

# Instruction Manual



**MODEL SHIPWAYS**  
• QUALITY KITS SINCE 1946 •

## Modeling an **18<sup>th</sup> Century Armed Longboat**

**1750 - 1760**



Instructions and model  
prototype prepared by

**Ken Foran**

Kit No. MS1460  
Scale: 1/2" = 1 ft. 1:24  
Overall Length: 26"  
Height: 17"

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## **Nautical Boat Terms.**

**Aft:** At, in, toward, or close to the rear of the boat.

**Belaying Pin:** a wooden pin used to secure a rope fastened around it.

**Block:** Oval wooden blocks with sheaves (pulleys) for rigging ropes and tackle.

**Boom:** A long spar on which the foot of a fore to aft sail is extended.

**Bow:** The front of the boat.

**Bowsprit:** The slanted spar at a boat's bow jutting out in front of the boat.

**Bulkhead:** A partition or dividing wall within the hull of a boat.

**Deadeye:** Round wooden block with holes to setup the boat's stays.

**Gaff:** Spar on which the head of a fore to aft sail is extended.

**Gudgeons:** Metal sockets into which the boat's pintles fit which are secured to the hull.

**Halyard:** Rope or tackle used to raise and lower sails.

**Hull:** The body of the boat defined by planks.

**Keel:** The main longitudinal timber of the hull, upon which the frames are mounted

**Keelson:** Lengthwise wooden beam in boat for bearing stress.

**Knees:** Carved braces located to reinforce the hull.

**Main:** The longest mast located in the middle of boat.

**Oarlock:** A contrivance to act as a fulcrum for oars.

**Parrels:** A band of rollers that attached the boom to the mast.

**Pintles:** Fixed hinge pins secured to the rudder to enable the rudder to pivot.

**Port:** The left side of the boat when you are facing toward the bow.

**Rigging:** Ropes, chains, and tackle used to support and control the masts and sails.

**Rudder:** A flat piece of wood at the stern of the boat used for steering.

**Risers:** Boards affixed to frames that run the length of the hull supporting the thwarts.

**Sheer:** The fore-to-aft curvature of the boat from bow to stern.

**Shrouds:** Ropes supporting the mast from the mast head to the sides of the boat.

**Stay:** Large ropes used to support a mast.

**Stern:** The rear part of a boat.

**Starboard:** The right side of the boat when you are facing toward the bow.

**Stem:** The foremost section of the keel into which planks are indexed.

**Sternpost:** An upright beam at the stern bearing the rudder.

**Tiller:** Handle or lever used to turn the rudder.

**Thwarts:** Boards that form seats across the width of the boat supported by risers.

**Transom:** Transverse planks affixed to the sternpost and forming part of the stern.

**Treenail:** Long wooden pegs used to affix planks to frames of the hull.

## Before You Begin to Build

At 1/2" = 1' 0" (1:24) scale, it is relatively easy to build this Longboat model and obtain precise detail. Laser cut parts offer a simple building method. Britannia (white metal) parts eliminate creating metal parts from scratch. If new to ship building planking and carving skills will be learned and developed.

Before starting the model, carefully examine the kit and study the plans and the assembly Instruction Manual. First, determine if all the listed kit parts are present using the Plan Parts Layout sheet and instructions. Handling the parts will produce a better understanding of the kit's building requirements. Try to visualize how every piece will look on the completed model. Also, try to follow the building sequence and what must be completed first, or ahead of time and what can be done simultaneously if you wish. For example, you may want to skip to the mast construction as you are working on the hull or waiting for glued assemblies to set or paint to dry.

**The Plans:** Plan sheets are provided for reference and part identification and may not be exactly true to scale due to the reproduction process. These drawings show elevation views, a parts layout with color guide for some parts. Review and study the plans and assembly instructions prior to starting the build to better understand how the parts will come together and the proper build sequence.

**Make Allowances:** Try to be exact when following the instructions, but use common sense. Adjustments may be necessary to compensate for small differences in how your model is shaping up and how the parts are relating to each other. An old saying in the model building craft is that "if it looks right, it is right." Also check the photographs for various details before working on them.

**Kit Lumber:** Laser cut Basswood parts are supplied in the kit. A word about laser cutting: a common misconception is that the parts should punch out of the carrier sheet. This is not so. Laser cut parts are retained in the carrier sheet by small bridges of uncut wood called tabs. Tabs can be oriented parallel to the grain or perpendicular to the grain. It is always better to cut through these tabs rather than try to punch out the parts by breaking the tabs. You may have to cut through not only the tabs but portions of the part outline that did not cut completely through the sheet. Turn the carrier sheet over and cut from the backside to release the part without damage.

**Britannia Metal Parts:** There are Britannia (white metal) parts in this kit. First, remove any mold joint flash with a #11 hobby blade using the back edge as a scraper, then file or sand with fine sanding stick or sandpaper. **Important: Always dry fit parts together first to determine if holes need to be drilled further or if mating surfaces are flat to each other.** Once parts have been dry fitted wash parts in dishwashing liquid and warm water to remove traces of mold release agent and the body oils your fingers may deposit. Allow the parts to dry thoroughly before applying primer and painting. Try to avoid painting, whenever possible, surfaces to be glued together, or locating pins that insert into holes. Due to the molding process used; some deformed parts may be received, or filled in holes that will have to be drilled. These can be straightened by **gently and slowly** reforming with your fingers. Check with the plans and photographs to verify the reforming of the part(s); every effort was made to reproduce the parts accurately but some deforming may occur during shipping due to the weight of the parts themselves.

