not an exact plan, just an approximation, so use your own judgment



Carlings — stern to mid-ship area



Carlings — mid-ship to bow area

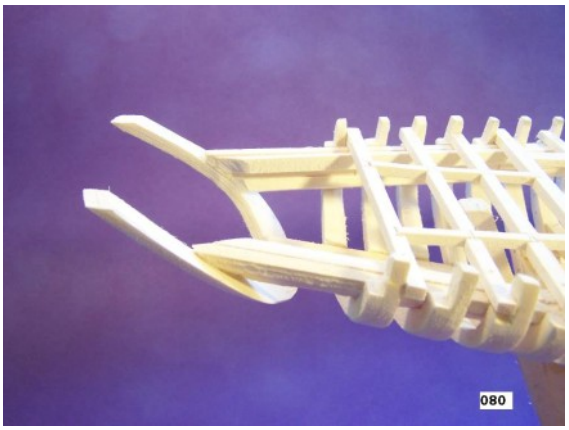
for this layout.

Of course, each carling is installed level with the upper edges of the deck beams. Do not place carlings in the way of masts.

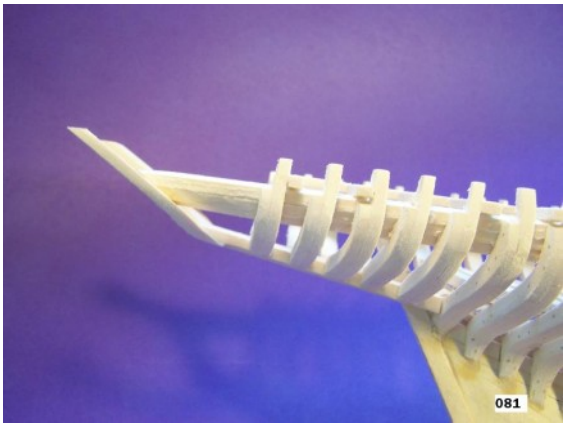
After all carlings have been installed, use a pad sander to sand the entire deck so that the beams and carlings are all level. This should not require a great deal of sanding, so don't go overboard. The goal is to have a test strip of planking about a foot long placed lengthwise on the beams to make sure the strip makes good contact with every beam without being forced. If there are minor discrepancies, sand slightly until they disappear. If you find major discrepancies (i.e., a deck beam is far too low or too high in relation to the others), replace the offending deck beam(s).

Transom Framing

At this time, it is only necessary to install a single U-shaped frame for the transom. It is cut from a single piece of 1/8" wood that has its grain running vertically. Since there is no pattern for the transom frame, use your best judgment to estimate its shape, cutting it somewhat oversized. Note in Photos 080 and 081 that the frame rests on the horn timber and spider leg assembly, and on the deck clamps and shelves. The top edges of the frame are level with the



Transom Framing 1



Transom Framing 2

stanchions. After sanding these items so that they are even and smooth, glue your oversized

piece onto them.

After the glue dries, use a pad sander to sand the frame to its exact shape by running the sander evenly along the counter frames, making sure that the transom frame is on the same plane at the counter frames. Finally, trim the inside of the deck clamps and shelves with a Dremel drum sander.

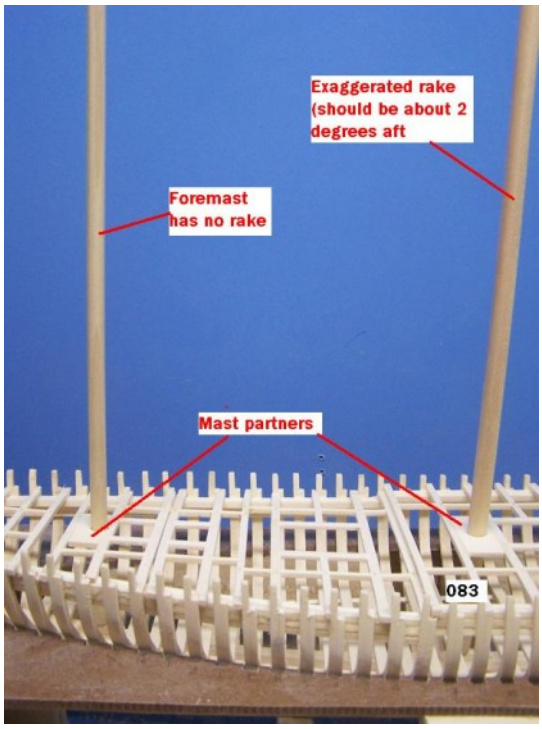
Mast Partners

A **Mast Partner** is a solid packing of wood about the same thickness of the deck beams into which the mast is fitted at deck level. The mast partner is always built and installed between the two deck beams where the mast is located. In the real ship, mast partners consist of many planks of wood; however, in our model we will use a solid rectangular piece of 1/8" wood. It is recommended that you drill a 3/8" hole into a piece of 1/8" wood for the foremast that will be considerably larger than necessary – to allow room for adjustment. Drill a 7/16" hole in another piece of 1/8" wood for the main mast, again making it larger than necessary.

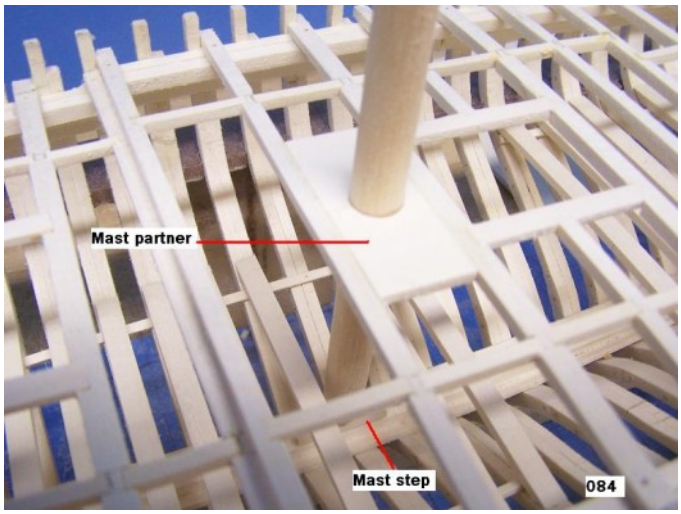
Mast Heels

Before determining the precise size of each mast partner, we need make the foremast and main mast so we can use them for test fitting. The lower foremast is made from a 3/8" dowel that is exactly 20 3/8" long from the mast step to the top of the mast. The lower main mast is made from a 7/16" dowel that is exactly 23 1/8" long from the mast step to the top of the mast. Cut both of these lengths of doweling. Taper the **heel** (lower end of the mast) of each mast slightly, and then drill a 1/8" hole in the base of each mast. Install a 1/8" dowel that is long enough to be inserted in the hole of the mast step. See Photo 082.

Another consideration to take into account before installing the mast partner is the rake of each mast, as shown on Plan Sheet 5. **Rake** is the inclination of the mast forward or aft from a line that is perpendicular to the ship's waterline. The foremast has zero-degree rake, which means it should be installed perfectly perpendicular to the waterline. On the other hand, the mainmast has a rake of about 2 degrees aft, which is a small amount of rake but is still important to the overall appearance of the finished model.



Rake of Main Mast



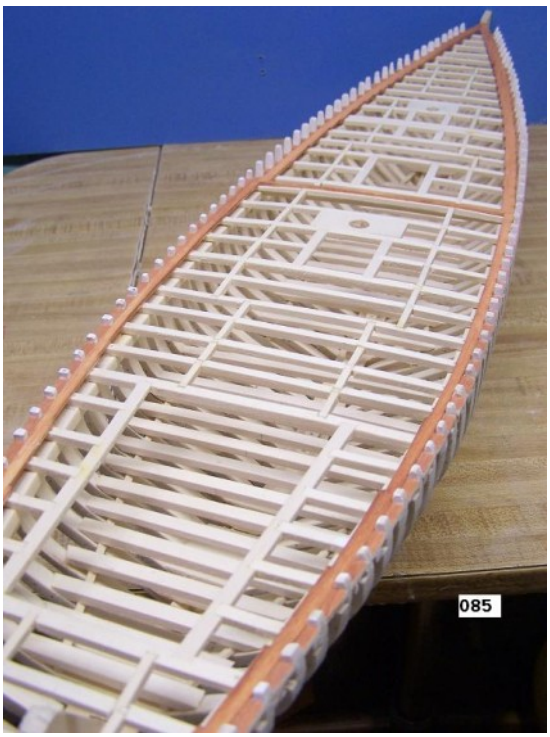
Mast Partners

Now insert your foremast into the hole in the mast partner, and then place the heel of the mast into the mast step. Press the mast partner down onto the deck beams. You may be required to expand the hole into one of the deck beams slightly. If so, do so with a rattail file. Examine the mast from all angles – you want this mast to sit exactly perpendicular to the waterline when viewed in profile, and you also want it to be perfectly perpendicular when viewed from the bow to the stern. When these conditions are met, mark the mast partner at the exact places it should be cut in order to fit between the two deck beams (0 and P, in this case). Cut where you've marked the mast partner. Then refit the mast back into the mast partner and the mast step hole. Check once again that it is aligned properly. Apply carpenter's glue to the edges of the mast partner that fits between the deck beams. Press into place, aligning it so it is even with the top of the deck beams. Do not apply glue to the mast or mast step, but insert the mast back in place, and recheck alignment once again – this is your last chance. Leave the mast in place until the glue has dried. See Photo 084.

Repeat this procedure for the main mast, remembering that it has a 2-degree aft rake and that the mast partners will be installed between deck beams A and 1.

Painting the Stanchions

If you intend on finishing your model with paint or stain, now is the time to consider the deck stanchions. On the original ship, they were painted white. Paint them only on three sides, leaving the exterior side unpainted. If you decide to paint or finish them at a later stage, it will be a much more difficult job. See Photo 085.

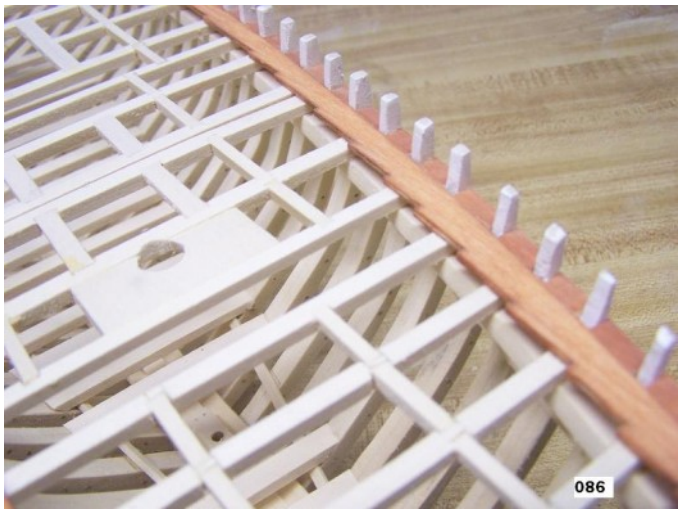


Nibbing Strakes

Nibbing Strakes

Observe the deck planking on Plan Sheets 2 and 3. The outer edges of most of the deck planking is cut off at a slight angle, with the outer edge fitted into a very wide strake against the bulwarks called a **Nibbing Strake** or sometimes **Margin Strake.** The process of cutting planks to fit into the Margin Strake is called **nibbing** or **joggling**. The two words are used interchangeably nowadays, but there is a distinction between "nibbing" and "joggling." Nibbing generally refers to wooden ship construction, while joggling refers to steel ship construction. An important rule that should be kept in mind is that nibbing should

only be used when the angle at the end of a plank where it meets the nibbing strake is less than 45 degrees. However, Eisnor's plans already indicate where nibbing belongs, so we don't have to worry about this rule.



Nibbing Strakes Close-up

Now we are ready to make and install the four nibbing strakes required for the *Bluenose.* Note that is common practice to make the nibbing strakes about 3 or 4 inches long on our scale, but the process will be simplified here by making only four strakes for the entire model. Use one of the deck plans on Plan Sheet 2 or 3 to make a precise pattern of each of the four nibbing strakes, transferring them to a length of 1/16"-thick wood. Cut out each piece carefully with an X-Acto knife. Sand the outer edge smooth. Test-fit it into the proper area of your model, pushing it up against the stanchions and ensuring that it abuts directly against each and every stanchion. You may be required to sand a slight angle on the nibbing strakes, especially those at the bow, so they will fit directly against the stanchions.

Before installing the nibbing strakes permanently, it is recommended that you apply a finish of your choice, such as Minwax Colonial Maple Stain, which is shown in the photo. After the stain has dried, glue the nibbing strakes in place. See Photo 086. Also note in this photo that the area between each of the stanchions should be filled in with small pieces of wood that have been stained the same color as the nibbing strakes. Glue them in place so that they are level with the nibbing strakes and project slightly beyond the exterior part of the frames. After all the pieces are in place, sand the exterior of this hull area to make all pieces smooth and even with the frames.

Deck Planking

All deck planks are 1/16"-thick by about 3/32" to 1/8" wide, and they should not be longer than about 3" to 4". Deck planking on real ships was rarely longer than about 12'.

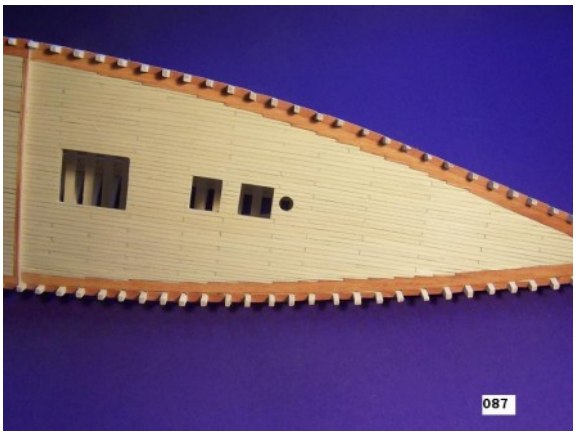
On the forward deck, all planking is parallel to the keel of the ship. On the quarterdeck, however, (aft from Frame C), the planking closest to the bulwarks is curved and tapers somewhat going aft, and they run almost parallel to the cabin, not to the keel of the ship. It is best to cut very long planks with a ruler and single-edged razor blade, making the planks 1/8" wide at Frame C and 3/32" wide at the transom, so that the required taper is achieved near the bulwarks of the quarterdeck. It is recommended that you start deck planking from the centerline and work outward toward the bulwarks for both decks.

Note that the ends of the planks that fit into the nibbing strakes do not come to a sharp point.

Each plank must end on the center of a deck beam. Stagger the ends so that two butt joints are not adjacent to each other

To simulate the caulking material that appears between each strake of planking, it is recommended that you run a soft pencil lead (2B pencil) down one edge of each plank, along with

both ends of the plank. Lay each plank with the penciled edge against an un-penciled edge. After you have finished the entire deck, sand it smooth with a sanding stick. The pencil lead will then show up as fine black lines. See Photos 087 and 088.



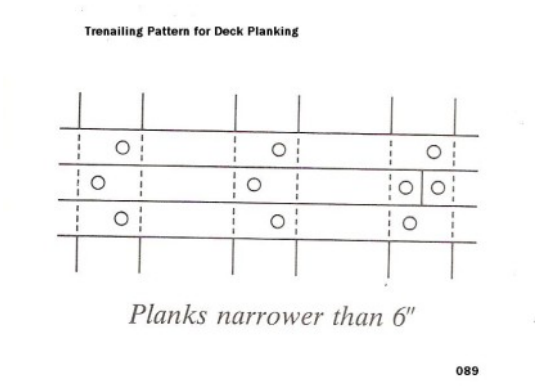
Deck Planking 1

Deck Planking 2

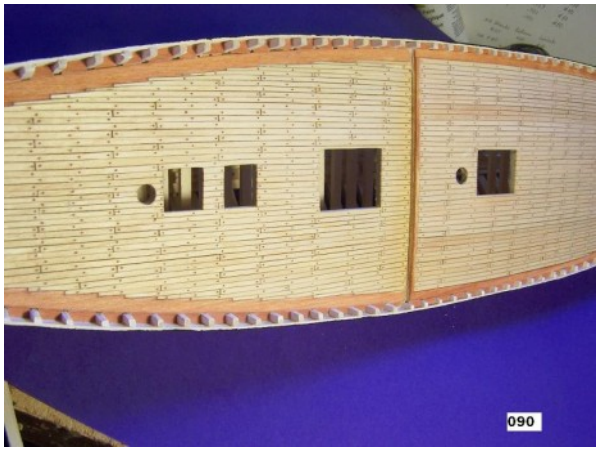
Trenailing the deck is optional. On full size ships, trenails were about 1 ½" to 2" in diameter. Therefore, if you decide to trenail the deck planking, use a #65 drill bit to drill holes for your bamboo trenails of corresponding size. They should be in installed in the pattern shown in Photo 089, which is standard for planks of widths less than 6" in full size planking. Trenails should be installed on all planks at the location of every deck beam.

After all trenails have been installed, carefully sand the decks smooth with a sanding stick. Use your finger to feel for any snags or planks a little out of proportion. Hold the ship sideways against a strong source of light to see if there are any irregularities in the planking. Fix any that appear.

Finish the deck with a finish of your choice. The finish shown in Photo 090 is a single coat of Minwax Golden Pecan Stain.



Trenailing Pattern for Decks



Decks Trenailed and stained

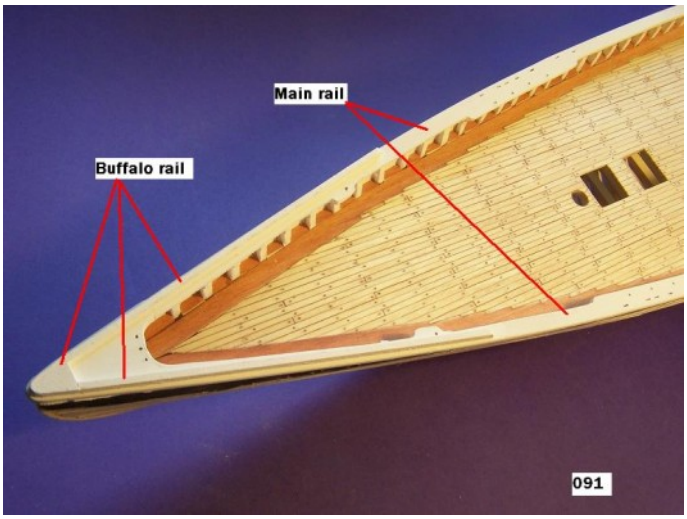
THE RAILS

Before installing the rails, it is highly recommended that you plank the top edge of the exterior hull with at least four strakes of planking material and then paint the strakes flat black. The planks should be 1/16" thick and about 1/8" wide, and they should be installed according to the rules of planking found in elementary model shipbuilding books. If you wait to do this planking after the rails are in place, it will be a difficult task to paint these strakes.

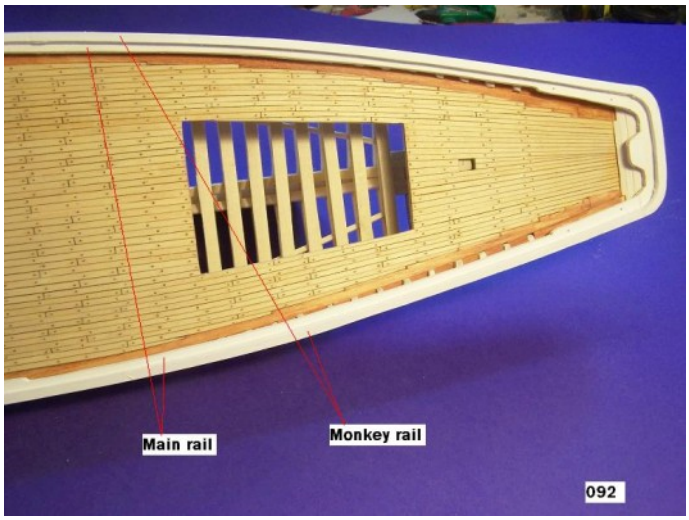
There are three different rails on the *Bluenose*: the main rail, the buffalo rail at the bow, and the monkey rail that extends from the midship area to the stern. Use Plan Sheet 3 for making patterns for all three rails.

Step 1: Making and installing the main rail

The main rail consists of 3/32"-thick wood. It is recommended that you build the rail in sections of about 5-6" in length all around the vessel. Note that the rail widens in areas that contain belaying pins. It is best to drill the belaying pin holes with a #64 drill bit. Use a smaller bit for eyebolt holes. Also cut out the tiny slits for the deadeye chain plates, which can be done by drilling holes for each slit and then punching out the slit with a very small chisel. Be careful that the wood does not split while doing this. Paint the entire rail with flat white paint. After the paint has dried, install the rail in its proper position with CA glue, but pay particular attention to the belaying pin holes, which must be placed *between* the stanchions. Also note that the deadeye chain plate slits must be positioned so that the chain plates will fit *outside* the planking strakes. Apply the glue sparsely and hold in place until it dries. It is now recommended that you carefully drill a #64 hole into the rail and directly into the center of every other stanchion. Apply glue to a bamboo dowel and insert it into each of these holes for additional security. Sand smooth. Then apply a coat of touch-up paint.



Main Rail and Buffalo Rail



Main Rail and Monkey Rail

Step 2: Making and installing the buffalo rail

The buffalo rail consists of three pieces of 1/8" wood: a small triangular piece that is rounded at the bow, and two straight lengths that are rounded at their aft edges. Cut out the pieces, and glue and dowel them in place a little off center toward the outer edge, as shown in the plans. See Photo 091.