**Photo Etched Parts:** An etched brass sheet of decorations are included in the kit. Sand the surfaces carefully with fine sandpaper to remove surface oxidation. Care must be used to cut these parts from the carrier sheet using the tip of a hobby knife blade on a hard surface like steel or small scissors/snips.

**Dowels:** Quality dowels are provided for the mast and booms. The best way to taper is by hand using a sharp #11 hobby knife blade in conjunction with sandpaper and sanding block and slowly working back and forth with them. It is much better to use small short cuts with the blade so as not to gouge the dowel. Also due to wood grain there is an easy way to cut and a harder way to cut down the length of the dowel. When starting to cut and it is difficult with gouging turn the dowel end for end. **Do this as a test before cutting dowels** to length for a part. A dowel can also be tapered by chucking it into an electric drill as the speed of the drill turns the dowel, use sandpaper to shape and taper.

**Glues:** Super glues, such as Jet, Flash, or Zap, produce quick adhesion. For most applications, the medium viscosity, gap-filling variety is best allowing a little time for final positioning. The thin type is recommended for filling a narrow crack, wicking into laminated tight joints and seizing rope ends to make “needle” points. These instructions will refer to super glues as CA (cyanoacrylite). For the majority of wood glue joints it is best to use Yellow Wood glue like Titebond which is easier to sand than CA which hardens the wood. A mix of 50/50 white glue and water is used on rope seizing and rope knots, which will remain flexible rather than CA which will harden rope, and CA should only be used on rope work very sparingly.

A word about gluing laser cut parts. Laser cutting burns through the wood and leaves a charred surface. This charred surface sometimes does not make good strong glue joints. It is recommended to lightly sand or scrape away the loose char before gluing. It is not necessary to remove all the char, unless a finished wood surface is required. In some cases simply scraping with the back edge of a # 11 blade is sufficient.

### **Building Tips and Suggestions before Starting to Build**

- Read assembly instructions, study the pictures and review the plans to understand and familiarize yourself with various parts and components and how they relate to each other.
- Check parts list to make sure you have all the parts listed.
- Verify that you have all the tools and materials needed to start the build. See the materials list and suggested tool list. A variety of clamps is essential see the recommended numbers.
- Try to follow the suggested build sequence outlined in the assembly instructions.
- Pay attention to steps that are **BOLD** face type. These are critical actions to avoid problems with assembly or when extra care is needed.
- Parts are **Capitalized** and **Boldface** on purpose for emphasis and identification when reading and easy reference.
- Cast white metal parts in some cases are delicate due to replicating in 1/24th scale. Extra care and caution is required when cleaning, filing parting lines and adjusting to dry fit.

- Prime, paint and dry fit all cast parts prior to assembling. Keep primer and paint to a minimum to keep fine details crisp. When dry fitting parts if excess paint is an issue scrap off paint as needed for a good fit. Fill any casting voids with putty if required and then sand and prime.
- When carving with a hobby knife blade remember that a slicing action with the blade will net better smoother results. Work with sharp blades.
- Take your time, learn and enjoy the build process as much as the finished model.

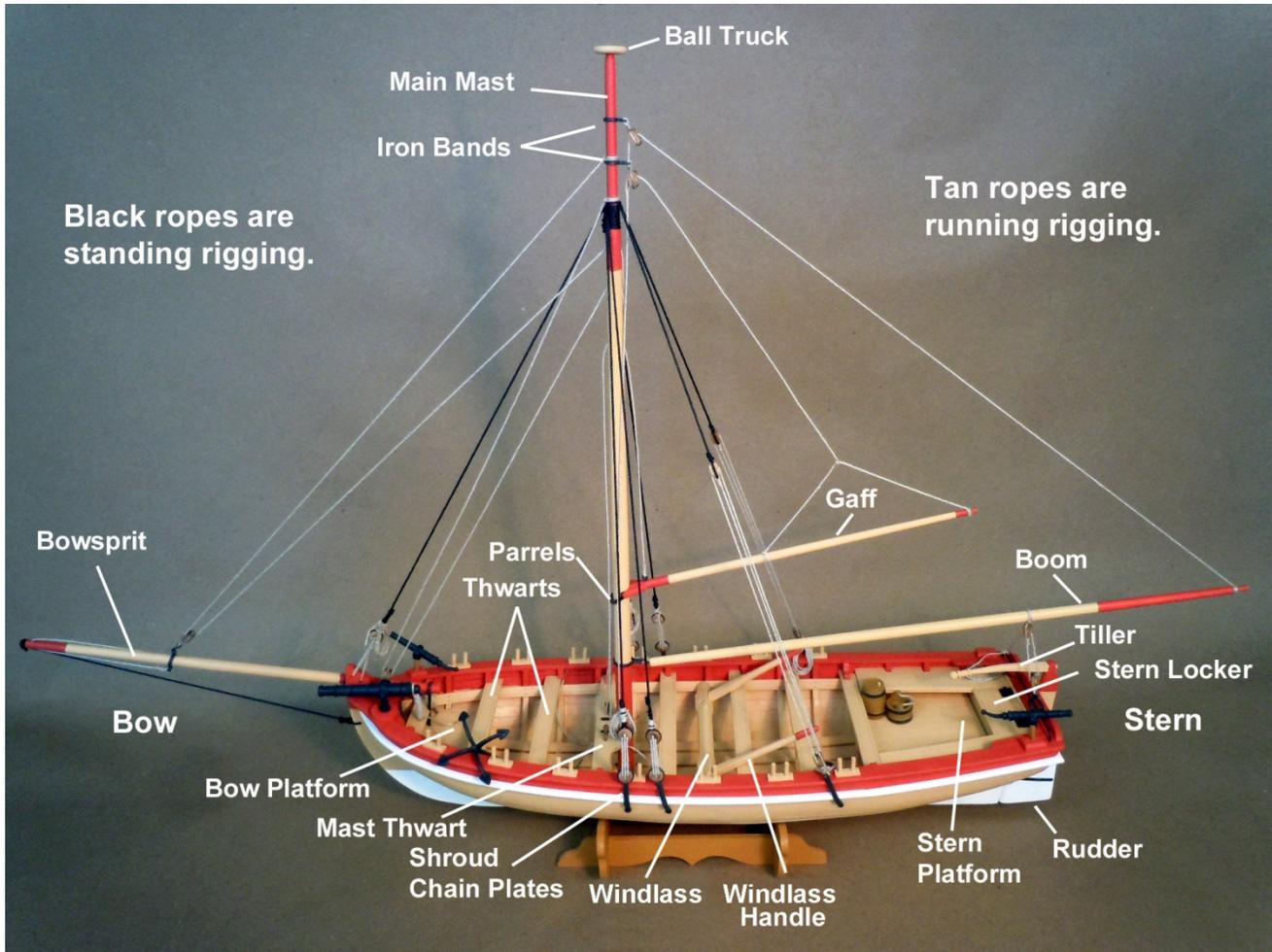
**Building Strategy** – Before starting to build think about which build strategy would be best for you to follow. One approach is to clean, file, dry fit and paint all parts before starting assembly; the other approach is to clean, file, dry fit and paint sub-assemblies as needed. The following instructions will work for either approach. Perhaps the deciding factor is really how much space you have to work in and being able to organize all the parts at once. Regardless of the approach, the following instructions will address sub-assemblies of components to be worked on and then set aside for later assembly.

**Materials that will be needed:**

- Medium CA –Small Bottle
- Thin CA – Small Bottle
- 1 small bottle of Yellow Glue.
- 1 small bottle of White Glue.
- Fine sand paper or sanding sticks.
- 1 Bottle MS 4802 Gun Carriage Red
- 1 Bottle MS 4828 Iron Cannon Black
- 1 Bottle MS 4829 Yellow Ochre
- 1 Bottle MS 4831 White
- 1 Bottle MS 4839 Primer
- 1 Bottle MS 4972 Natural stain.
- 1 Bottle MS4973 Pre-stain Wood Conditioner
- #2 and #7 Round paint brushes.
- 10/0 spotter paint brush for touch up.
- 1/2” Flat brush.
- 1 spray can of Matte Finish.
- Small can of Acetone – if needed to debond glue.
- Card stock 4- sheets for creating part templates.
- 7mm Nails – 12
- Small pins/ T-pins available at Craft Stores.

**Suggested tool list:**

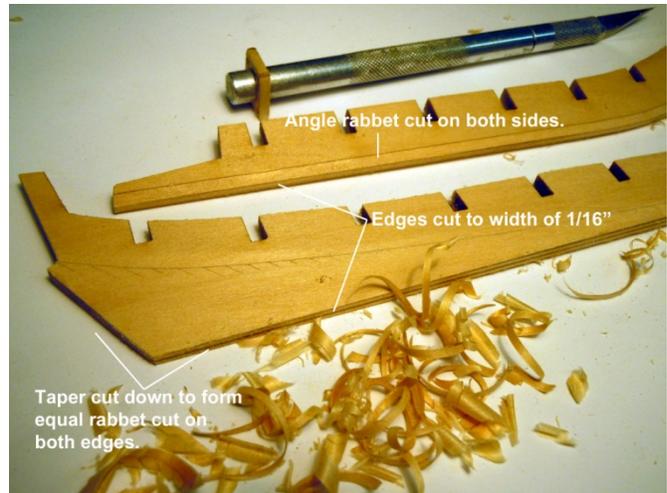
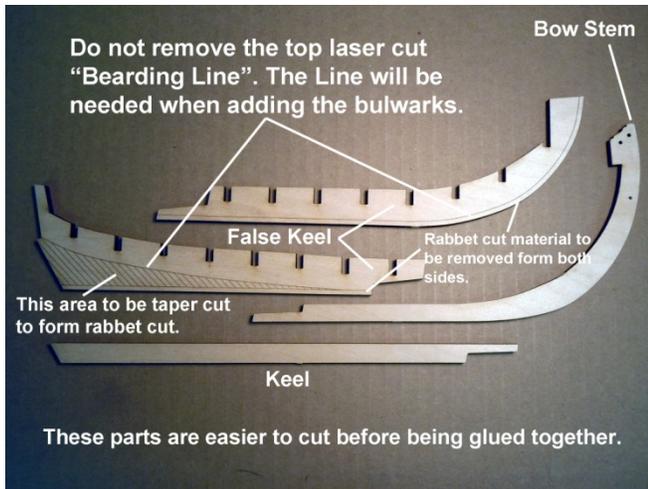
- Hobby knife blade holder.
- #11 blades - 12- 18 as needed. 1 chisel blade.
- Small needle nose pliers.
- Small end cutters.
- Tweezers – straight and bent.
- Medium size Mill Bastard file.
- Needle files. Flat , Half Round, and Square
- ScotchBrite pad- Fine and Medium.
- Sanding paper/stick – 80,100,120,220 grits.
- Small binder spring clamps – 18 to24.
- Set of small reams to clean holes.
- Small Square.
- Several round toothpicks.
- Wax paper.
- Masking tape- automotive low tack or roll of Black electrical tape.
- Pin vise for drill bits.
- Drill Bits 1/32”; 3/64”;1/16”; 1/4.”
- Mechanical Pencil .05 lead sizes.
- Small 4” bar clamps – 2 to 4
- Metal spring clamps- 2 to 4
- Small Plastic clamps – 10 to 12
- Small package of Clothes pins.
- A variety of flat rubber bands.
- 1 Stainless steel pick – bent ends.