Step 3: Making and installing the monkey rail

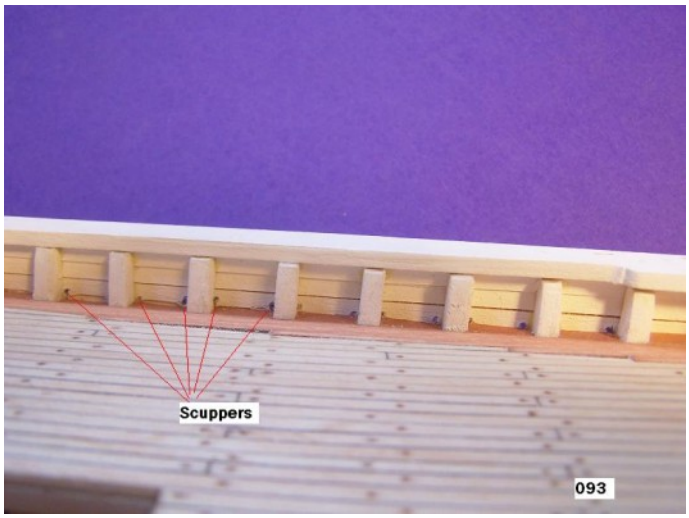
The monkey rail is also cut from 1/8" wood, and it is topped with a 1/32"-thick strip of wood that is slightly wider. Glue both pieces together. Note that the slits for the chain plates must be repeated here, so mark and cut them very carefully so that they match the slits in the main rail precisely. Glue and dowel the monkey rail in place atop the main rail, noting that it, too, is off center toward the outer edge of the main rail. Sand smooth. See Photo 092.

Step 4: Finishing the rails

Once you are satisfied that all the rails are properly made, finish by painting all rails flat white.

Scuppers

Scuppers are small channels cut through the ship's side in order to carry water off the deck into the sea. On the *Bluenose,* there is a scupper on each side at the lower edge of every stanchion from the foremast chain plates all the way aft, as shown in Plan Sheet 3. Each scupper should be about 1/16"-square.



Scuppers

The easiest way to install scuppers is to chuck a #61 drill bit into a pin vise and drill each scupper hole at its proper location from the ***inside*** of the bulwarks outward. Then take a miniature square-shaped file and push it from the ***outside*** of the ship inward to make it look somewhat square and slightly larger than the hole you drilled. Don't push too hard; you only want to enlarge the hole slightly. All scuppers should be consistent all the way across the ship at every stanchion. See Photo 093.

Part 6
The Exterior Hull

This stage of the build will describe how to mark the waterline, how to plank the exterior of the hull, and how to make and install the rudder, hawse pipes, chain plates, name plates, and decorations.

Marking the Waterline

To mark the waterline, the hull must be properly but temporarily mounted on a stand. Select a choice piece of wood for your stand, which should be at least as long as the model and approximately as wide as the model. Some modelers use brass pedestals to mount their model; others create their own design. Whatever you choose to do with yours, the pedestals should be mounted on the keel, with one installed about an inch away from the rudder and the other installed just before the keel takes an upward slope. Using Plan Sheet 1 as your guide, make sure that the waterline of the model will be perfectly parallel with your stand, which means that the aft pedestal will be a little shorter than the other.

Needless to say, the hull must be mounted perfectly, ensuring that it is upright and level when viewed from any direction.

Now use a waterline marking gauge to mark the waterline all around each of the hull's frames. This line represents the lowest point for all hull planking, which means that all frames will be exposed below this point.

Tapering the Cutwater

Remove the model from the stand. Taper the cutwater down to a width of about 1/8". It is best to use a sanding stick for this task. The taper will start at about 1/8" at its top edge, but its taper should decrease in prominence as you approach the waterline, where the taper disappears.

Planking the Hull

All planking is 1/16" thick by about 1/8" wide. The width of the planking can be slightly wider at the midship area of the hull and slightly thinner at the rabbet. No plank should be longer than about 4". The butts of all planking should be cut perpendicular to the frame upon which it is placed.

Start your planking right below the planks you have already installed before building the main rail. Plank one or two strakes all the way across one side of the hull, and then do the same thing for the other side of the hull – this will prevent any strain being placed on the hull.

When you reach the waterline, cut the edges of the appropriate planks to conform to the shape of the waterline you have already marked. Do this carefully and accurately.

Use carpenter's glue to glue the planks in place. They may be held firmly in place with planking clamps or with pins until the glue dries.

Planking—side view

Painting the Hull

After the hull planking has been

completed, the hull may be sanded lightly with a fine sandpaper to smooth out any slight bumps and imperfections. Apply two or three coats of semi-gloss black paint to all planking, being careful not to apply paint to any of the frames. The finished planking is shown in Photos 094 and 095.

Planking— bottom view

Installing the Hawse Holes

Carefully drill starter holes for the hawse holes, as shown in the plans. Expand the holes to their proper oval shapes by using miniature files. To simulate the lips of the holes, apply Hard Molding Paste, which is a gel medium available in artist supply stores, with a toothpick until it is the proper shape. You may be required to apply multiple coats of the paste to achieve good results. After the paste has dried, sand where necessary. Paint the lips and the opening with bright red paint. See Photo 096.

Creating Scroll Decorations at the Bow

There are many ways to make scroll decorations. The method shown in Photo 096 will be described here.

Hawse hole, scroll work, nameplate, cove molding

Start by copying the scroll work onto a piece of plain paper. Pin a piece of wax paper on top of copied scroll work. (Carpenter's glue does not adhere to wax paper.) Apply carpenter's glue liberally to pieces of thin string, and shape the string to the design of the scroll work and let it dry on the wax paper design. Do this only with the main body of the scroll work; the tiny parts of the design can later be painted directly onto the ship. Continue with additional pieces of glue-saturated string until you get the desired result.

After the glue has dried, gently remove the string scroll work from the wax paper by lifting it carefully with a razor blade. Give the scroll work a coat of yellow paint. Let dry.

Apply glue judiciously to the underside of the string scroll work. Glue the scroll work in place around the hawse hole. Touch up with yellow paint. Paint the tinier parts of the design with a very fine brush.

Cove Molding

Instead of cutting a groove for the cove molding, a long strip of 1/16" yellow auto pin striping

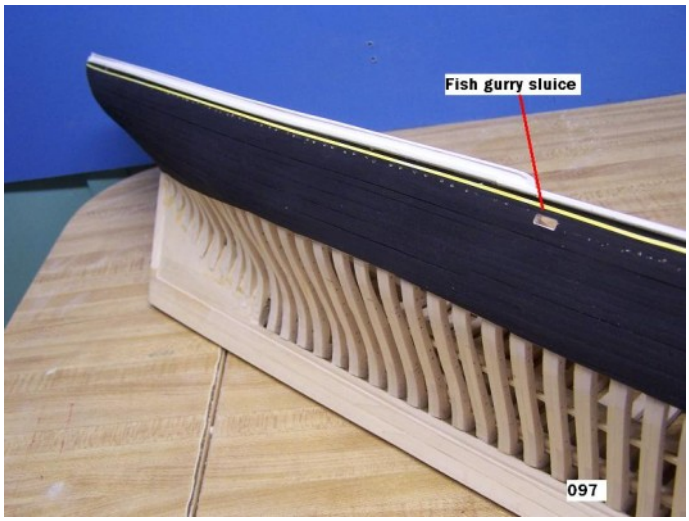
was used to simulate the cove molding. See Photo 096.

Name Plate

First, the white lettering and black background was created in Microsoft Word, printed out, and then glued onto a strip of 1/32"-thick wood. After painting the edges black, the name plate was glued in place, as shown in the plans. See Photo 096.

Fish Gurry Sluice

This is a small rectangular hole that was used to dispose of fish offal, which was simply swept off the deck and out the hole. As shown on the plans, cut it to side with a razor blade and a tiny chisel. Painting the hole is not necessary. See Photo 097.



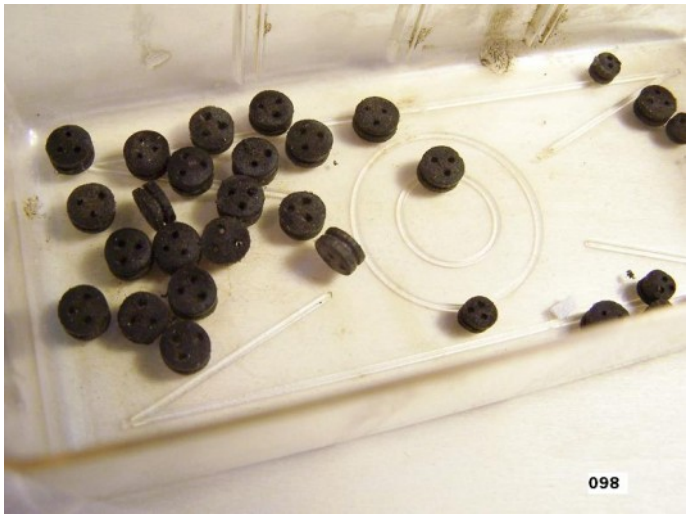
Fish Gurry Sluice

Oval Hawse Hole at Stern

Drill a starter hole for the hawse hole, as shown in the plans. Widen it to its proper shape with a miniature oval file.

Deadeyes

At this stage of the build, you will need sixteen 3/32" deadeyes and four 1/8" deadeyes. Turn the deadeyes on a lathe, shaping them appropriately. Files may be used for the groove, and a razor saw can be used to start separating them – this cut should only be suggested, so that you can fully cut them apart after all deadeyes are finished on your lathe. Take them out of your lathe, and finish separating them with a razor saw. Using an awl, mark the location of the three holes for each deadeye, and drill them out with a #66 drill bit for the 3/32" deadeyes, and a #74 drill bit for the 1/8" size.



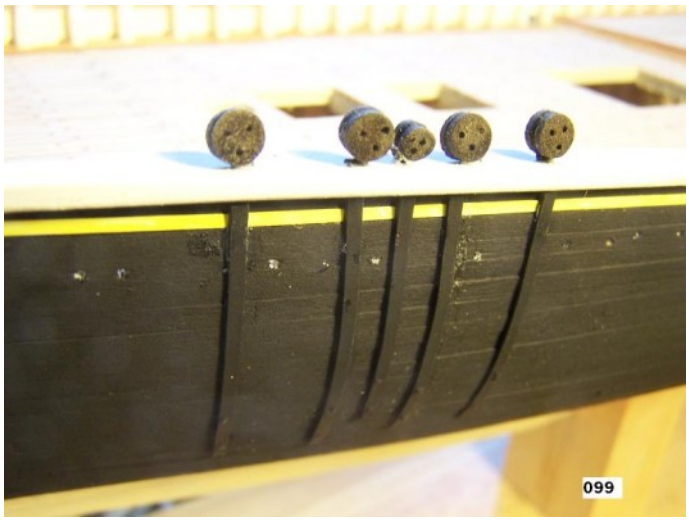
Deadeyes

The deadeyes may be painted black, or they may be finished by dipping them in Minwax Jacobean Stain, which is a very dark brown color, almost black. The advantage of using stain instead of paint is that stain will penetrate the holes much easier than paint. See Photo 098.

Installing Deadeyes

Using a fairly long piece of thread (No. 20 DMC cotton thread is fine), loop it around the deadeye and finish it off with a lashing. Make sure the lashing is at the lower hole of a triangle of holes. Snip off excess thread. Thread a needle with the loose end. Push your threaded needle into the top end of a hole in the rail, and pull it through the hole until the deadeye sits nicely

atop the hole. Flatten the lashing with a small pair of pliers, so it will fit into the slot. Place a small amount of CA glue on the lashing. Then pull the deadeye into place so it fits nicely in the slot. Snip off the thread even with the lower end of the rail. After the glue has dried, it will be secure enough to withstand the tension of the shrouds. Repeat this for all the lower deadeyes. Make sure you get the proper size deadeyes in their proper locations. See Photo 099.



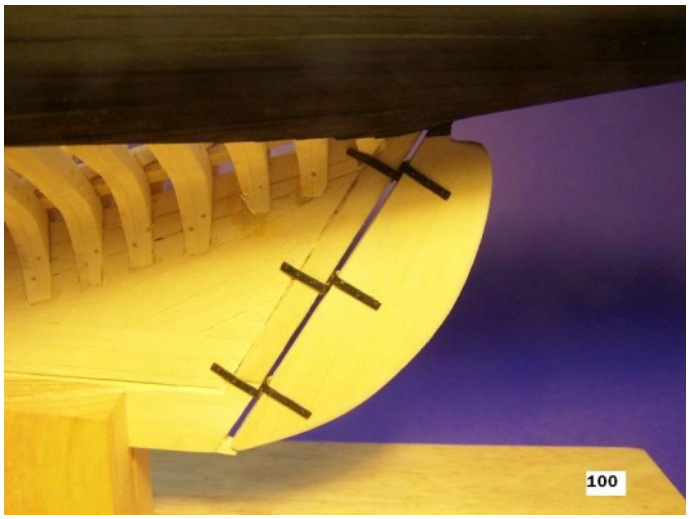
Deadeyes & Chain Plates

Chain Plates

Many modelers make their chain plates from thin sheets of blackened brass. An alternative method is to cut thin strips of cardboard to the sizes shown on the plans. The two rivets or bolts near the bottom of each chain plate can be simulated by a small dot of Hard Molding Paste. After the paste has dried, paint them black, and install them with a very small amount of CA glue. They are glued directly onto the hull for their full length, aligned with the deadeyes. See Photo 099.

Rudder

Using the pattern found on Plan Sheet 2, cut out the rudder from ¼"-thick wood. Be sure that the rudder post fits into the rudder hole properly. Round out the outer edges of the rudder with a sanding stick. Test-fit it into position, and make adjustments if they are necessary. Paint the top edge of the rudder post with semi-gross black paint to match the waterline.



Rudder

The gudgeons and pintles can be made from strips of blackened brass, with a pin or bamboo dowel used for the pintle pins. An alternative is to cut them from thin cardboard, suggest the rivets with Hard Molding Paste, paint them black, and install them with CA glue. See Photo 100.

Bowsprit Shroud Plates and Bobstay Plates

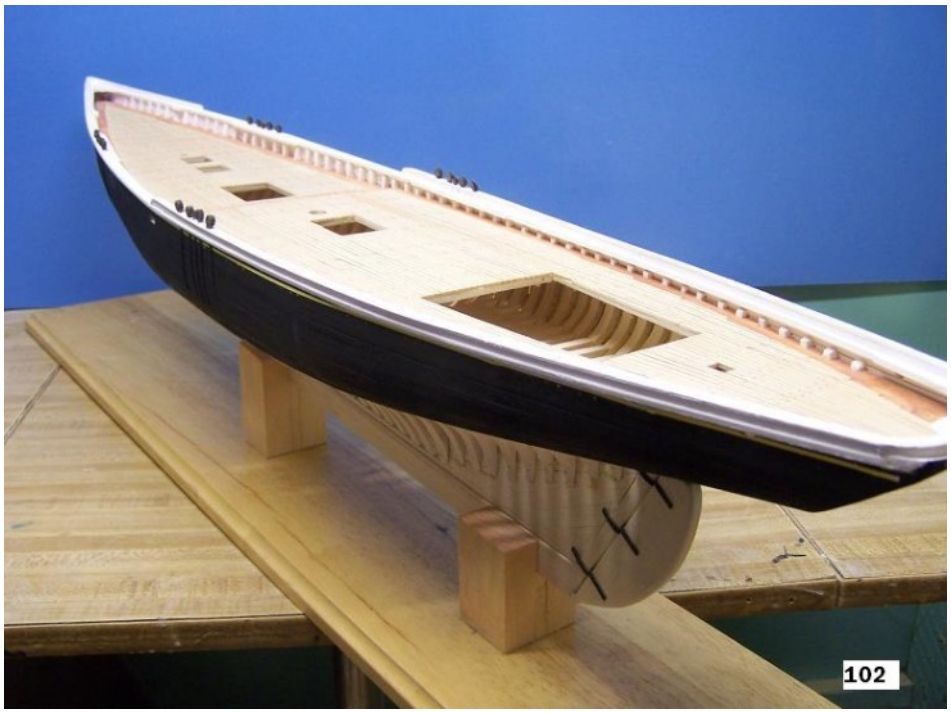
These six items are made of thin cardboard as well. Use Hard Molding Paste to suggest the rivets, and then paint them black. Install with CA glue. Make an eyebolt for each plate and install it in place. Only one eyebolt should be used for each bobstay plate.

Mount the *Bluenose* Permanently in a Stand

Since we are finished with the outside of the hull, it is time to mount the vessel permanently in your stand. There are several ways to do this. A long thin screw can be screwed from the

underside of the stand directly into the keel. This must be done very carefully because it is easy to split the keel. Another way is to simply glue the keel directly onto the pedestals or whatever type of stand you are using. See Photos 101 and 102.

The Finished model mounted in its stand—bow view



The Finished model mounted in its stand— stern view

Part 7
Deck Fittings

Deck fittings include the cabin, windlass, bitts, companionways, wheel, pumps, hatches, and many other items that comprise the details found on the deck of a typical schooner. It also includes such items as belaying pins, eyebolts, chocks, etc.

Most scratch builders make their own deck fittings, although there is nothing wrong with purchasing commercial fittings as long as they are perfectly acceptable for the vessel.

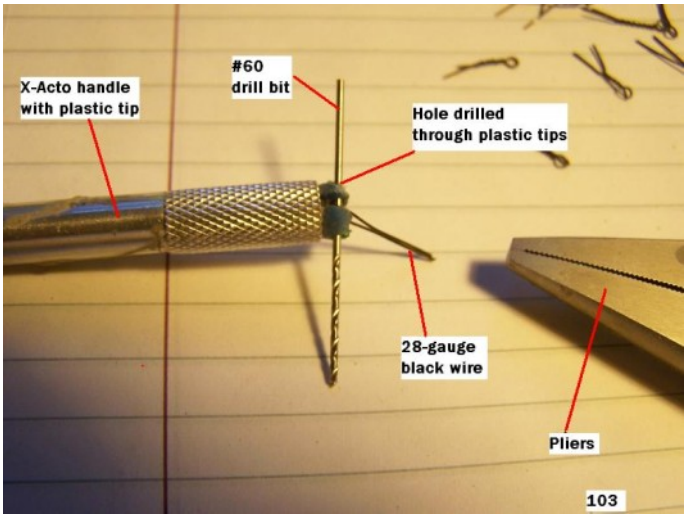
In this stage of the build, it is assumed that you are interested in scratch-building each fittings, so we will explain at least one way to build each item. Use your imagination to develop your own methods and techniques.

Fittings Installed on the Rails, Stanchions, and Waterways

Fittings in these areas include eyebolts, belaying pins, snatches, chocks, and anchor fluke falls. Each of these items is addressed separately below.

Step 1: Making and installing eyebolts

There are twenty-two small eyebolts and one large eyebolt installed on the rails and waterways (the waterways contain 2 at the stern). Locate them on Plan Sheet 3. Make sure you use *both* the "Inside Bulwarks" and the "Deck Equipment" views to understand the precise placement for each eyebolt. All eyebolts in these areas should be made of 28-gauge black annealed wire.



Making eye bolts

One way to make eyebolts is shown in Photo 103. Drill a hole in the plastic tip of an old X-Acto knife handle. Place a #60 drill bit into the holes. Insert a short length of 28-gauge wire under the drill bit, pull it about halfway through, and give it a twist so that it remains held by the drill bit. Grab the two wire ends with a pair of pliers and twist them until you have formed a tight eyebolt. Snip off excess wire with a pair of small wire cutters, leaving 1/8" or a little less.

To install each eyebolt in place, drill a #65 hole in its proper location. Dip the end of the eyebolt in CA glue, and insert the eyebolt in the hole with a pair of pliers. After the glue dries, it will easily withstand the tension of the rigging lines.

Note that the single large eyebolt for the jib stay should be made from 22-gauge black annealed wire twisted on a 1/16" drill bit.

Step 2: Making and installing belaying pins

There are 30 belaying pins attached to the rails. To make a belaying pin, use a round tooth-

pick. Snip off the pointed end of the toothpick – not too much, only a small portion. Now measure and mark the size of the belaying pin, especially the point where the handle meets in pin, and its total length. Chuck the toothpick into an electric drill with the pin end protruding. Hold the drill comfortably in your left hand (if you're right-handed), and then turn it on. Use miniature files and small sanding sticks to shape the toothpick into a belaying pin. Turn off the drill and move the toothpick so the handle -end is protruding. Now shape the handle. Remove the toothpick from the drill. Snip off the unwanted portion of the toothpick, and finish shaping with a sanding stick. With a little practice, you can manufacture many belaying pins in a relatively short time, and all of them will be acceptably consistent. Finish as desired, or leave them unfinished. See Photo 104.

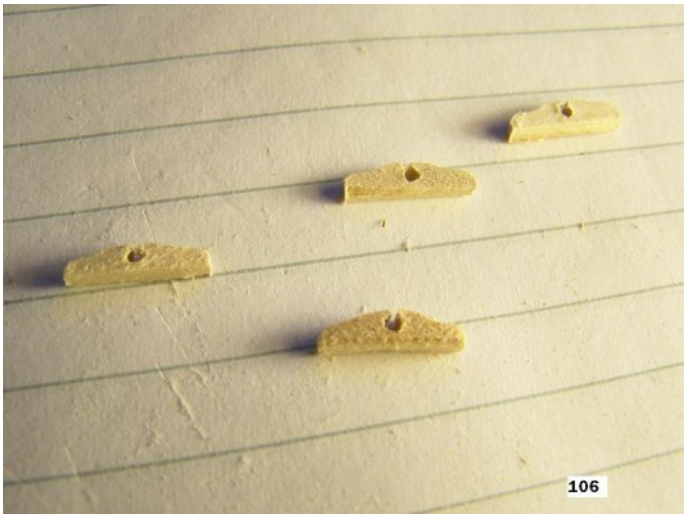
Belaying Pins

To install the belaying pins, drill holes with a #60 drill bit at each location. Place a small amount of carpenter's glue on the pin itself, and insert it into the hole.