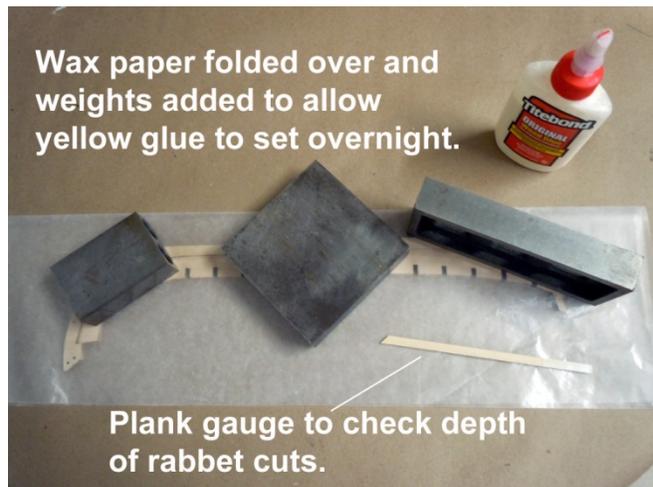
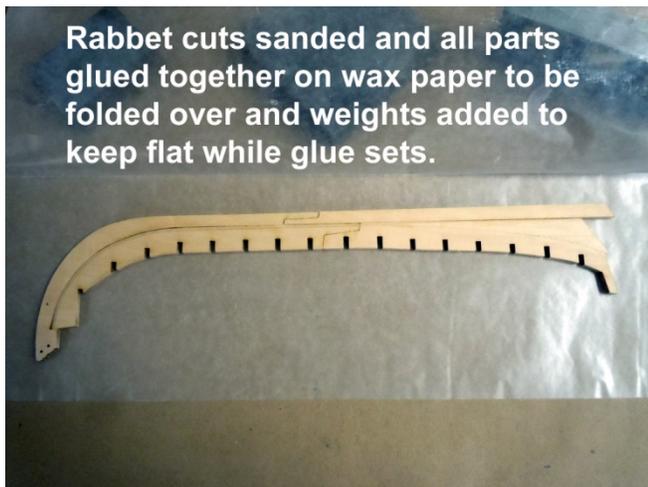
## 18<sup>th</sup> Century Armed Long Boat Building Instructions

**Hull Bulkheads:** Remove the four (4) **Keel** and **False Keel** laser cut parts from the 3/16" carrier sheet. Carefully sand the laser char from all edge surfaces to clean wood and take care not to remove too much material. Dry fit them to understand how they fit together. Draw 1/16" spaced lines on the bottom 3/16" surfaces of the two (2) **False Keel** parts. Next trace the curved shaded area along with the rabbet line to the opposite side using a small piece of tracing paper so that the laser cut guidelines are duplicated on both sides.

Now very carefully carve the Rabbet Cut (see detail on Plan View Sheet) using the laser cut and traced pencil lines as guides. **IMPORTANT do not cut away the laser cut "Bearding Line", it will be needed later to set the Bulkheads.** These cuts will be filled with planks later. The cut widths on the bottom surface should be equal the length of both parts as seen in the photos. Once cut with the knife a small file will smooth the cuts. **IMPORTANT these cuts are critical so use care to get them equal on both sides and bottoms.**