Snatches

Snatches

A **snatch** is a type of fairlead that contains a spring across its mouth to prevent the slippage of a rope. There are 6 snatches distributed around the stanchions of the *Bluenose.* They are shaped somewhat like a thumb cleat, as shown in Photo 105. Three tiny pieces of wood can be glued together as shown. Finish as desired. Glue them in place with CA glue.



Chocks

Chocks

Eisnor identifies 4 chocks, which are also known as fairleads. A **fairlead**, in its simplest form, is a wooden board pierced with a hole,

which has the purpose of leading a rope in a required direction. It is recommended that fairleads be made from a hard wood, such as apple, because they tend to split easily when made from a softer wood.

To make a fairlead, drill an appropriate hole near the edge of a piece of wood. Use miniature files and a sanding stick to finish its form. Paint fairleads black. After the glue has dried, install with CA glue. See Photo 106.

Rail fittings completed

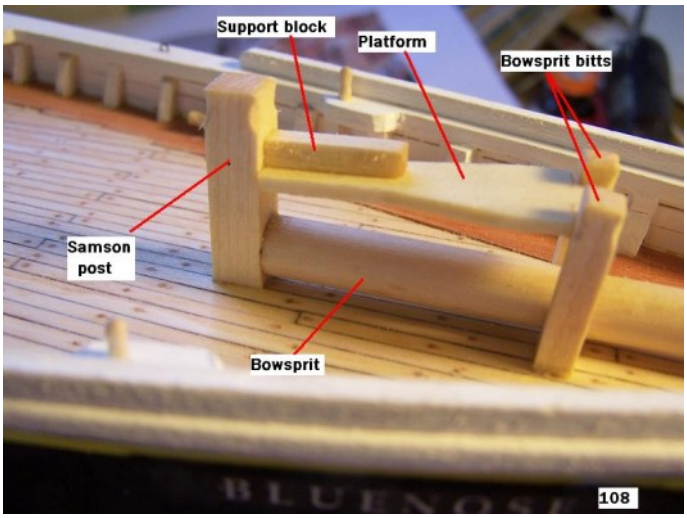
Anchor Fluke Falls

There are 2 anchor fluke falls near the bow of the *Bluenose.* Make and shape them from a 1/16"-square piece of wood. Chamfer the edges as shown in the plans. Finish as desired, and glue in place with CA glue. Note that there is a ringbolt directly above each anchor fluke fall.

Photo 107 shows several of the items associated with the rails, stanchions, and waterways that were installed in the above steps.

Bowsprit Bitts and Samson Post

This assembly, which holds the bowsprit firmly in place, consists of 5 main pieces: two bowsprit bitts, a samson post, a platform, and a support block.



Bowsprit bitts and Samson post

Step 1: Cut the bowsprit from a 10 ¼" length of 5/16" doweling. Taper it as shown in plans. Install a 1/8" dowel in the base end, which will fit into the samson post.

Step 2: Make the samson post from a length of ¼"-square wood. Chamfer the top edges and sides as shown in the plans. Note that its lower edge will be cut at a slight angle so that, when installed, it will be perpendicular to the waterline. Install a 1/8" dowel in its bottom edge, which will fit into a corresponding hole in the deck.

Step 3: Make the two bowsprit bitts from lengths of 5/32"-square wood. Chamfer the required areas. Note that their lower edges will also be cut at a slight angle. Install dowels at the bottom edges.

Step 4: Cut out the platform from 1/16"-thick wood. Finish with Natural Stain.

Step 5: Cut out the support block from 1/8”-square wood.

Step 6: Finished all these pieces with Natural Stain, and let dry.

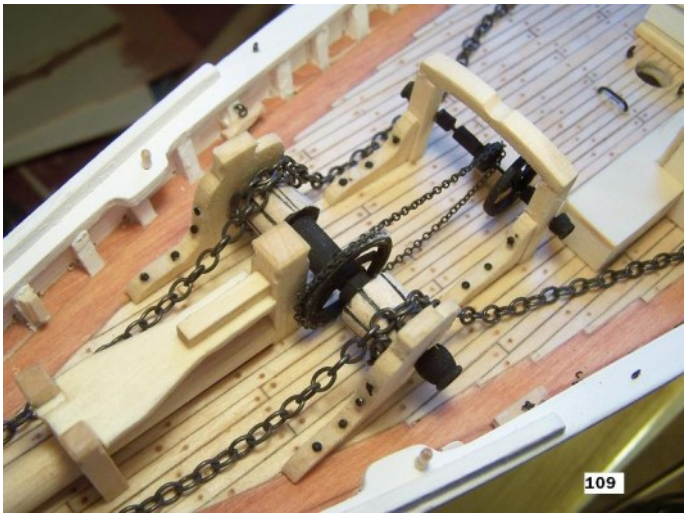
Step 7: Measure and drill a 1/8” hole in the deck for the samson post. Fit the post into the hole. Then insert the bowsprit in place, pushing it up against the samson post. With the bowsprit resting just slightly above the level of the deck, mark the location where the bowsprit dowel meets the samson post. Drill a 1/8” hole in the post at this mark, but do not drill the hole all the way through the post. Now glue the samson post in place, and also glue the bowsprit dowel into the post hole. It is also suggest that you place a small amount of glue where the bowsprit meets its opening at the bow.

Step 8: Mark the places for the bowsprit bitt holes, making sure that your platform can be installed properly. The bowsprit bitts should be placed right next to the bowsprit. Drill the holes and install the bitts.

Step 9: Glue the platform in place. Glue the support block in place up against the samson post and centered on the platform.

Windlass

The drawings on the plans are not easy to understand**.** You may be required to do a little researching to get a better picture of the windlass assembly. In Photos 109 and 110, the parts are measured from the plans and made from appropriate sizes of wood. The main axle that holds all the parts if made from a bamboo dowel, and all pieces are drilled with a hole to fit on this axle. To keep the parts stationary, you might want to add a touch of glue to the axle at these locations.



Windlass—1

The gear wheels were made as follows:

Step 1: Tape a piece of wax paper around a dowel that is the size of the inside diameter of the wheel you wish to make. Cut a long strip of thin card the width of the wheel. Glue this strip onto the wax-papered dowel, turning the strip around and around until it reaches the thickness of the outside diameter of the card. After the glue has dried thoroughly, remove the wheel from the wax paper – it should come off relatively easily.

Step 2: Cut the hub of the wheel from a pieces of dowel, and place it in the center of the wheel you just made.

Step 3: Mark the spacing of the spokes of the wheel on the outer wheel. Cut the spokes from thin card and carefully glue in place.

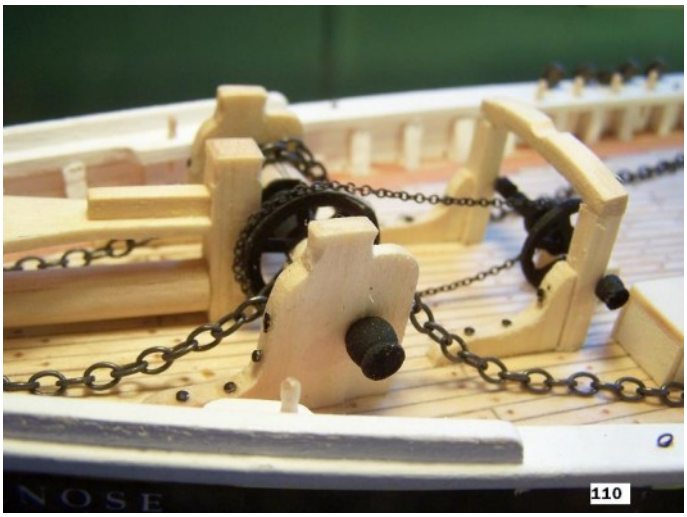
Step 4: Paint the gear wheel black.

Appropriate sizes of chain should be used. The chain can be attached to the gear wheels

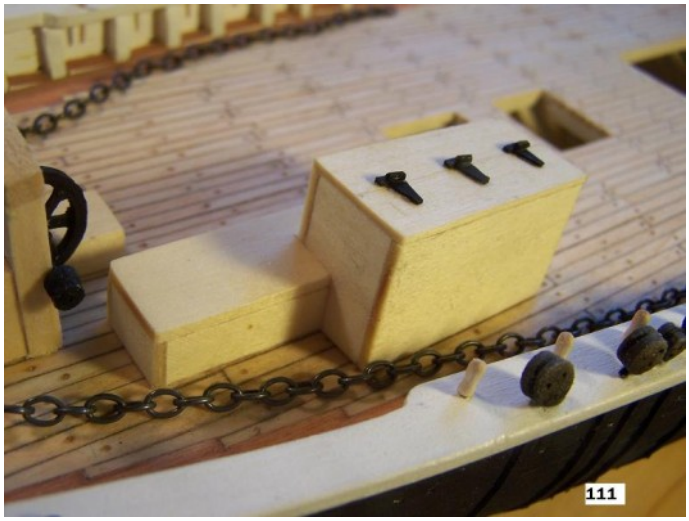
with a touch of CA glue to keep it in place. The larger size chain should be threaded through the bow hawse opening, cast around the drum whelps at least one time, and left loose on the deck until you install the anchors.

Most of the remaining parts can be made from various sizes of doweling, including the whelps, when properly shaped. Cut grooves to represent the whelps, paint them black, let dry, and then sand to remove excess paint where it doesn't belong.

Movable parts should all be painted black. Immovable parts of the winch should be finished with Natural Stain, or as desired.



Windlass—2



Winch engine housing

Winch Engine Housing

This housing is easily made from 1/16" wood, forming two boxes, as shown in Plan Sheet 3. The door at the top of the housing should be made from thinner wood, such as 1/32". The hinges for the door are each made of three pieces: two pieces of shaped cardboard, and a small piece of bamboo doweling for the hinge itself, when each piece glues in place with CA glue. See Photo 111.

Chain Box

The chain box merely has 4 sides made from 1/32"-thick wood, and two thin strips of wood at the base of the fore and aft sides. Finish with Natural Stain and glue in place. The port side of the windlass chain rests in the chain box. See Photo 112.

Foc's'le Companionway

The companionway consists of a base made from 1/8" wood, and an additional piece of 1/32" wood that is very slightly smaller in size that is glued atop the base. The base is then finished with Natural Stain.

The sides of the companionway are made from 1/16"-thick wood. Carefully measure these pieces individually. The top, the slides, and the upper piece are all made from 1/32"-thick wood.

Note that these pieces form a camber that must be shaped properly. Paint the entire structure with white paint, and then glue it atop the base.

Install the companionway in its proper location with CA glue. See Photo 112.

Jumbo Jib Club Horse and Eyebolts

The jumbo jib club horse is shaped somewhat like a staple from 26-gauge annealed black wire. Drill holes in the deck at its proper location, and then glue the jumbo jib club horse in place with CA glue.

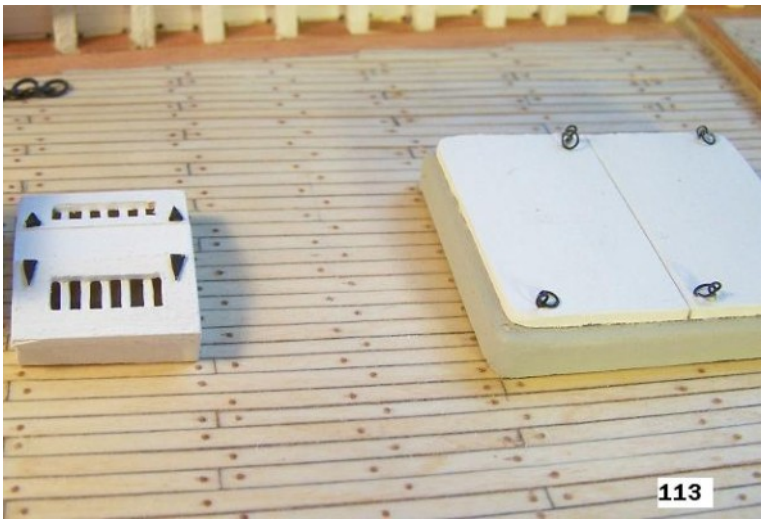
Install two eyebolts, one on either side of the foremast, that have been formed from 26-gauge annealed black wire. See Photo 112.

Chain box, companionway, jumbo jib club horse, and eyebolts

Foc's'le Skylight

The skylight consists of 4 sides made from 1/16"-thick wood, with 2 of the sides raised at a slight angle to form a flat top. The 3-part top is made from 1/32"-thick wood. The center of the top is merely a strip the measures 3/16" in width. The remaining two slanted sides contain windows. The windows should be measured and cut out very carefully with an X-Acto knife. The 5 bars on each of the windows is made from 1/64" airplane plywood cut very thin and glued in place. Paint the entire structure white.

After the paint has dried, install a piece of transparency film for copiers to simulate the windows. Use CA glue, but do



Main hatch and skylight

not place it where the simulate glass will be seen, because CA glue causes this material to fog drastically.

After completing these steps, glue in place on the deck with CA glue. See Photo 113.

Main Hatch

The hatch consists of a 4-piece base made from 1/8”-thick wood. Note that the corners and the top edges should be rounded. The base is painted a light gray color.

The hatch covers are made from a piece of 1/16”-thick wood that is slightly smaller than the base of the hatch. Again, round the corners, and then cut it exactly in half to form the two hatches. Paint the hatches white.

After the paint has dried, make 4 small eyebolts from 28-gauge annealed black wire. Drill 4 holes in their proper locations, but do not glue the eyebolts in place yet. To form the rings, wind a piece of 28-gauge annealed black wire around a 1/16” drill bit several times. With a pair of very finely pointed wire cutters, cut into the loops of wire so that they form several rings. Attach a ring to each of the eyebolts, closing the ring with needle-nose pliers.

Now glue an eyebolt/ring assembly in each of the holes in the hatch covers.

Glue the finished hatch in place on the deck with CA glue. See Photo 113.

Foc’s’le Stove Pipe

The stove pipe consists of 4 pieces of 1/8” doweling, and its base is a piece of 1/32”-thick wood. Cut the required 4 pieces to length, making the longest piece about 1/8” longer than necessary. The ends that fit together can easily be rounded with a miniature file. Use CA glue to glue the pieces together. After the glue has dried, paint the assembly black.

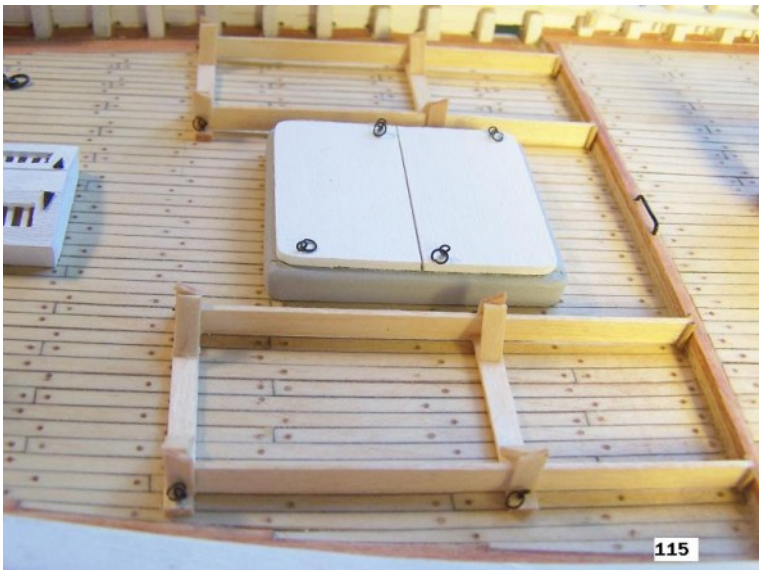
Foc’s’le Stove Pipe

Make the base and paint it black. After the glue has dried, glue it in place on the deck. Drill a 1/8” hole into the exact center of the base down into the deck. Apply a small amount of carpenter’s glue at the base of the stove pipe, and insert it into the hole, aligning it to its proper height and making it perpendicular to the waterline.

Dory Cradles

The cradles are made as shown in Plan Sheet 3. Also see the side drawing on the same plan sheet. Use 1/32" wood for the long sides and 1/16" wood for the remaining parts. Glue all parts together with carpenter's glue. Finish with a light coat of Colonial Maple Stain.

Make the tie-down rings from 28-gauge black annealed wire. Each ring consists of two parts: an eyebolt and a ring, both of which are made like those explained for the main hatch.



Dory Cradles

Mainmast Fife Rail

The fife rail consists of 18 individual pieces of wood:

The bitt-like posts are made of 1/8"-square wood. Chamfer the top edges exactly like you did for the bowsprit bitts. Install a bamboo dowel in the bottom of each post, so that it can be glued securely into the deck when the fife rail is completed.

The two decorative posts are turned on a lathe and shaped as shown in Plan Sheet 3... Install bamboo dowels in both the top and bottom of these posts – the top-end dowels will fit into the horseshoe- shaped pin rail and the bottom-end dowels will be secured to in the deck.

Make the horseshoe-shaped pin rail from 1/16"-thick wood. Mark and drill holes in the pin rail for the top-end dowels of the decorative posts. Drill 4 more holes for the belaying pins.

Make and install 4 belaying pins in this pin rail.

Mainmast Fife Rail & Fore Mast Boom Horse

The two bitt-like posts fit into a rectangular piece of 1/16"-thick wood. Cut out this piece and drill the two 1/8" holes, Use a miniature square file to make both holes square. Drill 3 small holes for the slit in the center and carefully cut out the slit.

A piece of 1/32" wood is cut to shape to fit into the slit. Note that this piece fits into a small piece of wood glued to the inner sides of the bitt-like posts. Also note that this piece contains a semi-circular notch in its top end. This piece also contain a single belaying pin, so make one and install it as shown in the plans.

Glue and dowel the pin rail to the posts.

Dip the entire assembly in Colonial Maple Stain. Wipe off excess stain, and let dry.

Place the fife rail on the deck where it belongs, measuring carefully. Use an awl to mark the four points where the bamboo dowels touch the deck. Drill these four holes in the deck. Apply carpenter's glue to the dowels, and then push the fife rail into its proper position. See Photo 116.

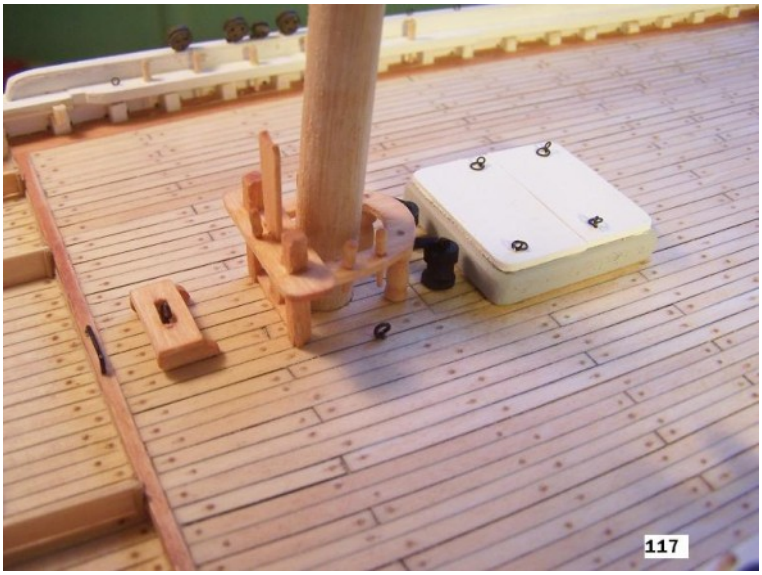
Fore Boom Horse

Make this horse the same way as you did for the jumbo jib club horse. Install it as shown on Plan Sheet 3. See Photo 116.

Fore Boom Lizard

The lizard is made from 3 small pieces of 1/16"-thick wood, as shown on Plan Sheet 3. The top piece contains a slot. The device is stained with Colonial Maple Stain and glued in place on the deck.

A long-stemmed eyebolt made from 26-gauge annealed black wire is glued into a hole drilled in the deck through the slot in the lizard. See Photo 117.



Lizard, eyebolts , bilge pumps and aft hatch

Eyebolts

On either side of mainmast fife rail, install an eyebolt made from 26-gauge annealed black wire.

Bilge Pumps

Make the bilge pumps from 3 short sections of doweling – two are cut from a 3/16" dowel and the central portion is cut from a 1/8" dowel. The three sections are glued together. Two small pieces of 1/32"-thick wood glued atop each of the pumps completes them. Paint them a flat black color and glue them in place. See Photo 117.

Aft Hatch

Make the aft hatch just like you made the Main Hatch. Paint it exactly the same at the Main Hatch, and also install the four eyebolt/rings. See Photo 117.

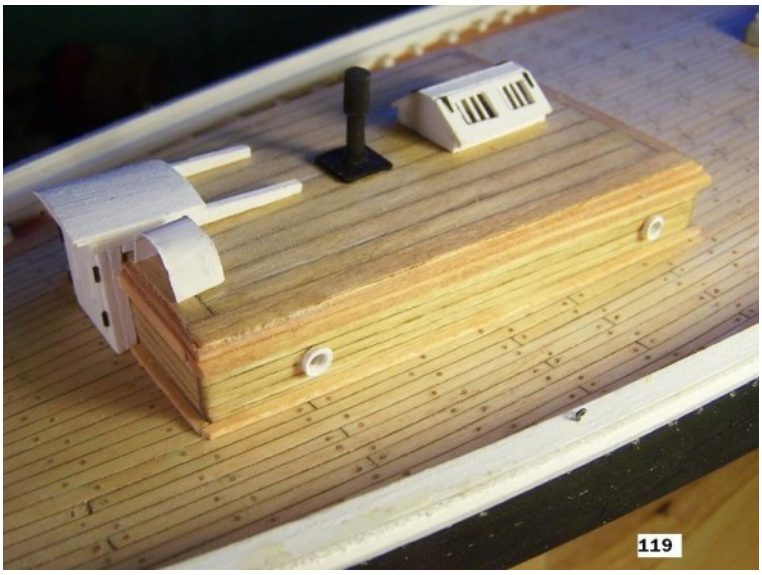
Main Cabin

Sides: Make the sides of the main cabin from 1/16"-thick wood. Note that each slat is about 1/8" wide. The edge of each slat is penciled with a 6B pencil to give it the effect shown in Photo 118.

Glue the slats together with carpenter's glue, and then assemble and glue to the shape of the cabin opening in the deck. Finish with Golden Oak Stain.

Main Cabin—1

Port Holes: Drill 1/8" holes at the locations for the 4 port holes in the sides of the cabin. Use a 1/8" dowel covered with wax paper to make the port holes from long strips of paper wound around the dowel, just as you did for the gear wheels of the windlass. Glue the port holes in place and give them a touch of white paint. You may also glue small pieces of acetate in the inside edges of the sides to suggest window glass.



Main Cabin—2

Companionway: The companionway, including the slider and its runners, is made from 1/16"-thick wood. The doors are cut with an X-Acto knife from cardboard and glued in place. The entire structure is painted white and glued in place. The tiny hinges are cut from a small bamboo dowel, painted black, and then glued in place.

Compass Housing: This is composed of two elements: A small piece of 1/16"-thick wood, and a covering made of cardboard and glued in place. Paint the structure white.

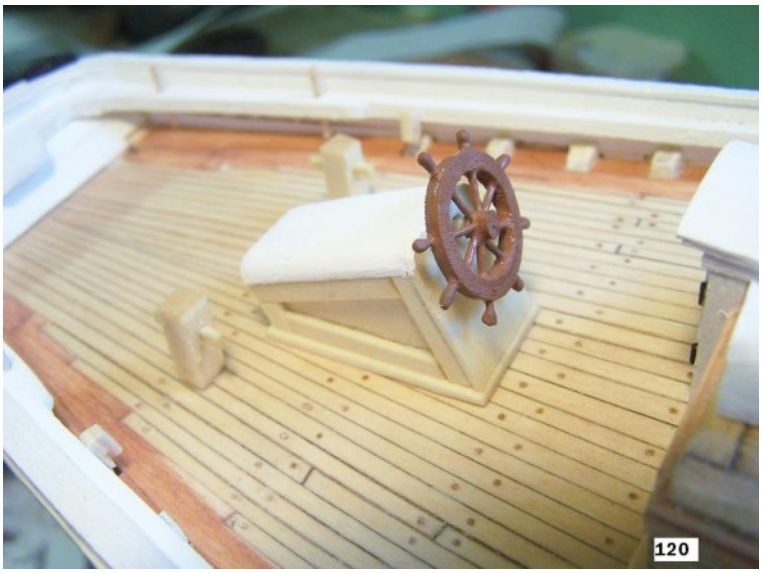
Stove Pipe: Using the same method you used to make the Foc's'le stove pipe, make a similar one for the main cabin.

Skylight: Again, using the same method you used to make the Foc's'le skylight, make a similar one for the main cabin.

See Photos 118 and 119.

Steering Box

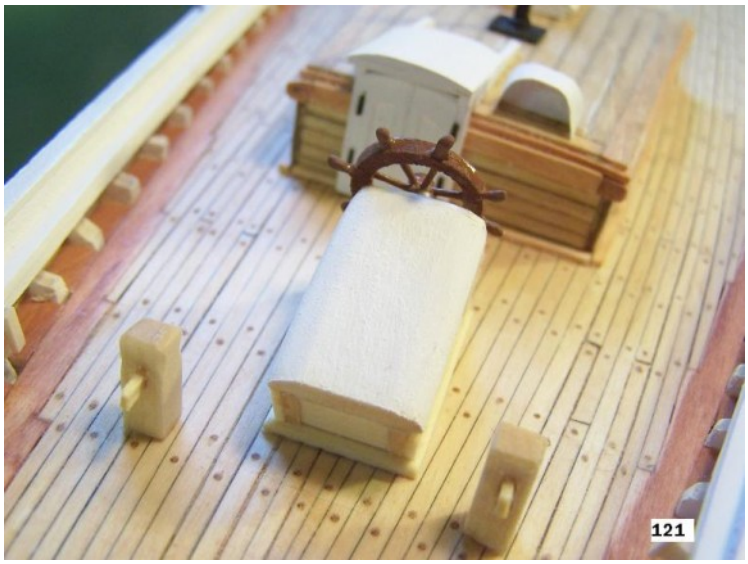
Make the base from a 1/16"-thick piece of wood. The rest of the structure should be made from 1/32"-thick wood. Note that the paneling is simulated by chamfering the edge of the 1/32"-thick wood pieces before gluing them in place. Note that the top edges of the box are rounded. Cut a slot for the axle of the ship's wheel. Give the entire structure a coat of Natural Stain, but paint the top of the box white. See Photos 120 and 121.



Steering box, ship's wheel and quarter bitts—1

Ship's Wheel

Make the rim of the wheel on a lathe, noting that its inside diameter is 1/2". Precisely divide the rim into eighths, and mark each eighth on the edge of the rim with a pencil.



Steering box, ship's wheel and quarter bitts—2

Make the spokes of the wheel out of tiny bamboo dowels, cutting them to length to fit snugly inside the wheel. Make the first spoke so that it goes all the way across its inside diameter. Use your pencil markings as a guide for the locations. Then make the rest of the spokes meet at the center. Glue them in place with carpenter's glue and let dry thoroughly. You may be required to let each piece dry thoroughly before gluing the next piece.

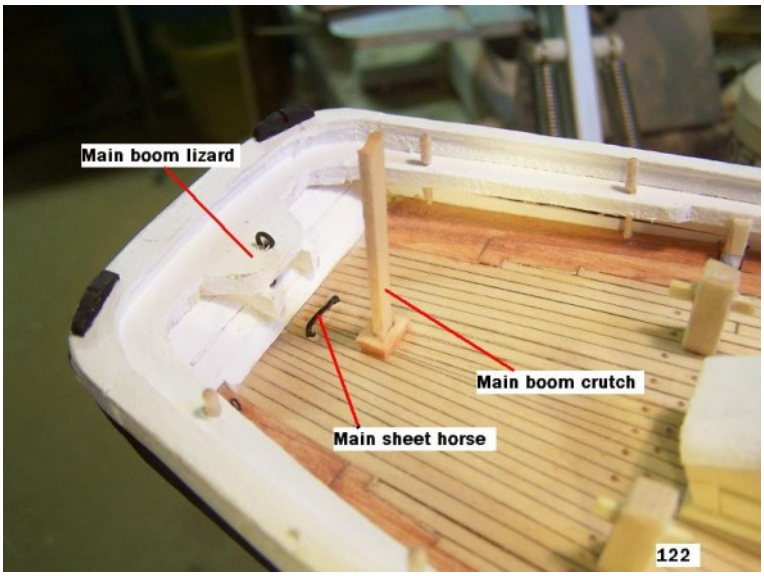
The hub of the wheel may be cut from a 1/8" dowel and glued in place with CA glue. See Photos 120 and 121.

Drill very small holes with a #70 drill bit chucked in a pin vise at the locations of each of the handles. Cut tiny pieces of bamboo doweling and glue a piece in each of the holes you drilled.

After the glue has dried, dip each of the handles in carpenter's glue to suggest the slight bulge of each of the handles. Let the glue dry before handling the wheel any further.

For the axle, cut a short length of 1/8" doweling and glue in place onto the bamboo spokes.

Paint the wheel brown. After the paint has dried, glue the axle of the wheel in place in its slot in the wheel box.



Main sheet horse, main boom crutch, and main boom lizard

Main Sheet Horse, Main Boom Crutch, and Main Boom Lizard

Install the main sheet horse just like you did for the jumbo jib club horse.

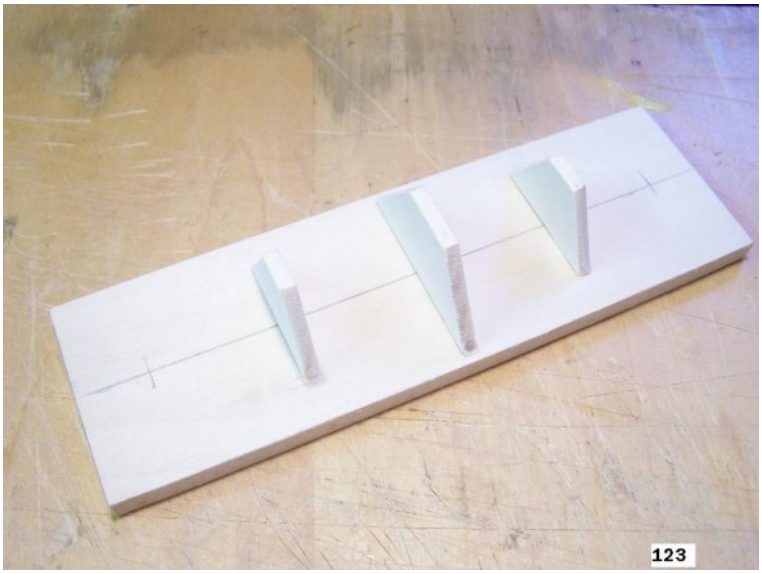
Install the main boom crutch. Make it from 1/16"-thick wood and insert it in a base. Finish the Natural Stain and glue it in place.

Make the main boom lizard just like you did for the fore boom lizard.

Dories

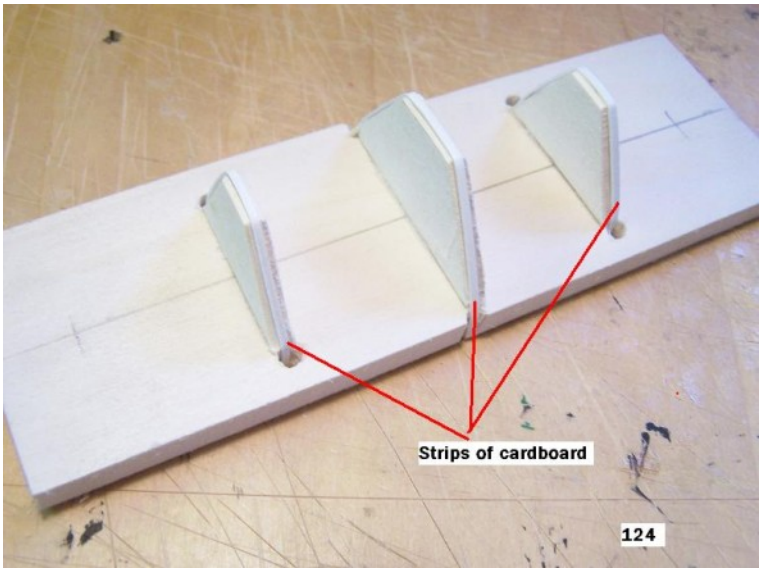
The plans call for 12 dories – six dories stacked on port and six stacked on starboard. Only two dories – one on either side – are shown in the photos. There are several steps to making a dory. Use Plan Sheet 3 for gathering the required measurements.

Step 1: First, it is necessary to make a jig that will hold all the parts of the dory together. The base of the jig should be at least 1/8" thick, and it should measure a little longer than the dory and a little wider. Find these measurements in the lines drawing. Measure and draw a centerline down the length of the jig, and precisely draw the locations of the sections. Using 1/8"-thick wood, precisely cut out the three sections of the dory, as shown in the Sections Aft and the Sections Forward. Glue the three sections onto the base of the jig, aligning them perfectly. See Photo 123.



Dory building jig

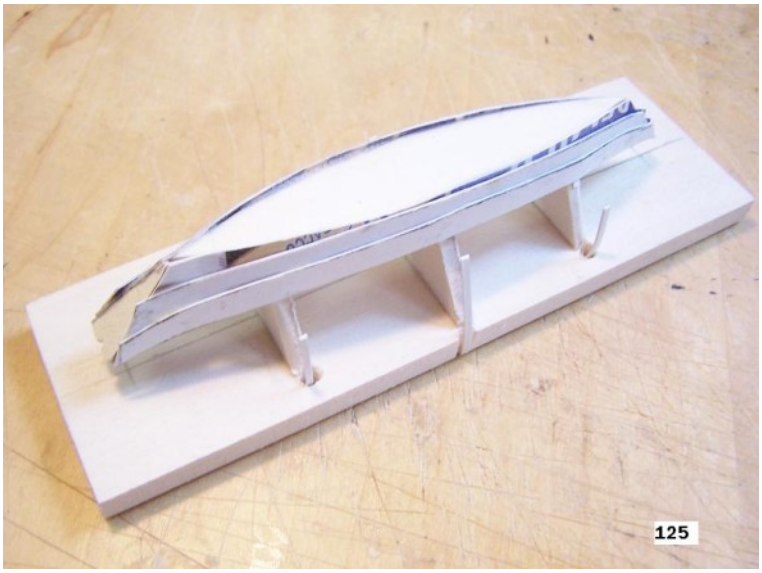
Step 2: Drill 1/8” holes in the base of the jig right at the outer edges of each of the three sections you installed. Using strips of thin but stiff cardboard, pass the strip across one of the sections and down through the two holes you drilled for that section. Using CA glue, glue both ends of the strip on the *underside* of the jig to hold it firmly in place. *Do not* use any glue on the strip attached to the section itself. See Photo 124.



Strips of cardboard placed around jig segments

Step 3: Using 1/32”-thick wood, cut out the flat bottom of the dory, as shown in the lines view. Very carefully, glue the bottom precisely in place. Make sure you only use enough CA glue so that the bottom is *only glued to the cardboard strips, not to the sections.* Hold both ends down (there is a slight curve in the flat bottom) until the glue dries.

Step 4: Using the Profile plan as your guide, make patterns for the three strakes of clinker-laid planks that go on each side of the dory. Make these items slightly wider and slightly longer than shown in the plans, because you want these pieces to overlap. Cut all six of them out of cardboard, keeping them in order. Starting with the bottom strake, fit it in place on the jig, and note the places where glue will be required. Apply CA glue sparingly but quickly along these places. Hold the cardboard in place until the glue has dried. Install the second strake similarly, with a slight overlap on the first strake. Repeat this procedure with the third strake. Then install the triangular stern by gluing it in place. All strakes should be glued together at the bow. Do not use clamps; just hold the pieces until the glue dry, because you want the bow shaped properly. See Photo 125.



Wooden bottom and cardboard planks

Step 5: Cut the dory loose from its jig by slitting the three cardboard strips with a razor

blade. The dory should pop off easily; if it doesn't, you've used too much glue somewhere it doesn't belong. Now use a pair of finely pointed scissors to trim the bow and the planks where necessary. Cut thin strips of card and add them as shown in the Inboard Plan. Note the stern knee and the bow knee. Finally, cut a thin strip of wood for the thwart carlin.

Step 6: Cut the thwarts from 1/32"-thick wood. They should be about 1 1/8" long so that the width of the dory will be expanded to its proper size when the thwarts are installed. Install them with CA glue. See Photo 126.

Thwarts

Step 7: Cut the gunwale caps from cardboard. It is best to make a pattern by placing the dory upside down on a curved piece of cardboard and tracing the outer edge of the dory with a pencil. Then cut out the gunwale caps with an X-Acto knife. The gunwale caps should only be slightly more than 1/8" wide. Glue them in place with CA glue.

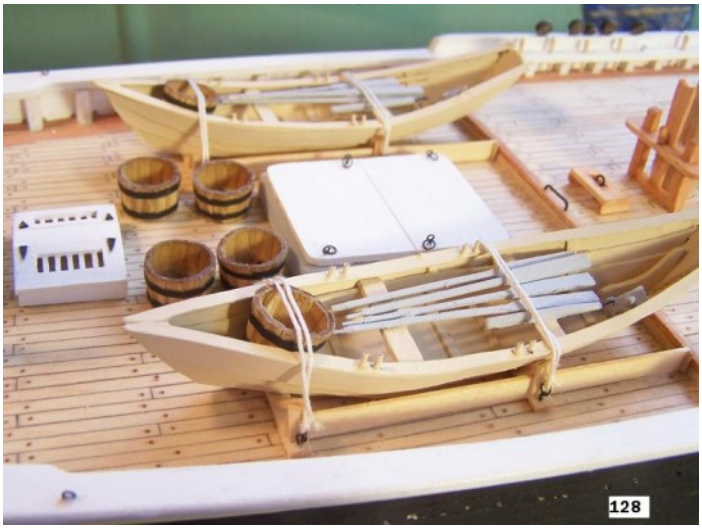
Step 8: Carefully drill tiny holes for the thole pins. Make the thole pins out of thin bamboo doweling, and glue them in place.

Finished Dories not yet tied down

Step 9: Paint the entire dory with a buff color paint. Place a small amount of CA glue at the bottom edges of the dory, and glue it in place in the dory cradle on deck.

Step 10: Make 4 oars, a fish gaff, and a scoop for each dory. These items can be made from very thin scrap wood. Paint all items a light gray color. Place a small amount of CA glue in an appropriate location and glue them in place on the dory. See Photo 127.

Step 11: Tie the dories down with tan thread, preferably No. 10 DMC cotton thread. See Photo 128.



Dories tied down

Buckets

Buckets are not found on the plans, but it is always good to have a few of them on a fishing vessel.

Step 1: The jig for a bucket is easily made from a 1/2" dowel. Using a disk sander, hold the dowel at an angle to the sandpaper and twist it round and round until you achieve the general shape of a bucket. Cut several thin slices of wood from a dowel that is slightly larger than the base of the jig. See Photo 129.

Making Buckets—1

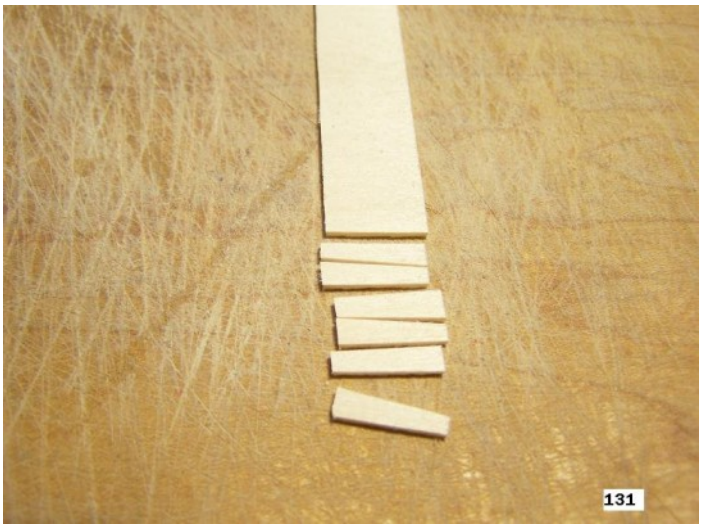
Step 2: Using rubber cement, attach the bottom of the bucket to the jig. Do not use regular glue because you want to be able to easily remove this piece from the jig. See Photo 130.

Making Buckets—2

Step 3: Cut a ½"-wide strip of 1/32" wood. Then cut the slats of the bucket from this piece. Note the slight angle of the cuts – the narrow end goes to the base of the bucket. Note that the jig should protrude out of the slats. See Photo 131.

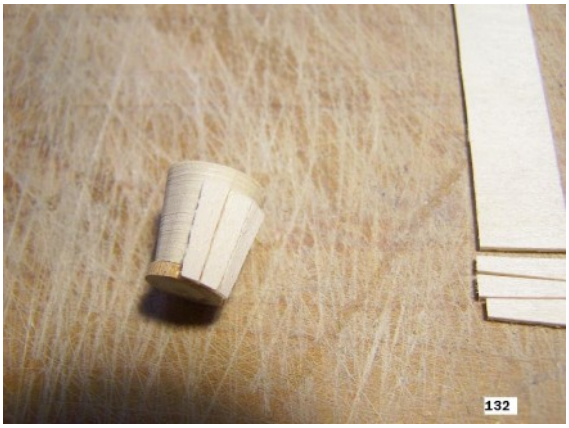
Step 4: Apply a small amount of CA glue to the very bottom of one of the slats – nowhere else. Place the glued slat into position on the jig. ONLY the bottom edge gets glued. The CA glue will dry rapidly. Take another slat, apply glue, and hold in place adjacent to the first slat. Repeat this process for each new slat. See Photo 132.

Eventually, you will only have room for one last slat. This slat should be cut to fit perfectly in plate.



Cutting Bucket Slats

Step 5: With all the slats in



Gluing slats onto base of bucket

Finished buckets

place, apply carpenter's glue to the outside surface of the slats, especially in the cracks where no glue has been placed. Use only a small amount; you don't want to glue the slats to the jig. Let dry.

Step 6: Grip the top protruding edge of the jig with a pair of pliers. Hold the bottom of the bucket with your thumb and forefinger. Give a slight twist to the pliers while holding the bottom firmly. It should come loose from the rubber cement rather easily.

Step 7: Dip each bucket in Golden Oak Stain and wipe dry. See Photo 133.

Step 8: Iron bands around each bucket can be made from strips of paper that have been painted black and glued in place. See Photo 134.

Step 9: Glue the buckets in place on the deck. See Photo 135.