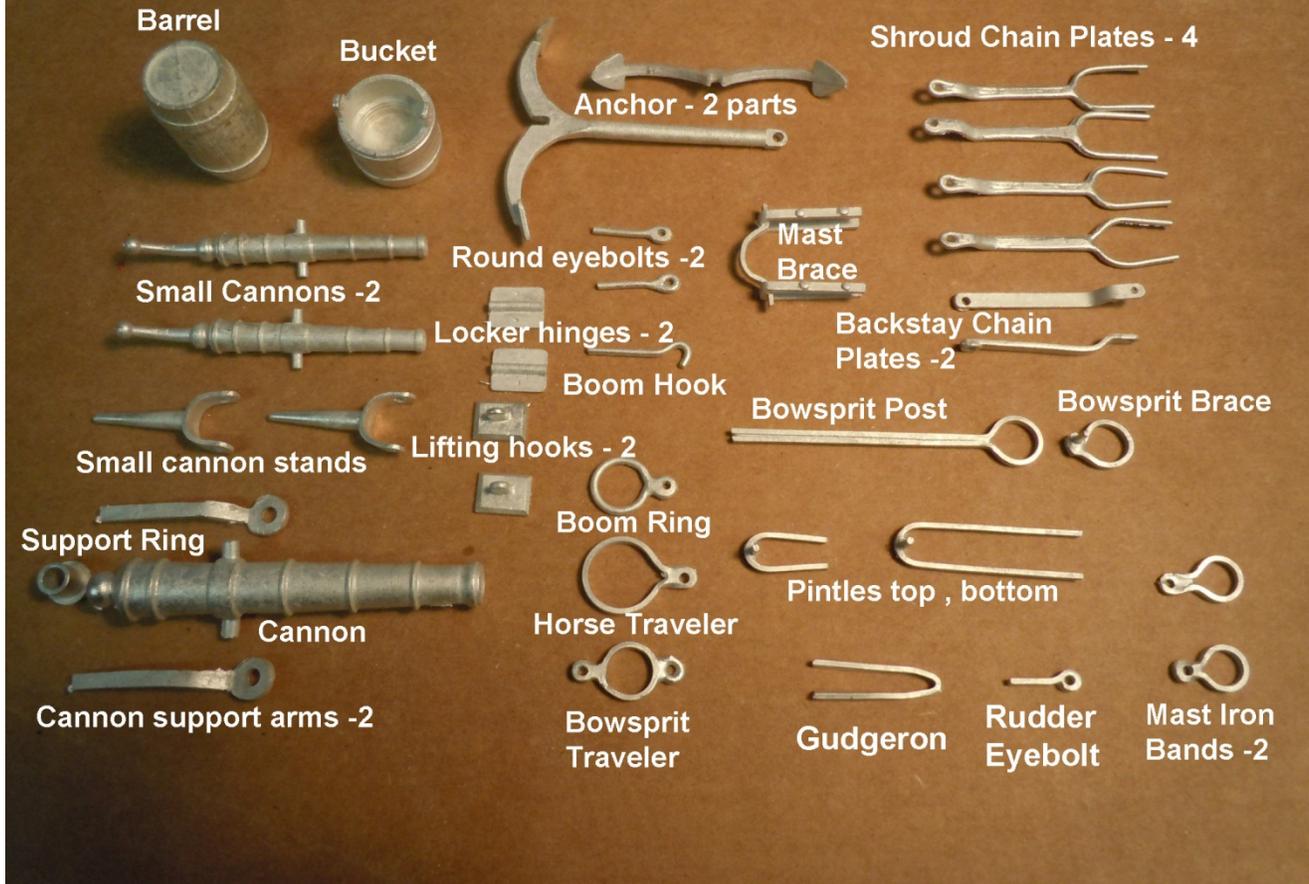


Once satisfied with the rabbit cuts it is time to glue all four (4) parts together. Obtain an 18" length of wax paper and fold it in half lengthwise. Working on a hard flat surface place the parts on one half of the wax paper; glue will not stick to the wax paper. Now apply wood glue to the 1/16" edge of the bow section of the **False Keel** as well as the forward to edge that touches the **Keel**. Place in position against the **Keel** making sure all surfaces touch. Next apply the wood glue to the indexing edges of the **Keel** and insert into position of the previous parts. Now add glue to the 1/16" edge of the stern section of the **False Keel** and add it into position and press into place making sure all surfaces make contact. Now with a damp paper towel and a pointed scrap piece of wood scrape away any excess glue in the rabbit cut. Once one side is clean carefully flip the assembly over and clean the other side. Once cleaned fold the second half of the wax paper over the assembly and weight them down with heavy objects and allow to set for a couple of hours to be flat.



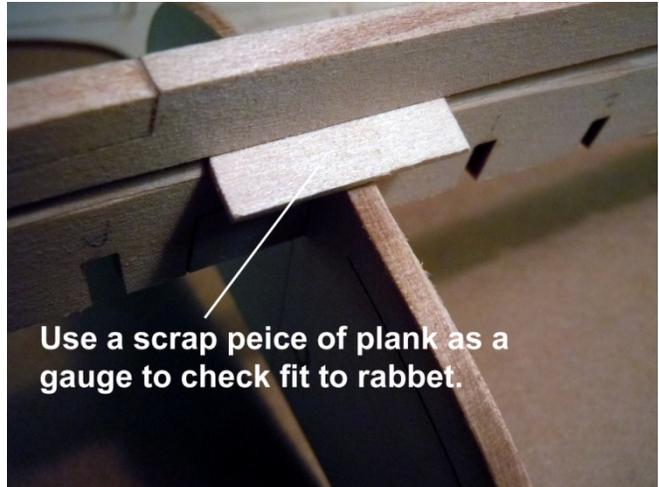
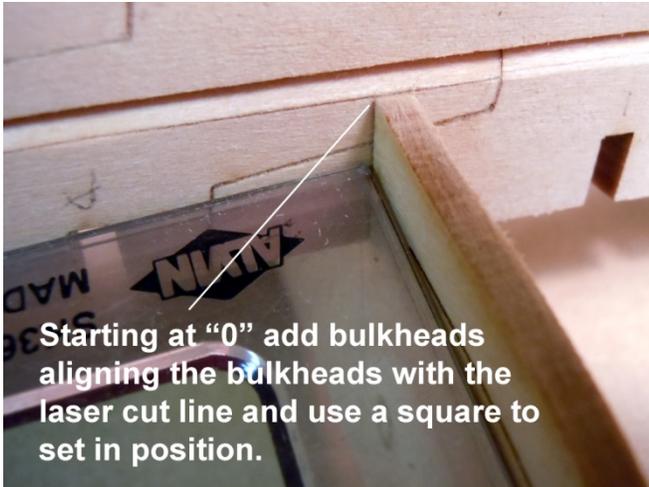
Now would be a good time to paint all the cast metal parts while waiting for glue to set on **Keel** parts. Metal parts **MUST be primed** first for good paint adhesion. Set painted parts aside once painted for later assembly. **Note:** glue with medium CA the two (2) **Anchor** parts together before priming and painting. Some of the small parts may have holes filled during casting; check and drill holes as needed. Painting parts now gives ample time for paint to cure and saves time later on during assembly of kit.