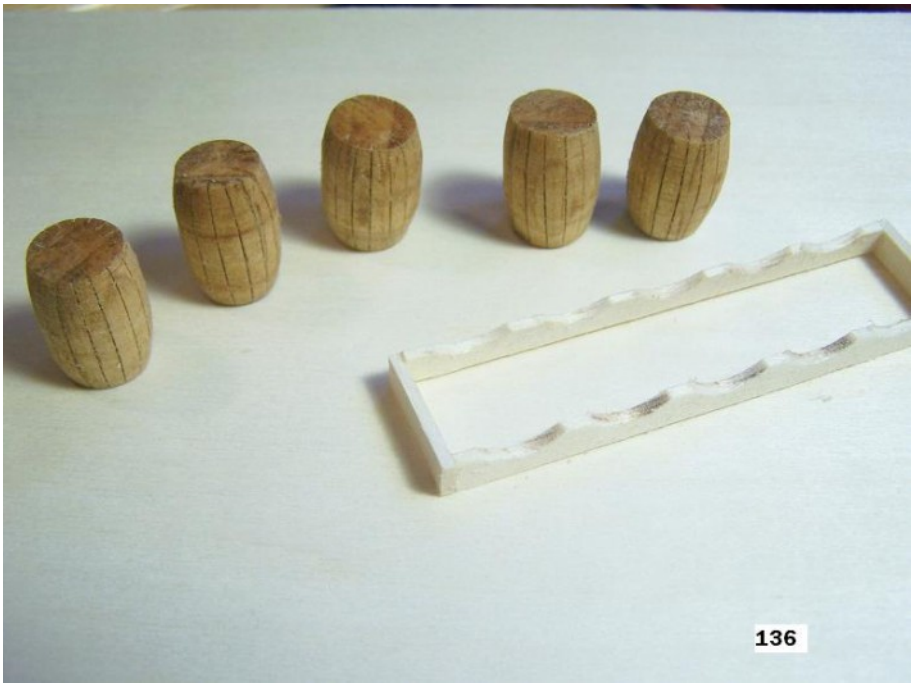
Finished buckets with iron rings

Buckets installed on deck

Barrels

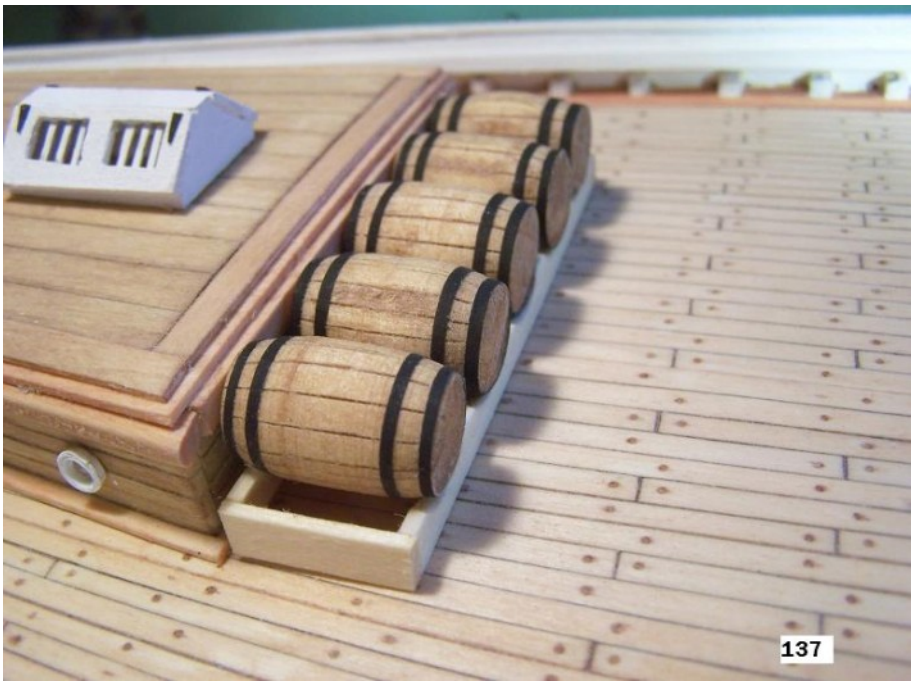
A few barrels placed judiciously on deck also look good on a fishing vessel. The barrels can be turned on a lathe from a ½" dowel. Make each barrel about 11/16" long. The barrel staves can be suggested by razor saw cuts. Finish the barrels with Golden Oak Stain.

The barrel rack is made from 1/16”-thick wood. Make the semi-circular cuts with a Dremel sanding drum. See Photo 136.



Barrel Rack and Barrels

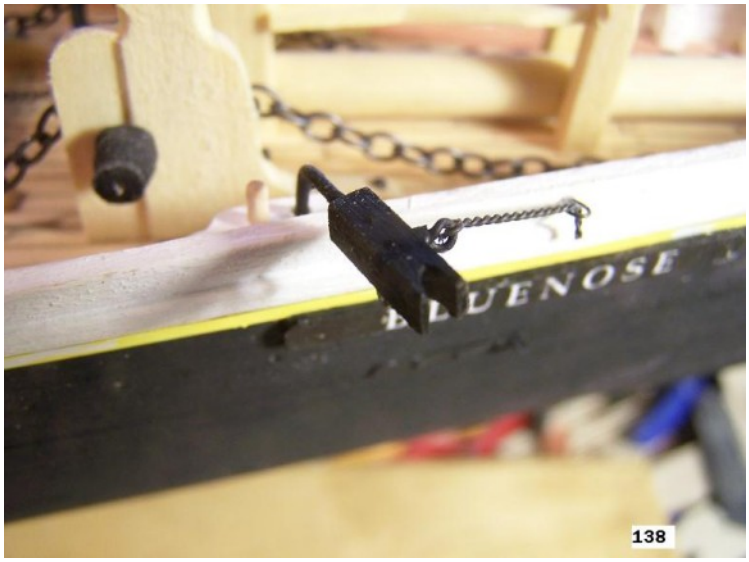
Install iron rings around each barrel by cutting strips of thin cardboard, paper, or masking tape, and painting them black. Glue the painted strips around the barrels. Glue the barrels in the barrel rack. Install the rack on deck with a scant amount of CA glue. See Photo 137.



Barrels installed on deck with iron rings

Catheads

The **cathead** is one of two projections over the bow end of the vessel that contain sheaves in their ends that take on the cat tackle with which the anchors can be hove up to the cathead clear of the bow.

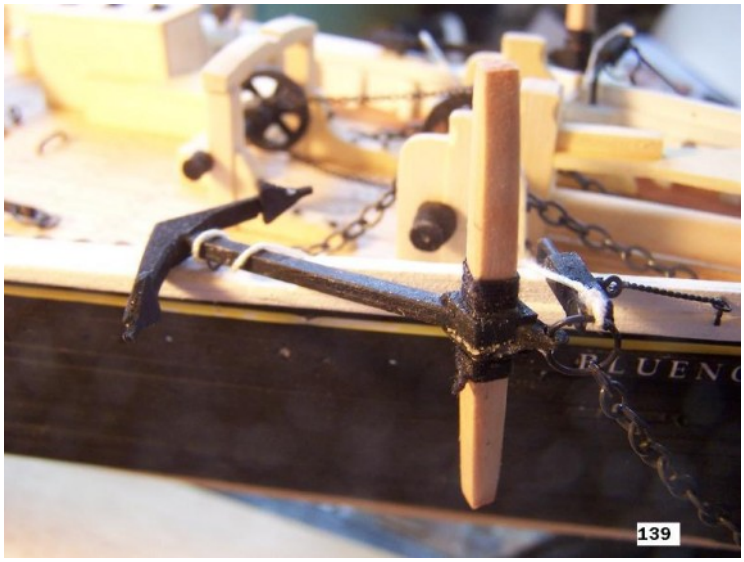


Cathead

The catheads are made from two parts: a heavy wire base that is CA glued into a 1/8"-square piece of wood. The piece of wood is filed to shape to accept a sheave, which is merely a piece of bamboo doweling inserted in its end. Eyebolts are attached, as shown in Plan Sheet 3. Bend the wire to shape, and glue it in place in the rail and the deck with CA glue. The entire device is painted black.

Anchors

There are two anchors required, one on either side of the bow. The entire anchor is made from wood of appropriate size and shaped as shown in Plan Sheet 3. The fluke are cut from cardboard and glued in place. The ring is a piece of 22-gauge annealed block wire bent around a ¼" dowel. Cut off the wire, bend it to its circular shape, and install it in a hole drilled in the anchor's shaft. Note that there is a diamond-shaped hole into which the anchor stock is fitted. Paint this part of the anchor black.



Anchors

Make the anchor stock from a piece of square wood tapered properly. Shape it to fit into the diamond-shaped hole and glue it in place. After the glue has dried, stain the anchor stock with Colonial Maple Stain. After the stain has dried, wrap a piece of No. 10 DMC black cotton thread about 5-6 turns around the stock on each side of the center.

Rig the anchors in place as shown in Photo 139.

Fisherman's anchor on deck

Make the fisherman's anchor as shown in Plan Sheet 3. It's is a little different from the bow anchors, so note the differences as you build it. Paint the anchor black. After the glue has dried, glue the anchor in place on the deck. See Photo 140.

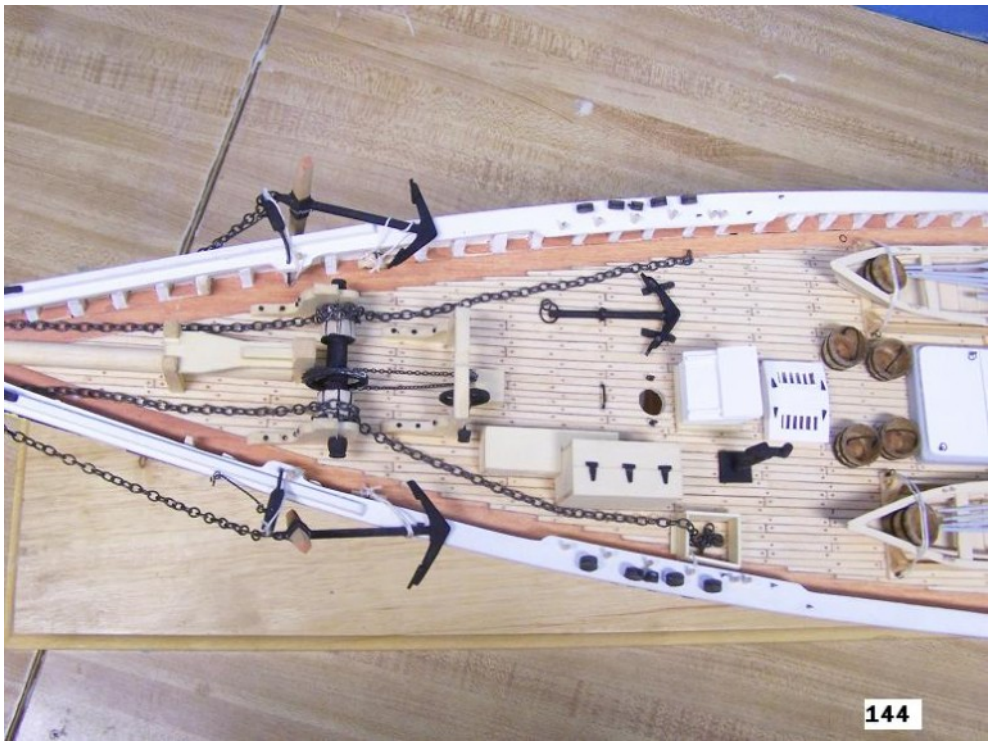
This completes all the deck fittings. Photos 141 through 148 illustrate the completed deck fittings from several different angles. Check these photos against your own model to make sure that nothing has been forgotten.

Fisherman's anchor on deck

Deck fittings finished—stern profile view

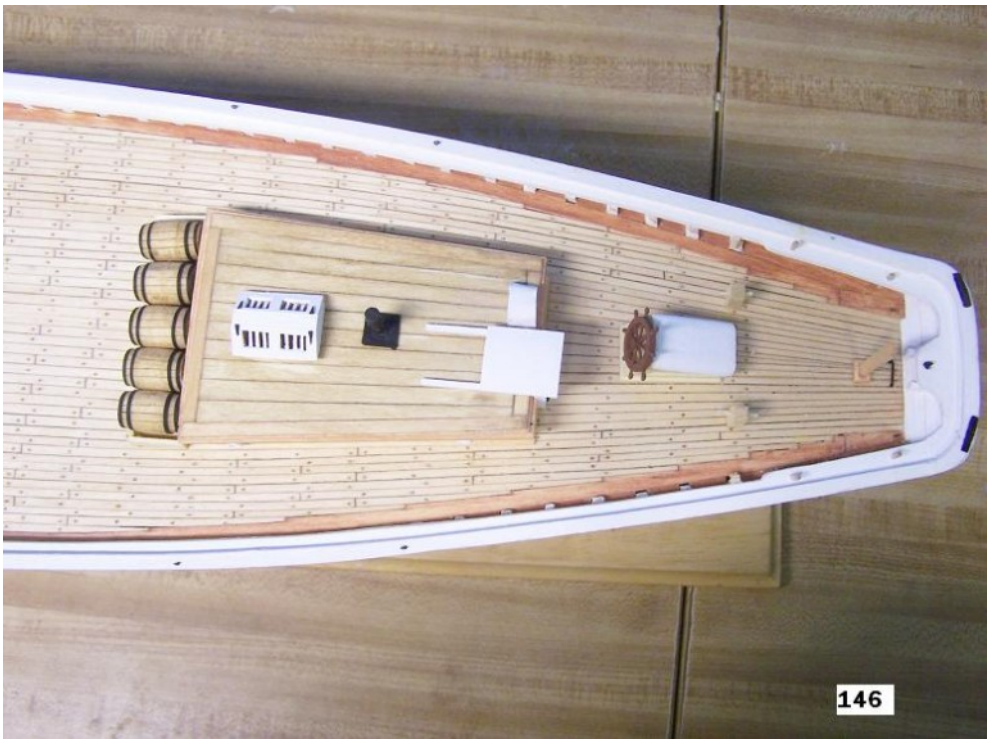
Deck fittings finished—mid-ship profile view

Deck fittings finished—bow profile view



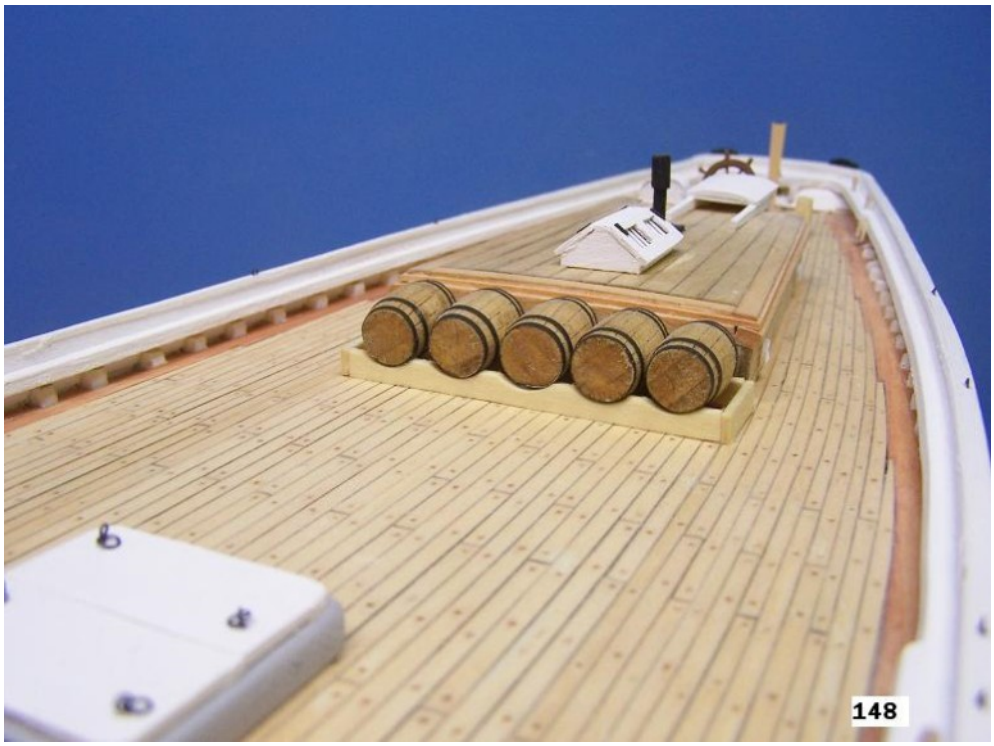
Deck fittings finished—Bow top view

Deck fittings finished—Midship top view



Deck fittings finished—bow top view

Deck fittings finished—looking forward from midship



Deck fittings finished– looking aft from midship

Part 8
Masting

General information applicable to all spars

There are 10 masts, gaffs, and booms on the *Bluenose.* Masts, gaffs, booms, and the bowsprit are all called **spars**. A **mast** is always a vertical spar (sometimes raked) that is stepped, or mounted, on a vessel's keel, and it may consist of several spars one above the other. A **gaff** is a spar to which the head (upper edge) of a four-sided sail is attached. A **boom** is a spar that usually contains jaws and is used to stretch out the foot (bottom edge) of a sail.

Let us first examine some general information that applies to modeling all spars for the *Bluenose*. It is important that you examine each spar on Plan Sheet 4. You will find that each spar contains at least one taper; however, some, like the main gaff, contain two, with the greatest diameter near the center of the gaff. You may use a mast tapering tool, or you may taper the spars by eye. All the spars in the photos are made from birch dowels purchased from a hardware store, and they were tapered to shape by turning the dowel carefully on a sanding disk at various angles and by sanding it with various grades of sandpaper. Whatever method you use, be sure to match the tapers shown on the plans. Spars that are not properly tapered simply will not appeal to the observer.

When you make your masts, gaffs, and booms, try to install all of the fittings and most of the rigging blocks *before* you place the spar permanently in position on the model. This makes rigging the vessel much easier.

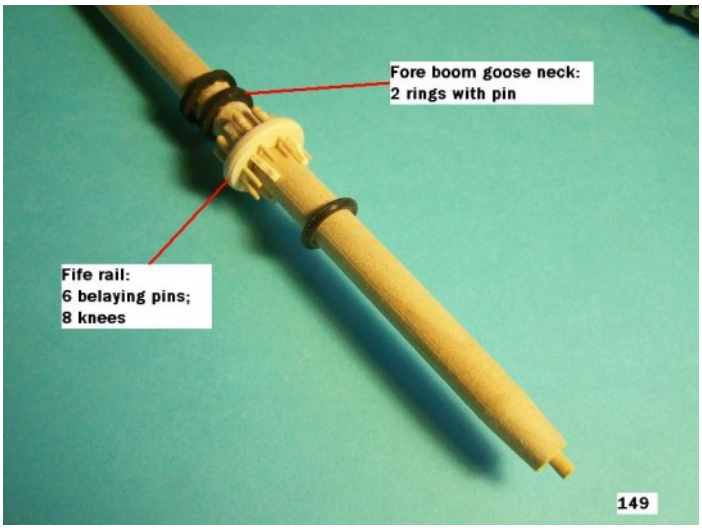
All spars should be finished in the same manner. On the original *Bluenose*, the mastheads, crosstrees, and trestletrees were painted white, as were the jaws on the booms. The rest was oiled but appeared to be varnished. In all the photos, Minwax Natural Stain was used.

The foremast

Taper the foremast as shown in the plans. Insert the foremast in its location on the deck, fitting it into the mast step. Mark the exact location of the deck right on the mast.

Make the fife rail by turning a piece of wood on a lathe to its proper dimensions. Drill 6 holes for the belaying pins, spacing them as shown in Plan Sheet 3. Make and install the belaying pins. Now measure the location of the fife rail on the mast and glue it is place, making sure that it is properly orientated. Make 8 knees as shown on Plan Sheet 3 and glue them in place.

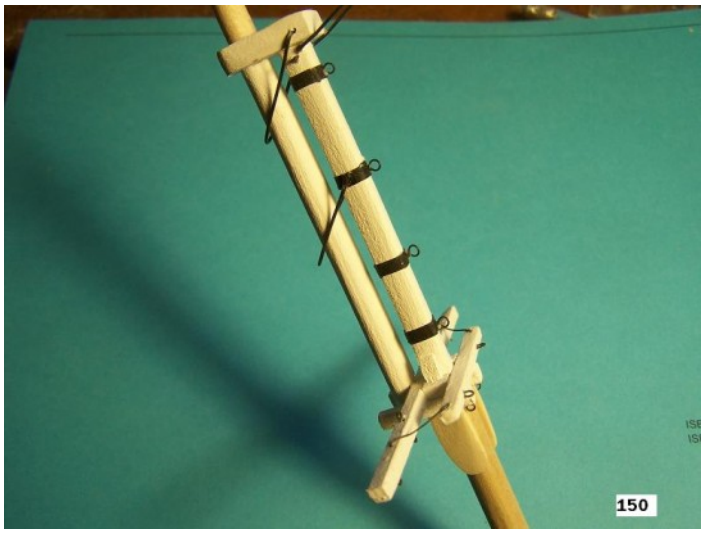
Make the two rings required for the boom goose neck. Drill holes in the goose neck, aligning them properly, but do not install the pin until after you have made the fore boom. Glue the rings in place, measuring their proper height from the level of the deck.



Fore mast fife rail and fore beam goose neck

Note that the masthead is square-shaped. The masthead starts at the top of the cheeks. Square off this area with a flat file, noting that it tapers slighting toward the top end. Paint the masthead white.