# Cast Metal Parts



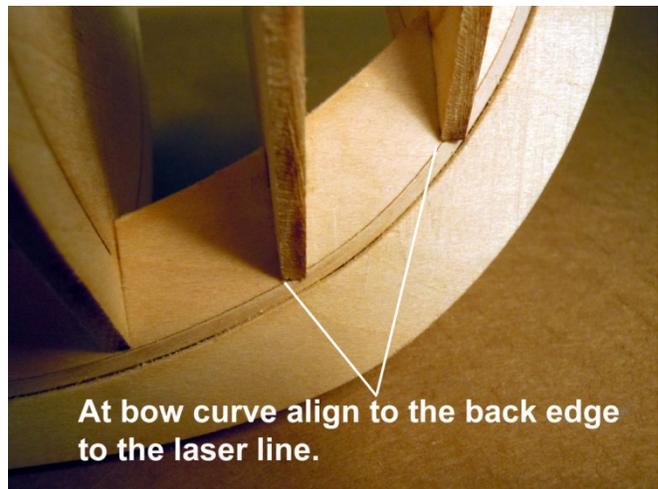
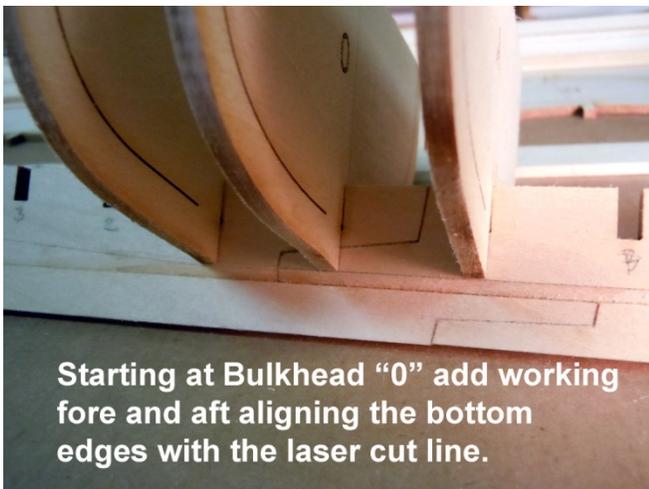
Once the glue has set on the **Keel** parts add the **Bulkheads** in Number and Letter sequence fore and aft from “0”. Numbers and Letters are laser cut just below each slot location on the **False Keel**. Due to sheet size restrictions the numbers are on one side and Letters on the opposite side. **Bulkheads** are all marked as well. Adding the **Bulkheads** is a very critical step to make sure each **Bulkhead** is perpendicular to the **False Keel** assembly and equally parallel to each other with the Numbers and Letters all facing forward towards the bow.

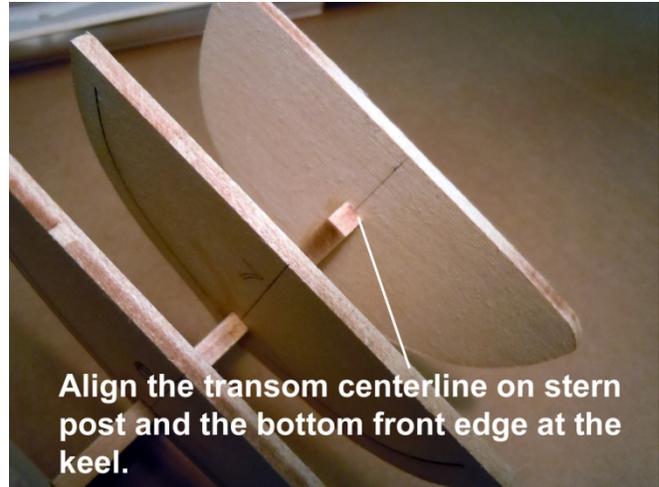
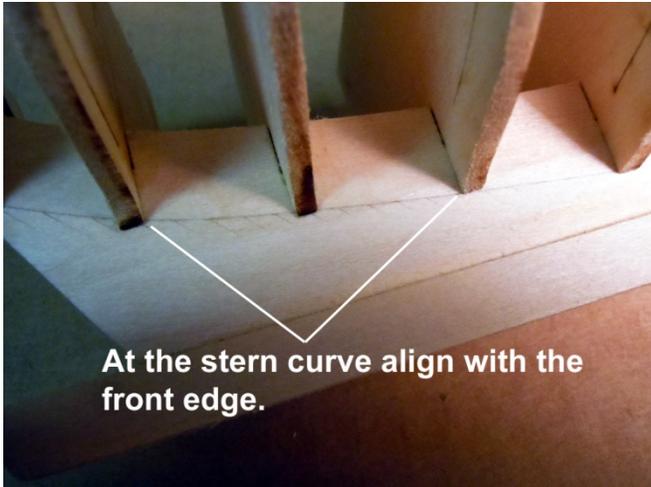
Remove the individual **Bulkheads** from the carrier sheet only as needed; **IMPORTANT** leave the center area attached to the **Bulkhead** and sand the char from the edges and surfaces of the **Bulkhead** portion and dry fit into position with the bottom edge of the **Bulkhead** aligning with the laser cut mark of the rabbet cut. See photo below. Now start with the center **Bulkhead** “0” and clean, dry fit then glue into position using wood glue and a small square making sure to align with the laser cut mark. Allow the first **Bulkhead 0** glue to set since it will be used to position the rest of the **Bulkheads**.



Now add the balance of the **Bulkheads** working fore and aft from the center making sure the **Bulkheads** are parallel to each other when looking down, as well as, looking from the bow across the top edges. **IMPORTANT** The bottom edges align with the laser cut mark and when in the curved bow and stern sections; the stern **front** edges aligns with the laser cut mark, while the bow **rear** edges align with the laser cut mark. If a **Bulkhead** does not match when dry fitting, carefully remove wood from the bottom of the **Bulkhead** indexing notch only. See the photos.

Make sure the "Numbers and Letters" in the center area of the **Bulkheads** all face in the same direction. Work slowly and carefully for it is critical that the **Bulkheads** are in the correct position when adding the planking later on. One advantage of using the Yellow Glue is that it affords a little time for cleaning off of excess glue and aligning each frame as it is added to the previous **Bulkheads**. Also if a **Bulkhead** is found later to be out of alignment and the glue has set, just soak the joint with Acetone and it will loosen the joint. Remove the **Bulkhead**, clean and sand if necessary and re-glue into proper alignment. The Acetone will take a little time to work to debond and may need additional applications.





Next add the **Transom**, but first lightly mark a centerline from top to bottom on one side and transfer the center mark on the bottom edge of the opposite side for aligning and glue in place. See photo above.

Once the glue has set on all the **Bulkheads** to the **Keel** assembly, add a working "Strong Back" brace down the center of the top of the **Bulkheads**. Use a 1/8" x 1/4" x 12" wood strip and carefully dry bend to match the top **Bulkhead** edges. Once formed cut one end to match the angle of the **Transom**; cut the other end at a 45 degree angle and do the same to a second piece and glue them end to end and allow the glue joint to set. Then cut to length at the stern edge of the bow **Bulkhead H**. Glue the working brace in place down the center of the top edges of the **Bulkheads** and to the surfaces of **Bulkhead H** and the **Transom**. Two rubber bands indexed on two **Bulkheads** and over the working brace will hold until the glue has completely set. This working brace will stabilize the **Bulkheads** for the stresses to come during the planking process. See photo below.



Remove the laser cut **Bow Fillers** from the carrier sheet and sand the two straight edges to remove the laser char. Then very carefully carve an angle on the curved edge to match the laser cut line along the rabbet edge. There will be a left and right so make sure to carve the correct curved edges. Do one at a

time and dry fit to test as carved edge is developed. Glue to **False Keel** but not to the center area of the **Bulkhead H**. See photo above.

Next the **Bulkhead** edges need to be faired (blended) to define the hull shape for planking. Fairing the bow and stern sections is best accomplished by first carefully trimming the **Bulkhead** edges with a sharp hobby blade and then careful sanding with a sanding block across two or three **Bulkheads** at a time working toward the flatter center areas. Sand and blend slowly using a plank strip to check the progress of blending. The picture below shows the completed hull framing ready for planking.



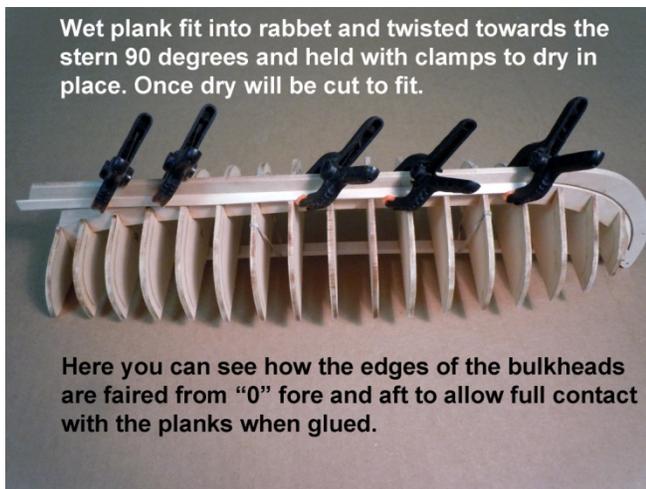
**Hull Planking:** A word about clamps, you cannot not have too many clamps, as well as a good assortment of rubber bands. Above is a picture of the various types of clamps used during the planking of the hull and more will be discussed later before the actual planking.