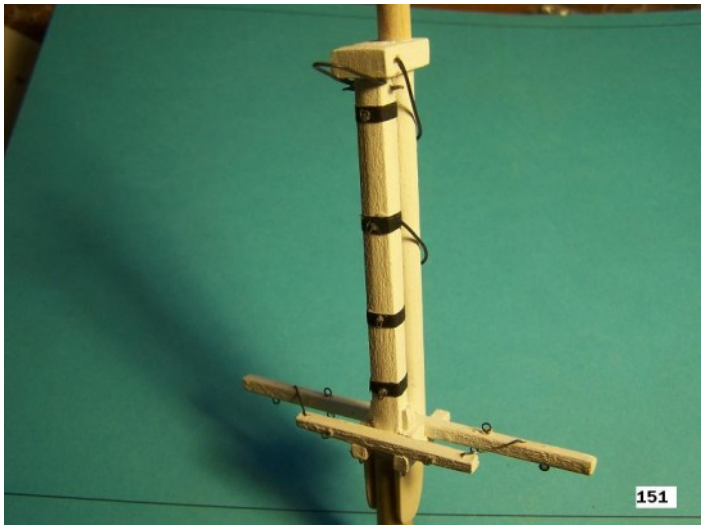
While the paint is drying, make and install the two hounds. Slightly flatten the area where the hounds will rest. The hounds are made of 1/16" wood, shaped at shown in the plans, glued in place with CA glue, and tapered slightly toward their bottom edges.



Fore Mast masthead and Trestletrees—1

Make the trestletrees as shown in Plan Sheet 4. Observe that there is a slight taper. Before gluing the four parts together, fit them around the masthead to determine the proper-size square opening. Glue the pieces together as shown in the plans. Install all the eyes on the trestletrees. Eyes may also be used for the fairleads. Finally, install the metal braces that connect the two arms of the trestletrees together, which may be made from wire. Now glue the trestletrees in place on the mast – they should rest snugly on top of the hounds as well as around the four sides of the masthead. Now install the bolsters and the slabs, paint them white. Retouch the painted masthead where necessary. See Photos 150 and 151.

Next, install the iron bands around the masthead. These may be made from thin strips of masking tape painted black. Wrap the painted tape around the masthead three times and finished with a small amount of glue to secure each band in place. Drill holes in the iron bands and install the eyes. Make sure everything is properly situated in its correct direction.



Fore Mast masthead and Trestletrees—2

Make the mast cap from a piece of 1/8"-thick wood. Remember that it will contain two holes – a square hole into which the lower masthead will be fitted, and a round hole into which the fore topmast will be fitted. Measure precisely before you drill and shape these holes. It is recommended that you use a hardwood for the mast cap, because it will be required to withstand a certain amount of stress caused by the rigging. Paint the mast cap white.

Make the three bails out of 26-gauge annealed black wire. Drill the holes and install them in place. See Photos 150 and 151.

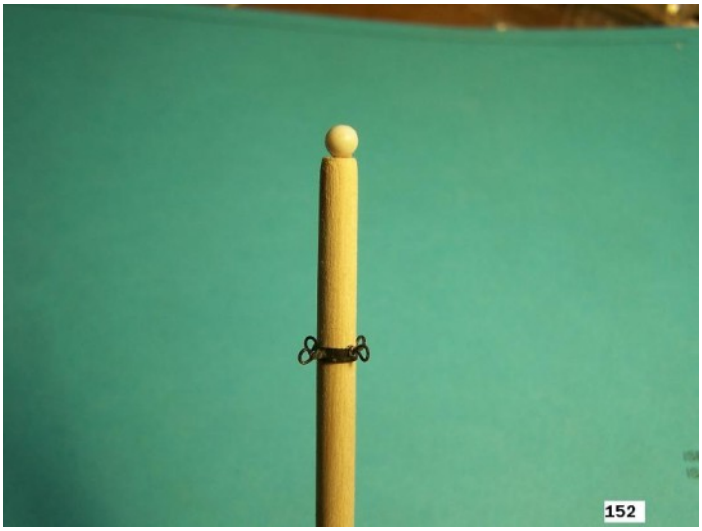
The fore topmast

Taper the mast as shown in Plan Sheet 4. Use a Dremel sanding drum to shape the bottom of the mast, which will fit up against the trestletrees.

Test-fit it in place with the mast cap and masthead trestletrees. Paint the area from the mast cap to the lowest end with white paint.

Make and install the iron band with its 4 eyes near the top of the fore topmast.

Install the truck (round ball at the top of the fore topmast) by snipping off about 1/8" below the ball of a roundhead pin. Drill a hole and CA glue it in place. See Photo 152.



Fore topmast

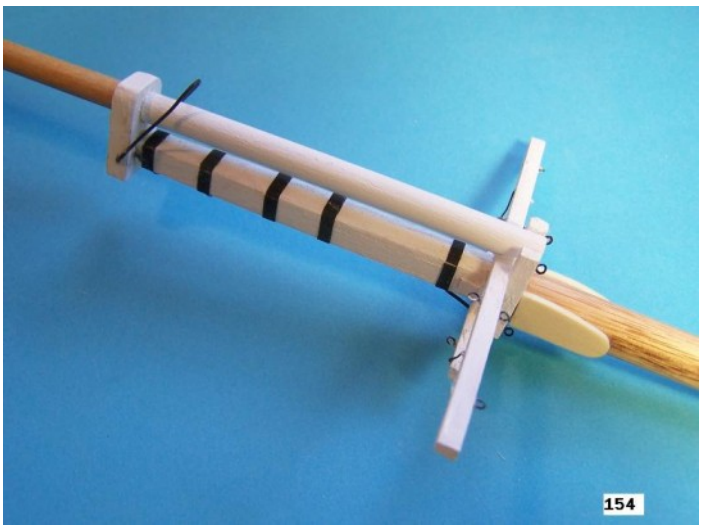
The main mast

Taper the mast where necessary. Install the main boom jaws rest by turning a piece of wood on a lathe to the size shown in the plans. Glue it in place, and add the four knees on the underside of the jaws rest. See Photo 153.

Main mast and main boom jaws rest

Square the masthead as shown in the plans. Paint it white. Install the eyebolts, which are similar to those found on the fore mast but with significant differences. Also install the bails, iron bands, and other parts associated with the masthead.

Make the mast cap, ensuring that it fits properly at the square head of the masthead. See Photos 154 and 155.

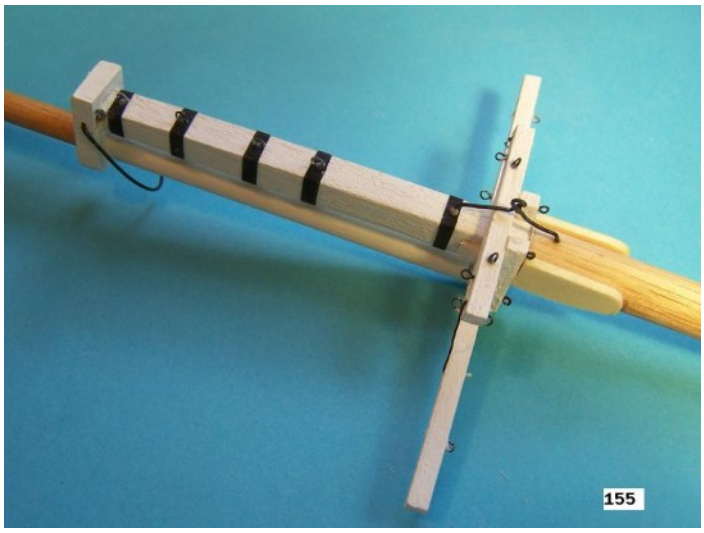


Main mast mast head and trestletrees—1

The main topmast

Except for its length, the main topmast is made almost identically

to the fore topmast.



Main-Mast mast head and trestletrees—2

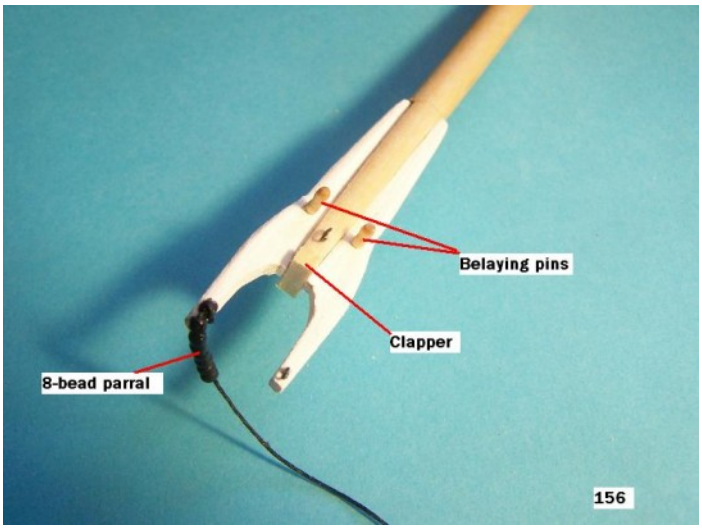
The main boom

Taper the boom as shown in the plans. Note that there are angular cuts where the jaws rest.

Make the two jaws from 1/8" wood. Draw a pattern for the jaws onto your wood, and cut it out very carefully. Round off the outside edges somewhat until it blends well with the boom itself. Sand them smooth, and then paint them white. Glue the jaws in place with CA glue, but make sure you place the jaws so that you can insert the bolster properly.

Make an insert the bolster. Glue it in place and paint it white.

Install the eyebolts as shown in the plans. They are made from the usual annealed black wire. See Photo 156.

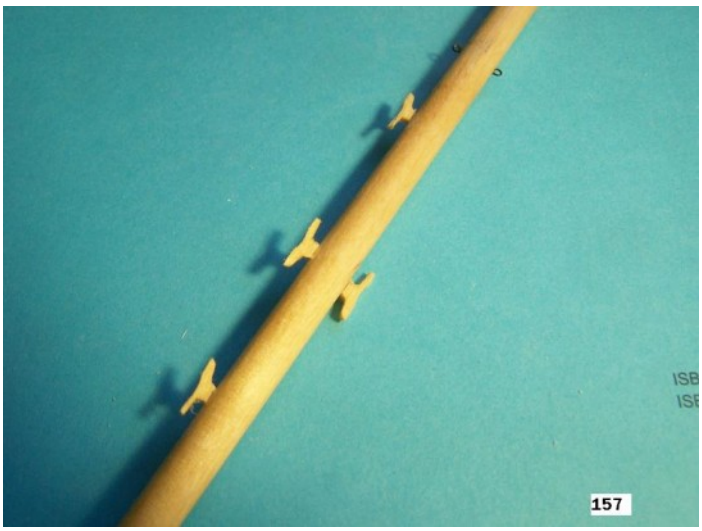


Main boom jaws

The central area of the main boom contains two eyebolts and four cleats. Make the cleats out of hardwood; glue them in place; and it is recommended that you insert a very small bamboo dowel into the cleat and mast for additional security. Be sure to situate them properly in position. See Photo 157.

Near the top of the main boom, install the iron bands, eyebolts, and the sheave. The sheave can be made from a 1/16"-thick piece of wood. Cut a slot into the sheave so that a piece of rope can be passed through it. Glue in place with CA glue.

Finally, install the parral. A **parral** is a type of collar that attaches the center of a boom, gaff, or yard to the mast and can slide up or down



Main boom cleats and eyes

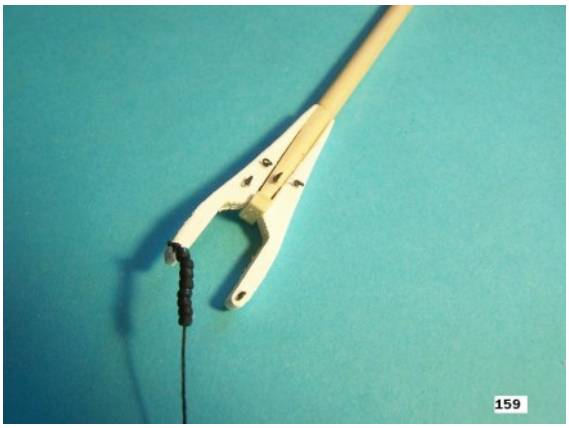
the mast as required. It consists of 8 to 10 tiny wooden balls called **trucks**. The trucks, in the model, are small beads strung on a piece of heavy string, and then tied to the eyes at the ends of the jaws. See Photo 158.

The main gaff

The main gaff jaws and parral are made in the same way that you made the main boom jaws and parral. Make sure you incorporate the slight differences on your model. See Photo 159.

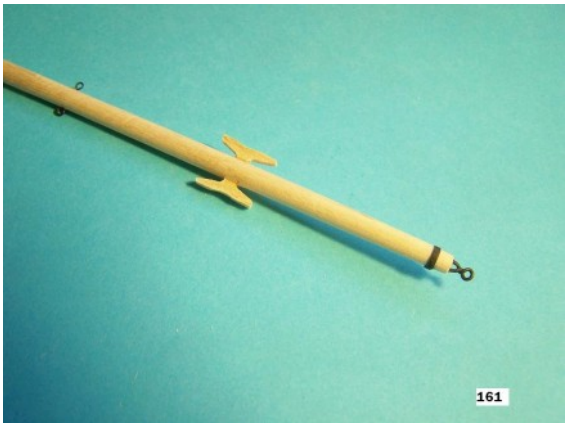
Install the fittings on the main gaff as shown in the plans and in Photo 160.

Main boom iron bands, eyes and sheave



Main gaff jaws and parral

Main gaff fittings



Fore boom goose neck, cleats and eyes

Main boom iron bands, eyes and sheave

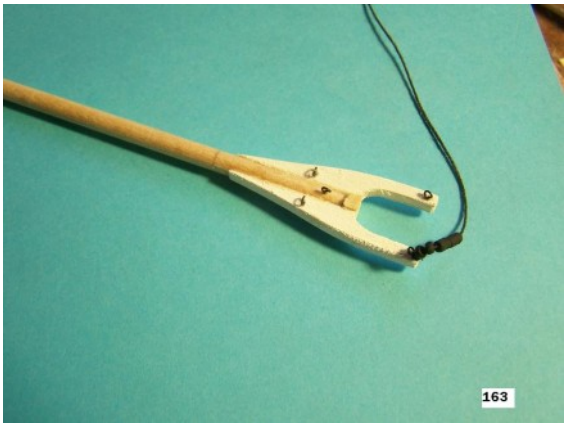
The fore boom

Taper the fore boom as shown on the plans. Install the cleats and eyebolts in the lower area of the boom. Note that the goose neck is made from a thicker wire, 26-gauge, and contains an eye with its two legs glued into holes drilled in the end of the boom. See Photo 161.

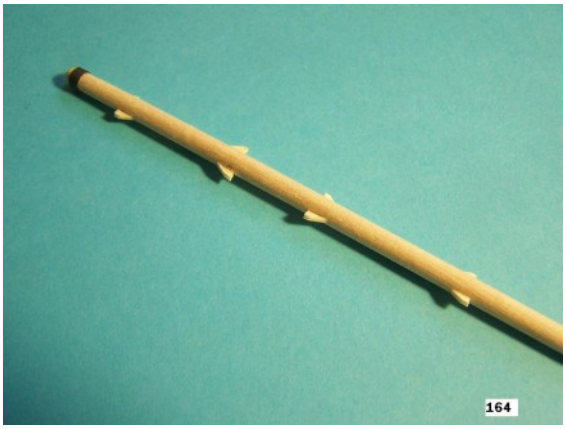
Install the iron bands and eyebolts in the upper end of the fore boom as shown in the plans and in Photo 162.

The fore gaff

Install the jaws, parral, and other fittings as shown in the plans and in Photos 163 and 164.



Fore gaff jaws



Fore gaff fittings

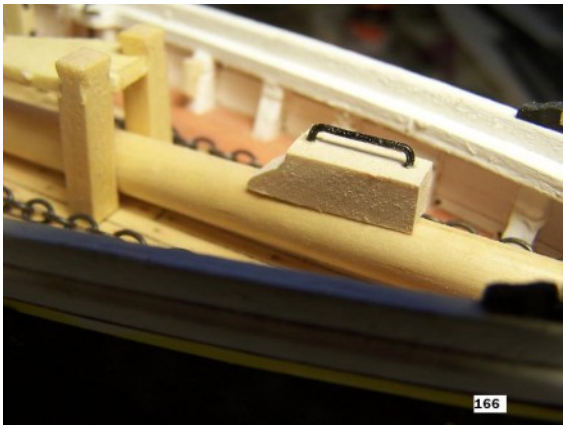
The jumbo jib club

There is no taper on this spar. Install the goose neck, iron bands, and eyebolts as shown in the plans and in Photo 165.

The bowsprit

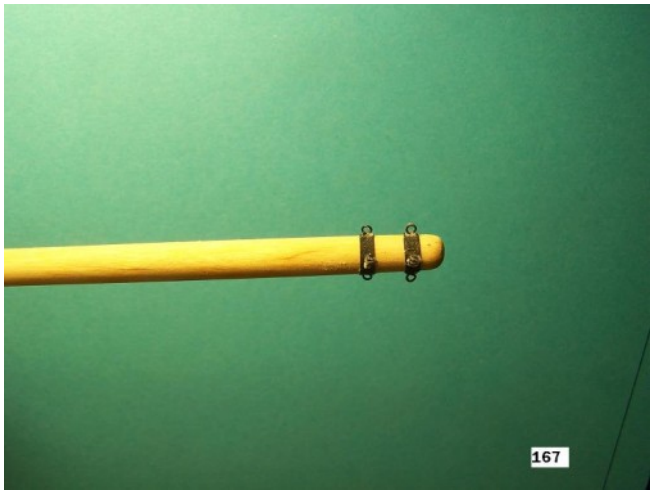
The bowsprit, which has already been installed in place on the model, contains the jumbo jib club horse and its support. Make the support first by cutting it out to its shape from a piece of

Jumbo jib club



Bowsprit horse and support

scrap wood. Sand its lower surface with a slight curve so it will rest easily on the bowsprit. Drill two holes at the location of the horse. Make the horse from heavy black wire. Glue the horse in place, and then glue the assembly atop the bowsprit in its proper position. See Photo 166.

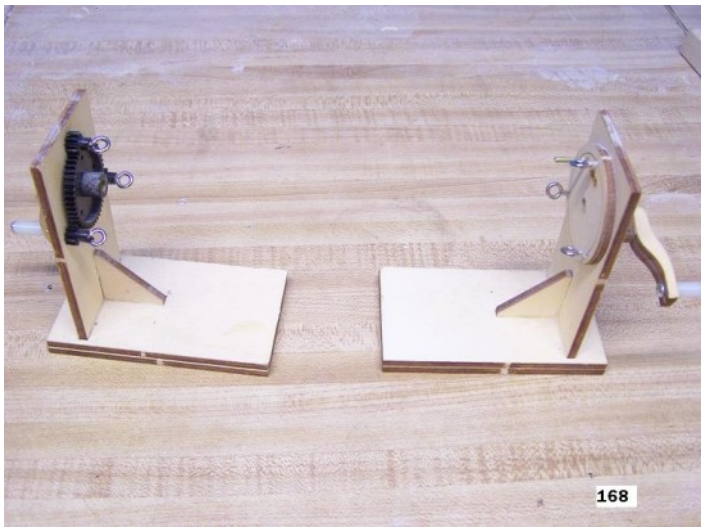


The fore end of the bowsprit contains two iron bands. Each iron band bears four eyebolts. Make and install these items. See Photo 167.

Part 9
Standing Rigging

General considerations

When rigging a ship properly, many factors must be considered. The first and foremost consideration is that the rope is as precisely as possible to scale. Nothing looks worse than oversized or undersized rope on a model. A very useful book for determining rope sizes for the rigging of vessels is *The Art of Rigging* by George Biddlecombe. The back of the book contains numerous tables on various types of ships that provide information on rope sizes, and types and sizes of blocks as well. It is indispensable for finding this information if you don't have such information available from any other source. Using the information for schooners of the approximate tonnage of the *Bluenose,* the required information will be presented as each rope is discussed here. It should be noted that most tables in books supply the size of rope measured in circumference. To convert this into diameter, simply divide to 3.1416. Finally, to determine the size of actual rope you need to scale, divide by 48 for our scale model of the *Bluenose.*



Simple Rope Making Machine

Of course, you can purchase ready-made rope of the required sizes; however, in keeping with the entirely scratch-built concept, it is recommended that you make you own rope, if only the largest sizes. If you decide to make your own rope on a ropewalk, you can also make your own ropewalk. Many plans for simple or quite elaborate ropewalks can be found on the internet. Or you can purchase one from many modeling ship- building sites. A very simple ropewalk is shown in Photo 168. Even a simple ropewalk is capable of making high-quality rope if you use a suitable thread for the job. Linen thread is ideal but very expensive. An excellent substitute for linen thread is DMC Cebelia cotton thread, which is readily available from almost any fabric store at a fraction of the cost of linen thread. An example of this hand-made cotton rope is shown in Photo 169. It should be noted that lengths of rope can be made conveniently up to about 10 feet long on a typical ropewalk.

Hand-made Rope

After you have made your rope on a ropewalk, it is recommended that you pass it through a block of quality beeswax several times. Then wipe is down with a piece of cloth to remove excess beeswax. This will eliminate any problems with the fuzziness usually associated with cot-

ton thread.

All standing rigging should be black rope, and all running rigging should be tan or light brown rope.

You can measure the size of the rope you are making by using the following information: Take a length of 1/4" dowel and mark off a 1/4" interval at one end, leaving about a half-inch space at the very end of the dowel. Starting at your left-hand mark (if you're right-handed), wind your piece of thread around the dowel snugly until you reach the other quarter-inch mark. Don't pull too tautly. When you've covered your 1/4" markings, count the number of turns you've made for the rope and multiply by 4 to get the number of turns per inch. Now divide that number into the basic unit of one inch to get the size of your thread. For example, if you've counted 32 turns on your 1/4" markings, then 32 x 4 = 128. Then 1 divided by 128 = 0.0078". For all practical purposes, you can say this measures 0.008".

0.06”	3 strands #10
0.056”	3 strands #20
0.053”	3 strands #20
0.05”	3 strands #20
0.046”	1 strand #5 or 3 strands #20
0.043”	1 strand #5 or 3 strands #20
0.04”	1 strand #5 or 3 strands #30
0.036”	1 strand #10 or 3 strands #30
0.033”	1 strand #10 or 3 strands #40
0.03”	1 strand #20 or 3 strands #40
0.027”	1 strand #20 or 3 strands #50
0.023”	1 strand #30 or 3 strands #50
0.02”	1 strand #30 or 3 strands #60
0.017”	1 strand #40 or 3 strands #60
0.013”	1 strand #40 or 3 strands $80
0.01”	1 strand #50 or 3 strands #80
0.005”	1 strand #50 or 3 strands #100
0.001”	1 strand #60 or 3 strands #100

Rope Table

Through the remainder of this practicum, you will be given the actual diameter of rope sizes to use on your model of the *Bluenose.* If the actual diameter is not found listed on this table, use the next higher-size increment. If you will be using DMC Cebelia cotton thread, the following table shows the thread sizes you should use. If you are making your own rope from other brands of thread, you must create your own table. The first column represents the diameter of the rope to use on the *Bluenose.* The second column represents the DMC Cebelia cotton thread to use that corresponds to the diameter. As you can see in the table, for rope sizes 0.05” and greater you *must* create the rope on a ropewalk, simply because DMC Cebelia thread is not made in these larger sizes. For all sizes smaller than 0.05” you have an option – you can use either a single strand of DMC Cebelia thread (without using a ropewalk) or you can use three strands twisted on a ropewalk. The choice is yours.

Lower foremast and mainmast shrouds

A **shroud** is a fairly heavy length of rope that supports a mast laterally.

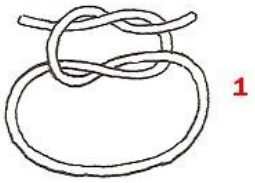
If you are making your rope on a ropewalk, use 3 strands of black No. 20 DMC cotton thread, which will yield a single piece of 0.043” rope. Use this size rope for all 16 of the lower shrouds on the *Bluenose.* Note that the small deadeye in the center of each channel is *not* a part of the lower shrouds; therefore, do not include this deadeye among the lower shrouds. This deadeye will be addressed later.

The shrouds are set up in pairs (with a single pair called a **span**). Cut a piece of 0.043” rope

so that it is long enough to start at one deadeye in the channel, go up around the masthead, and then down to an adjacent deadeye in the channel, leaving a couple of inches to spare. The first span of shrouds goes to the starboard forward side of the ship, the second the port forward side of the ship, the third to the starboard

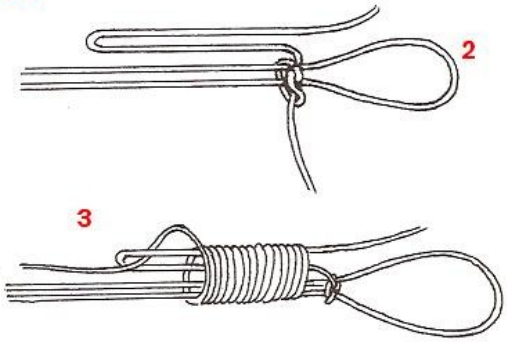
170

Typical Seizing



Making a seizing:

1. Tie a square knot around a loop of thread.
2. Thread needle; pass thread round and round the loop.
3. Pass needle through windings and pull tight.



171

Making a Seizing

side, and so forth. Each span is seized at the masthead; a typical seizing is illustrated in Photo 170. It is made by using a needle and fine thread, as shown in Photo 171. As you install each span, make sure that you push it down to slabs on the masthead; the next span is pushed down snugly against the last span, and so forth.

If you haven't made the required quantity and sizes of deadeyes, do so now.

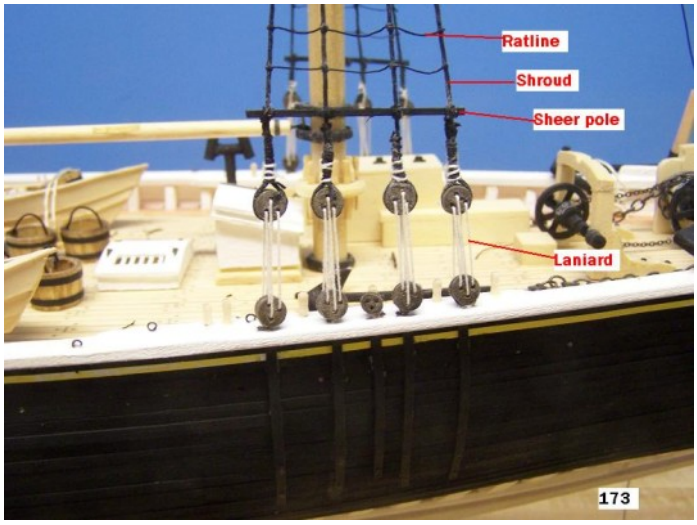
A deadeye is turned into the lower end of every shroud with a throat seizing and is then lashed to the shroud itself. The upper deadeyes must be spaced about 7/8" above the lower deadeyes, and all together, must be parallel to the channel. It may help to use a wire jig to hold the deadeyes properly spaced apart to get them just right. Do not pull the shrouds too tightly. This could easily pull the masts themselves a bit out of shape.

The deadeyes are then reeved with laniards (No. 30 DMC tan cotton thread NOT turned on a ropewalk) to their counterparts in the channels. The knot used to start the laniard, which consists of two overhand knots on top of each other, is always in the same location on either port or starboard side – when looking outboard at a deadeye, the knot will always start in the upper right-hand deadeye hole. Use a needle to pass the laniard through each of the deadeye holes, around and around, until all holes have been

172

exhausted. Finally, fix the end of the laniard to the shroud as shown in Photo 172.

It is also recommended that you use a small drop of clear fingernail polish on the lashing to hold it in place. Fingernail polish will dry clear and will not be seen. See Photos 173 and 174.

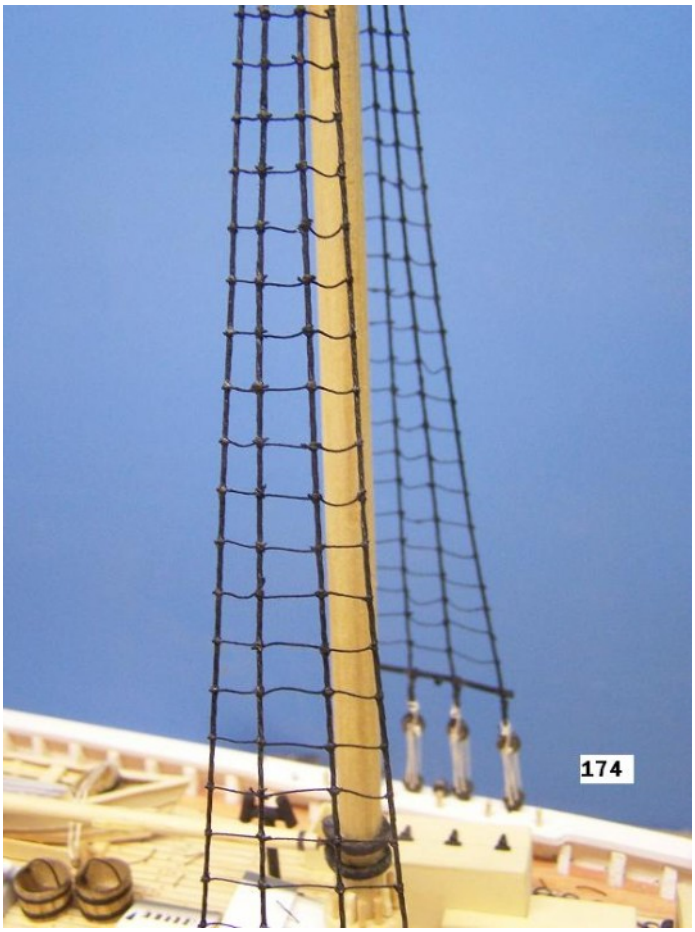


Lanyards, Sheer Pole, Shrouds and Ratlines

Sheer poles

The sheer poles are short pieces of wood attached just above the upper deadeyes of the lower shrouds. See Photo 173.

Measure the width going across the five shrouds about ¼" above the upper deadeyes. Cut 4 pieces of 1/16"-square wood to this length, and paint them black. After the paint has dried, use a very small amount of CA glue to tack them to the outside of the shrouds about ¼" above the upper deadeyes. Using a single strand of #80 tan thread, lash each of the shrouds X-fashion to the sheer pole.



Lower Shrouds and Ratlines

Topmast shrouds

There are a total of 8 topmast shrouds. Use 0.023" black rope. Pass each span through the appropriate eye near the top of the topmast, and then tie each shroud to the appropriate eye in the crosstrees. See Photo 175.

Ratlines

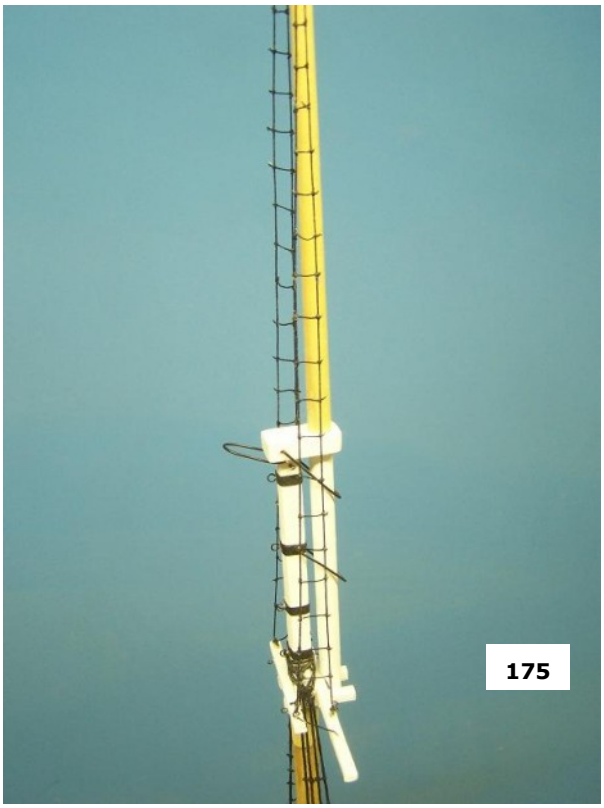
Ratlines are the thin horizontal ropes running across the shrouds at short intervals, forming a series of rungs used by the seamen to climb to the upper reaches of the masts. The process of tying the seemingly endless ratlines to the shrouds is called "rattling down."

Ratlines on a full-size ship are usually spaced about 14-15 inches apart, much like the rungs

of a ladder. Make a template from a piece of cardboard on which you draw a series of lines spaced 5/16" apart that represent the ratline spacing to scale. The template should be long enough to fit the entire length of a group of shrouds and wide enough to cover all 4 shrouds.

Clamp the ratline template behind the shrouds. Make sure the lines on the template are parallel to the waterline of the ship. The first row of ratlines will be installed 5/16" above the sheer pole.

In real life, ratlines are only about 1 ½" in circumference; therefore, use a single strand of #80 thread or even smaller to tie all ratlines. You may find that a pair of tweezers will be helpful in typing the knots. Remember to beeswax the ratlines before installing them. Tie a clove hitch knot to each and every shroud going from left to right. Do not pull the knots too tightly. Follow your template to make them align properly. Leave a little extra thread at each end. When you have finished one group of shrouds, go back and put a touch of fingernail polish at the outer ends of each row of ratlines to prevent the knots from untying. Snip off excess thread at each end of the shrouds but only after the fingernail polish has dried.



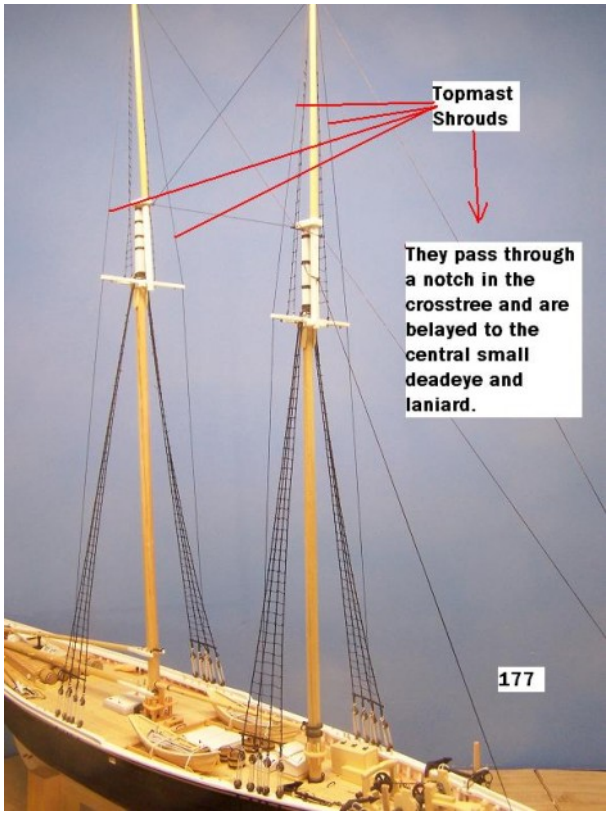
Topmast Shrouds and ratlines

Ratlines should be installed on all lower shrouds and all topmast shrouds. The lower shroud ratlines should terminate about one inch below the crosstrees. The topmast shroud ratlines should terminate about two inches below the upper eye for the shrouds. The 5/16" spacing between each ratlines applies to all of them.

Finished Shrouds

Topmast stays

Use 0.05” rope. Topmast stays are rigged to both port and starboard sides of the ship. Start by seizing the rope to the eyebolt in the upper part of the topmast, draw it through a notch in the crosstree, and then tie a small deadeye even with the upper deadeyes of the shrouds. Install a laniard in the upper and lower deadeyes exactly the same way as you did for the shrouds. See Photo 177.



Topmast Shrouds

Jib topsail stay

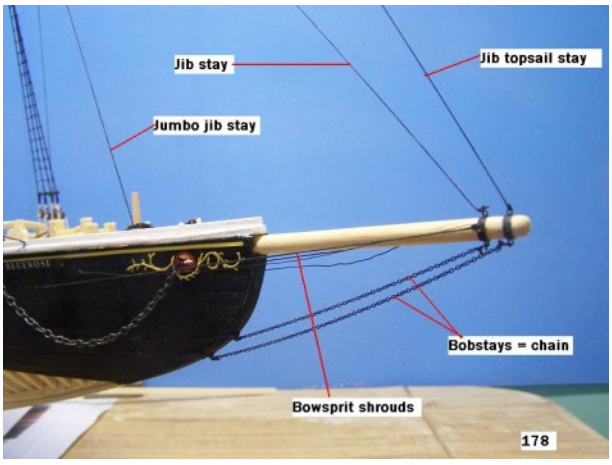
Use 0.027” rope. Seize the rope to the uppermost forward-facing eyebolt in the fore topmast iron band. Draw it snugly and seize it to the foremost upper eyebolt in the bowsprit iron bands. See Photo 178.

Jib stay

Use 0.027” rope. Seize the rope to the center of the upper bail located at the foremast masthead, and then draw it snugly and seize it to the upper eyebolt in the second iron band of the bowsprit. See Photo 178.

Jumbo jib stay

Use 0.036” rope. Seize the rope to the lower bail located at the foremast masthead, and the draw it snugly and seize it to the jumbo horse on the bowsprit. See Photo 178 and 180.



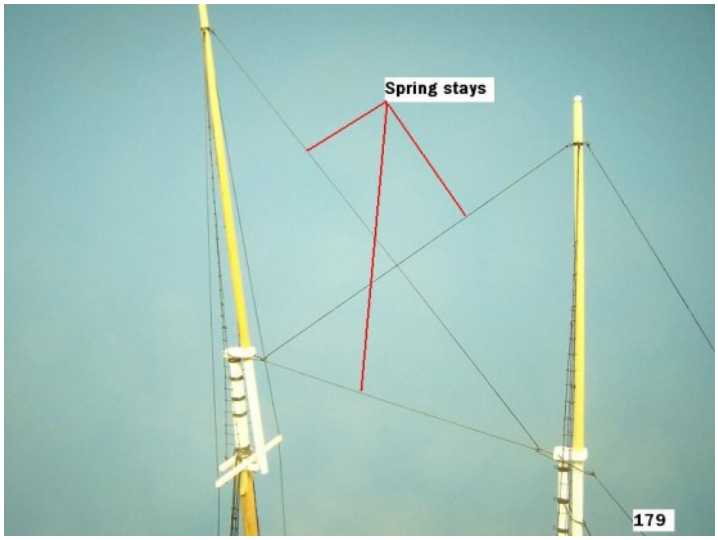
Jib topsail stay, jib stay, jumbo jib stay, and bowsprit shrouds

Bobstays

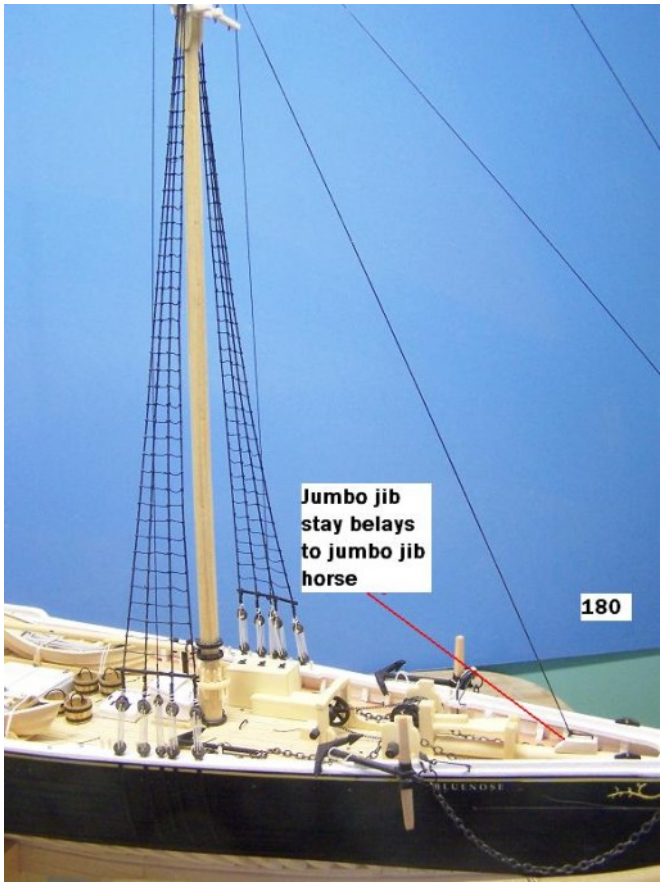
Use fine black chain. One way to attach the chain to both ends, as shown on the rigging plans, is to tie a piece of thread to the end of the chain, and then tie it to one of the eyebolts. Then stretch the chain out to the other eyebolt, snip off the chain to this length, and then tie another piece of thread to the last link in the chain. Finally, tie it to the eyebolt. Apply a touch of CA glue to the thread and the eyebolt. Note that there are two bobstays, both of them chain. See Photo 178.

Spring stays

Use 0.036” rope for all 3 spring stays. Seize each one separately to the appropriate bails and eyebolts, as shown in the rigging plans. See Photo 179.



Spring Stays



Jumbo jib stay belayed to jumbo jib horse

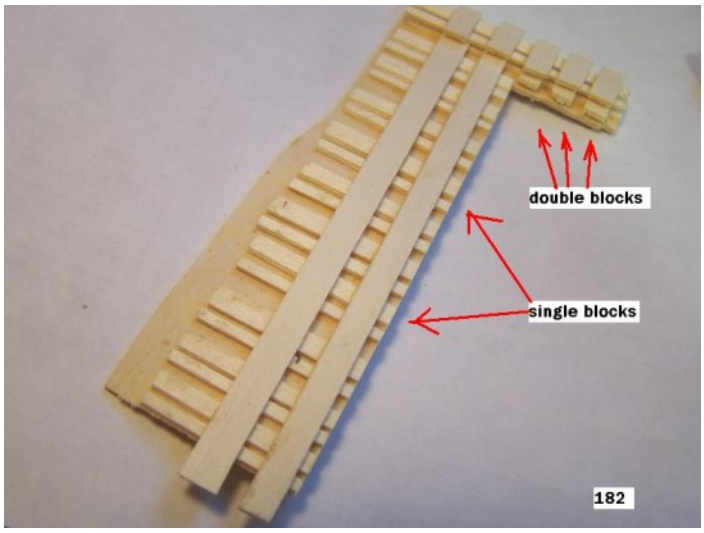
The completed standing rigging is shown as viewed from the stern in Photo 181.

Standing rigging completed – view from the stern

Part 10
Running Rigging

Before you begin the final stage (running rigging) of building your *Bluenose,* you must make a few different sizes of blocks. **Blocks** are basically pulleys used to increase the mechanical power of the ropes used in handling the sails and spars. Blocks can be single, double, treble, or larger, depending on the number of their wheels. A common single block comprises three main parts: the shell, sheave (the wheel held between the two flat sides of the shell), and the pin, which holds the shell and the sheave together and which provides the sheave's axis. The block is bound with a **Strop**, which is a ring of rope passing in a notch around the block and across both ends of the pin, by which the block is suspended from masts, shrouds, and so on.

For our purposes, it is not necessary to incorporate sheaves into the blocks. On 1:48 scale, they will not be seen, although some modelers do indeed make tiny sheaves. Blocks may be purchased at your local hobby store or you can make them yourself. There are a variety of methods you can use. The following method is an experiment that I used to make blocks for this model. I include it here mainly for the novice builder to see. The purpose is to show the novice builder that even after some 50+ years of modeling, modeling is an ongoing learning experience. There's always something to be learned.

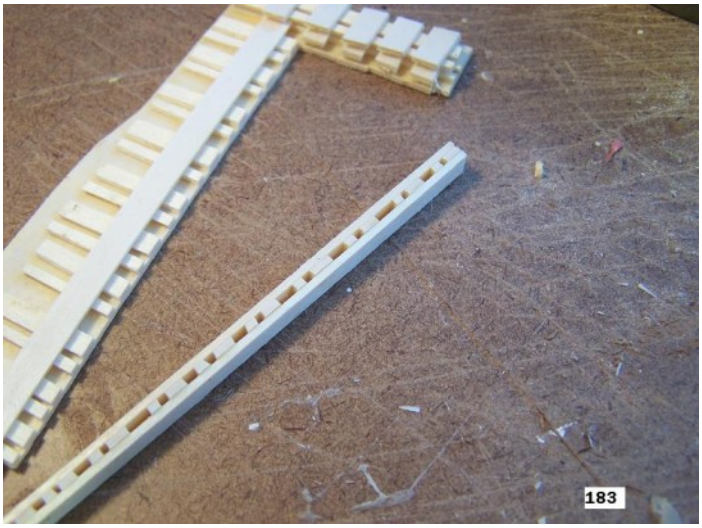


General Layout for Making Blocks

Making Blocks

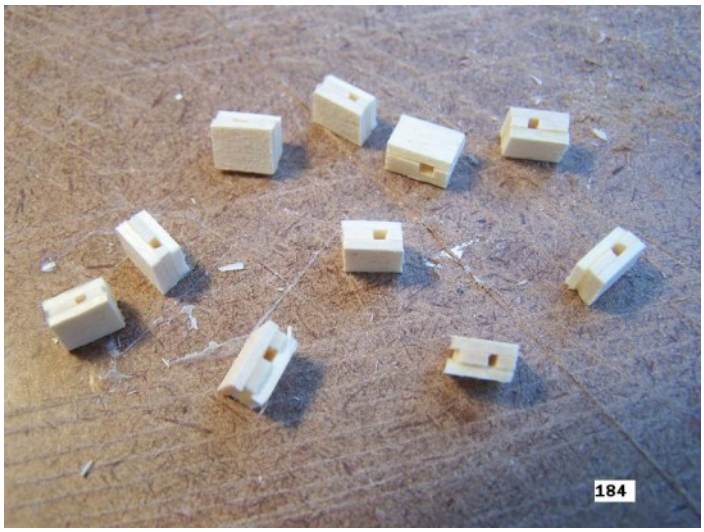
Step 1: Use 1/32" wood for all steps. First, I placed a solid square of wood to be used as the base. Starting with the 3/16" single blocks I cut a strip of wood slightly smaller than 1/16" and glue it across the top of the solid square of wood. Then, I cut a strip of wood slightly smaller than 1/8" and glue it in place just below the first strip, leaving about 1/32" gap between the two – the gap represents the hole through which rope will pass. As you can see in Photo 182, I continued placing similar strips of wood below the ones just finished. Since you need 40 of these blocks, measure the area you need to fill for that number of blocks. When done these inner strips, I then glued a length of wood that represents the opposite side of the blocks making sure that the glue contacts all appropriate areas. Once completed I applied glue and placed a weight atop the entire unit.

Step 2: Once the glue had thoroughly dried, I cut off the glued strips that represent the blocks. And ended up with a long piece that represents several blocks. See Photo 183.



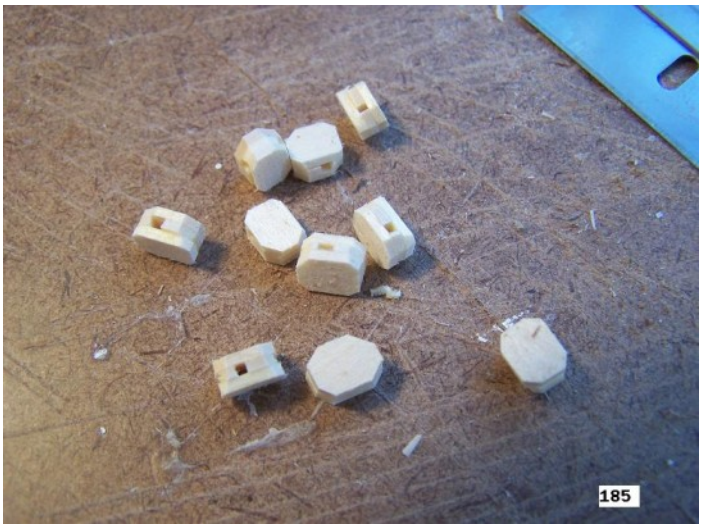
Cutting off glued strips for blocks

Step 3: Then I cut off individual blocks from each strip. Remember that each block will contain a hole for the rope. See Photo 184.



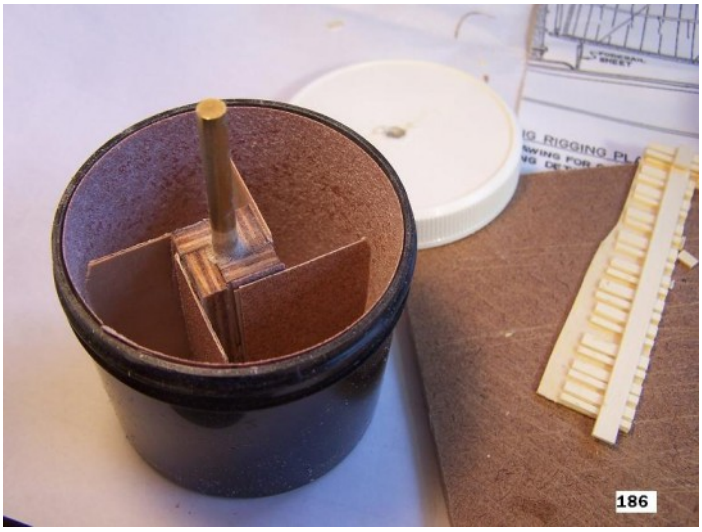
Cutting off individual blocks

Step 4: Next, cut off all the sharp corners of each block with a single-edged razor blade. The object here is to make it easier to shape the block to its proper shape in the next step. See Photo 185.



Cutting off corners with a razor blade

Step 5: I Inserted about 20 of the blocks into a rotary device shown in Photo 186, placing the cap on top and screwed it on. I chucked the axle of the rotary device into an electric drill. Holding the drill in a horizontal position, and holding the rotary device in my left hand, I turned it on. I let the drill run for about 60 seconds before turning it off. Disassemble and take out the blocks. The concept here is that the tumbling of the blocks against the sandpaper would round the sharp edges.



Inserting blocks into rotary device

Filing grooves in blocks

Step 6: When done I found the blocks were somewhat fuzzy. This is probably because I used a soft hardwood (basswood). A harder wood would probably have turned out better. This fuzziness was easily removed by rubbing the blocks gently in a wash rag. Using a miniature V-shaped file, I filed a groove around the block. See Photo 187.

The rotary device as used in this operation is not recommended. As mentioned this was a brand new device used in an experiment; however, the device did not perform very well. The sanding paddles in the device did not remain firm; instead, they tended to break easily. After using the device for all the required blocks, the entire insides of the device had to be restored to its original condition by replacing the wood and sandpaper, which should have lasted for a much longer period of use. I am confidant however that with some modifications and further testing this device should produce some nicely sanded blocks.

If you do not use the rotary device, the same thing can be accomplished by using small sanding sticks by hand – it just takes longer.

This is only one method of making your own blocks. Elementary texts on model shipbuilding describe several other methods.

Rigging

Use light brown or tan thread for the running rigging, with #30 thread for the upper lines and #20 thread for the lower lines. Be sure to beeswax all rope. Follow the rigging plan as closely as possible, and use the series of photos that follows for details.

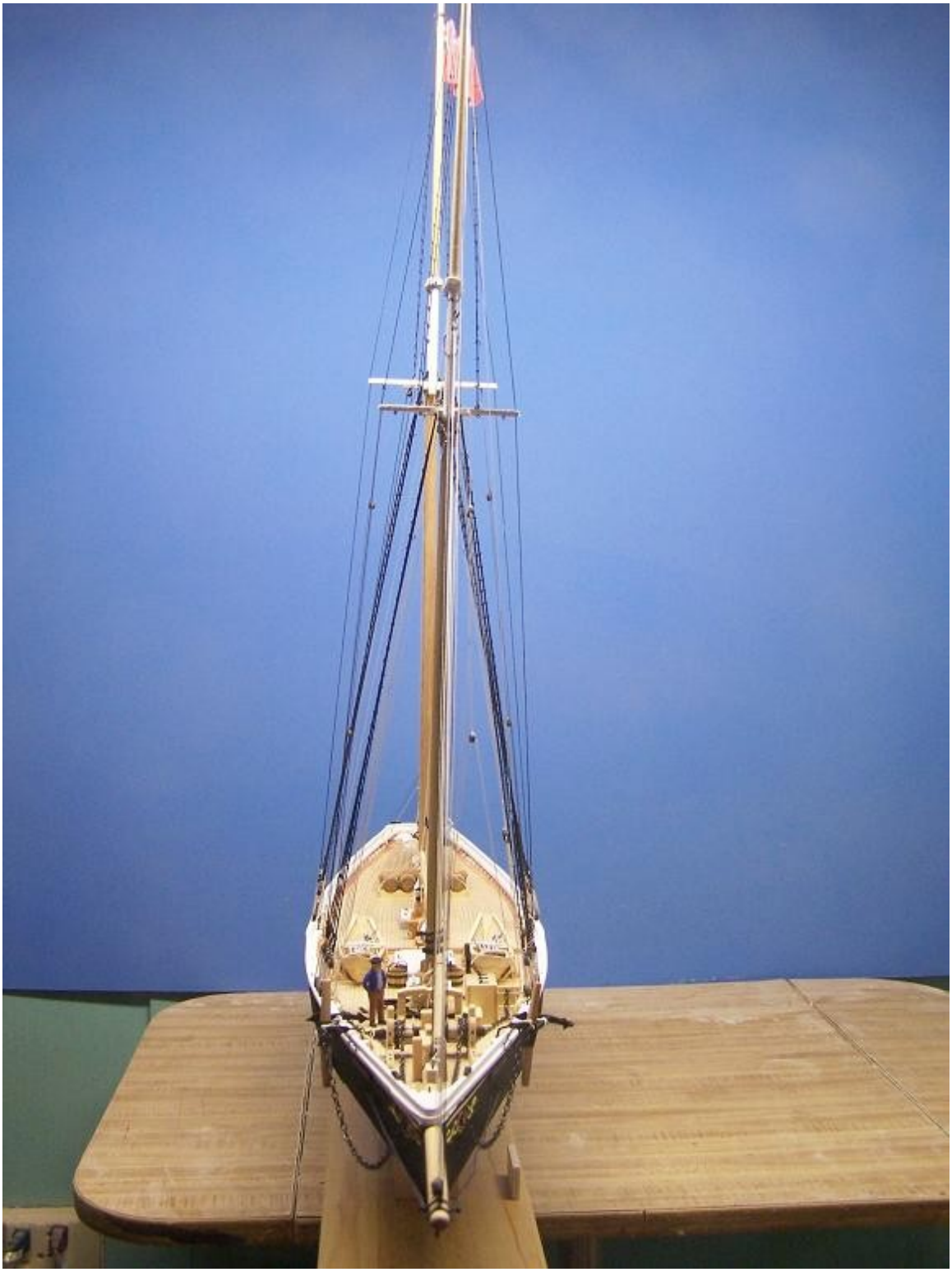
Finishing touches

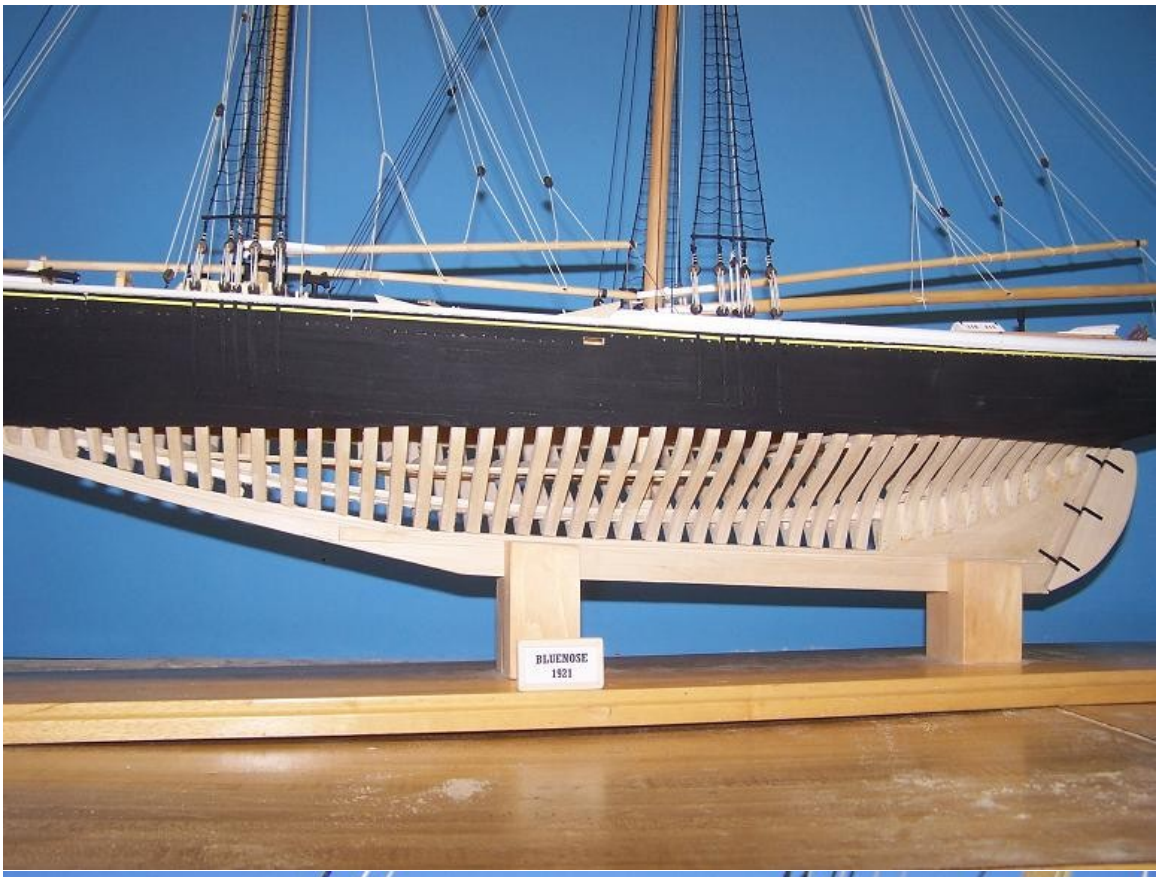
Add a pre-1967 Canadian flag at the main topmast.

Add a nameplate.

Add a few figures to give the viewer an idea of the vessel's scale.

The completed *Bluenose* appears in the following series of photos.




BLUENOSE
1921


BLUENOSE

Appendix

Material List

- 3 sheets 1/32" x 6" x 24" wood
- 6 sheets 1/16" x 6" x 24" wood
- 8 sheets 1/8" x 6" x 24" wood
- 3 sheets 1/4" x 6" x 24" wood
- 2 36-inch lengths of 3/8" birch doweling
- 1 36-inch length of 1/4" birch doweling
- 1 36-inch length of 5/16" birth doweling
- 2 36-inch lengths of 3/16" doweling
- About 3' of 28-gauge black wire
- About 8' of 22-gauge black wire
- DMC Cebelia cotton thread in sizes #10, #20, #30, and #80
- About 2' fine chain
- About 2' heavier chain
- Paint and/or stain of your choice
- Board suitable for a stand

The following is a letter from Smith & Rhuland Ltd. in response to a modeler in 1970 inquiring about the colour scheme of the Bluenose. This colour scheme as noted on page 2 of the letter- was standard for schooners of this period built at Smith & Rhuland Ltd.

P. O. BOX 580

PHONE 634-4461

SMITH & RHULAND LIMITED

COMMERCIAL AND PLEASURE BOAT BUILDERS

CONTRACTING & REPAIRING

LUNENBURG, — NOVA SCOTIA

March 18, 1970.

[redacted]

Dear Sir:-

We list below the color scheme of the original "Bluenose", as requested in your letter of March 10.

(1) Cabin Sides - White
(2) Sills and Top of Cabin - Light Gray
(3) Pin Rails - White with Varnished edges
(4) Ratchet Supports - White, Varnished tops
(5) Winch Supports - White, Varnished tops
(6) Dories - Buff or Midtan
(7) Masts - These were oiled and appeared to be varnished
(8) Booms - Same as masts with White Jaws
(9) Decks - Oiled resembling varnish
(10) Mast Hoops - Varnished
(11) Stanchions and Inside Bulwarking - White
(12) Waterways - Gray
(13) Forecastle House - White with varnished corner Posts
(14) Bowsprit - Oiled resembling varnish
(15) Mast Head - White
(16) Crosstrees - White
(17) Top Masts - Oiled resembling varnish
(18) Wheel Box - Top White, Sides varnished and Sills Gray
(19) Rails - White Top, Varnished edges
(20) Hatches - Gray with White hatch covers
(21) Cabin Slider - Top white, Runners Varnished
(22) Hull - Topsides - Black
Bottom - Red Copper
Waterline - 3" Wide Boot Top

P. O. BOX 580 PHONE 634-4461

SMITH & RHULAND LIMITED

COMMERCIAL AND PLEASURE BOAT BUILDERS

CONTRACTING & REPAIRING

LUNENBURG, — NOVA SCOTIA

--2--

We hope that we have not confused you too much in colors but this is the way they were painted in those days.

Wishing you all success in building your model.

Yours very truly,

Fred A. Rhuland.

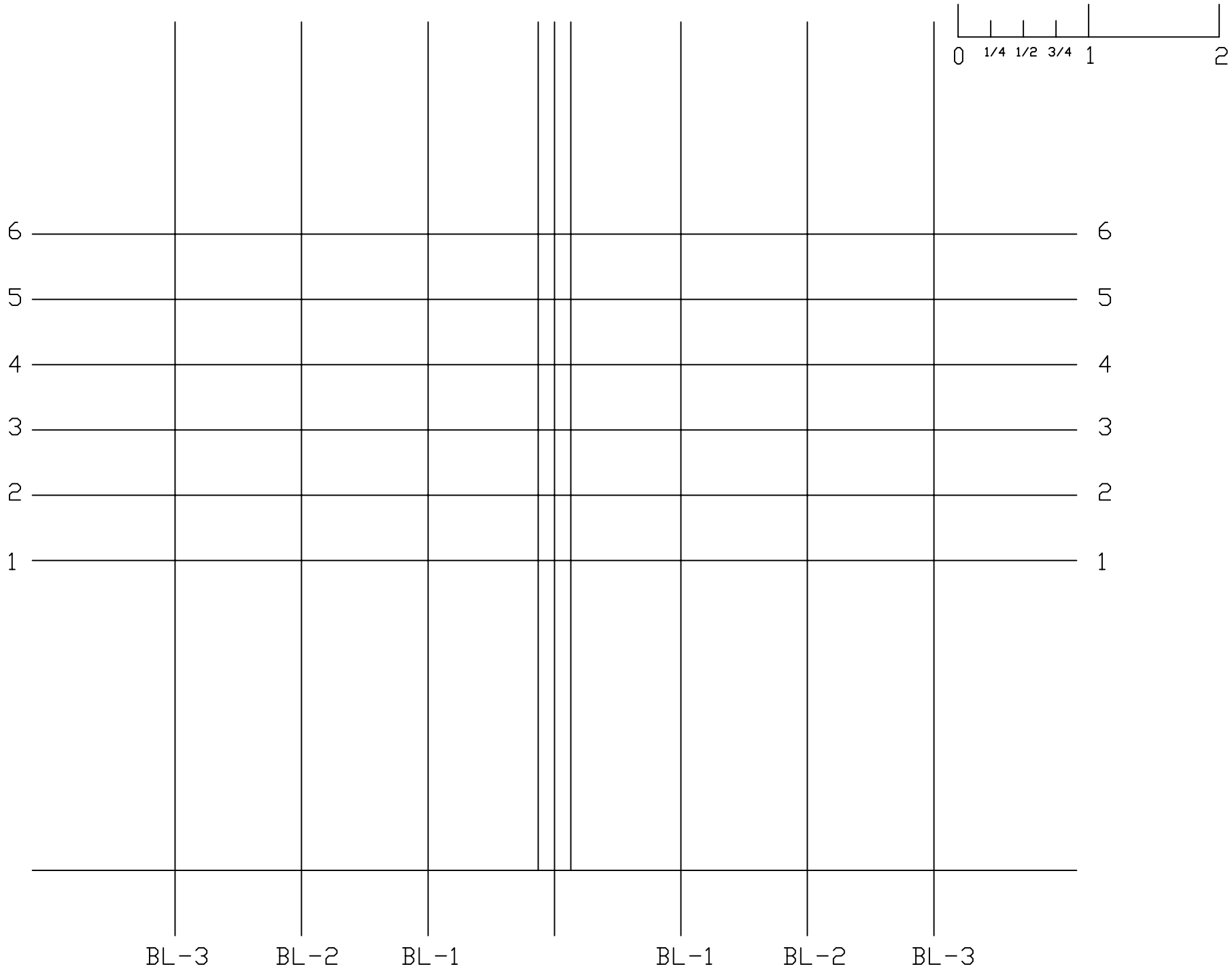
FAR:sk

Framing Grid

The framing grid on the next page is provided for your convenience for drawing your frames.

CAUTION

Not all printers print the same way. Before using this page, print one page and confirm that the scale is correct. **If the scale varies in any way do not use this page.**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