Now onto the more challenging step of hull planking; with the challenging part being that the planking will be seen both inside and outside thus requiring tight fitting joints. The best technique for this is to edge glue the entire plank edge joint to the next plank using Yellow Glue. Yellow Glue provides time to set the plank in place with clamps and more importantly can be easily sanded and does not harden the wood like CA would. The majority of the kit planks are 1/16" x 1/4" x 12" and thus requiring end butt joints as well. Tight strong butt joints are done by cutting the two ends to form a scarf joint at 45 degrees for extra glue surface and indexing when being added. A small plastic container or drinking glass with hot water will be needed to soak the ends of planks to be formed by hand to conform to the **Bulkheads**. Wood absorbs water up the end grain, so the longer in the hot water the more water is absorbed and makes the wood strip more flexible. This is what is needed to be able to form the curved bow planks. Edge bending will also be needed for some planks; this can be done by placing a wet plank on a flat surface and slowly bend the edge of the plank while pressing down flat on the surface while bending. All bending and forming should be **done very slowly** allowing the wood fibers yield slowly while being formed. Planking should be started at the bow indexing tightly into the bow rabbet and then work to the stern with indexing 45 degree joints as needed when additional planks are added. For ease of planking, the planks are numbered 1 thorough13 in the suggested sequence that they should be added with the **Garboard Strake (the first plank against the keel)** being number 1 at the **Keel**. See photos and Plan Sheet.

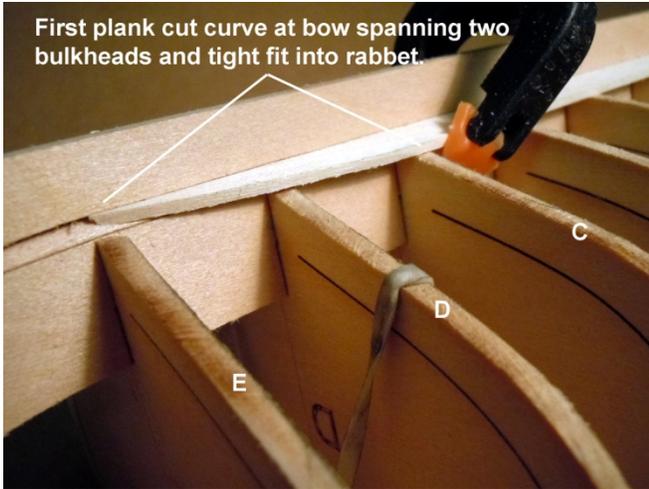
**Note: Save all plank cut off parts to be used later to make the Bow and Stern Platforms.**

Before starting to plank make at least twelve (12) 3/4" spring binder clamps with 1/8" x 3/16" x 1 1/8" pieces of strip wood super glued or epoxyed to the inside of the spring binder clamps; or remove the spring handles from one spring and add them in the center of another spring to provide a clamping surface. Have at least 6 small plastic clamps and 2 or 4 small bar clamps. Combinations of these clamps will be needed to hold wet planks in place to the **Bulkheads** for both forming and then gluing in place. A few wide rubber bands will also be needed. One can never have too many various clamps or types of rubber bands. See photos above and below.

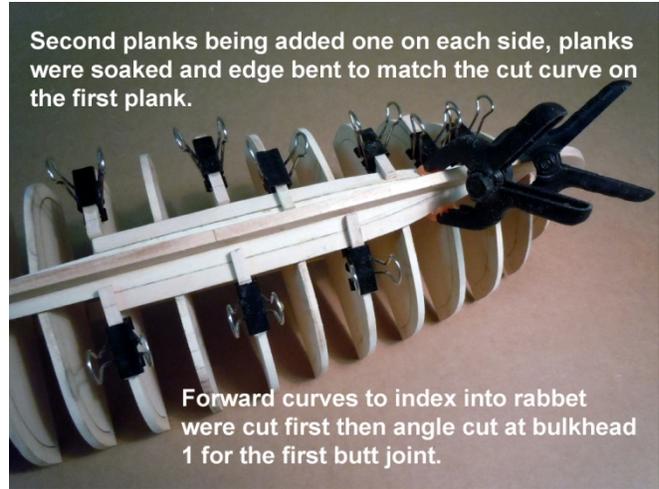
Soak four (4) 1/16" x 1/4" x 12" planks in hot water for about 10 minutes. Now start planking at the **Keel** by cutting an angle from the dry end corner 1-3/4" down to the opposite side of the plank. Then at the center of the line add a 1/16" mark and then draw an arcing curve from the center point to the ends of the angled line. Now cut the curve. Test fit to the rabbet with the cut curve pointed end aligning with "**Bulkhead E**" and slowly twist the wet end to mate to the **Keel** and clamp in place along the length and allow to dry in place. Once dry, the edge of the plank against the rabbet needs to be chamfered (cut at an angle) to fit into the rabbet. Carefully cut and sand the edge to the angle needed to fit into the rabbet. Once satisfied with the fit glue the plank in place with glue in the rabbet and enough on the frame for the width of the plank. After the glue sets cut the stern end of the plank to match the **Stern Post**. Repeat by adding the corresponding plank on the other side of the **Keel**. For best results always add the same planks two at a time, one on each side of the hull. The first plank is called the **Garboard** and should look like this. See photos below.



The second set of planks to be added will have the curve cut at the bow, edge bent to match the **Garboard** already in place and the end angle cut for a joint at "**Bulkhead 1**". The angle cut for the joints should be cut stern to bow at 45 degrees to create an indexing notch for the next plank end to form a scarf joint. Once dry enough for gluing darken the edges with a pencil to accent the joint line before gluing in place. Darkening all the plank edges should be done for all planks moving forward. Darkening helps emphasis the tarred joints on the real boats.

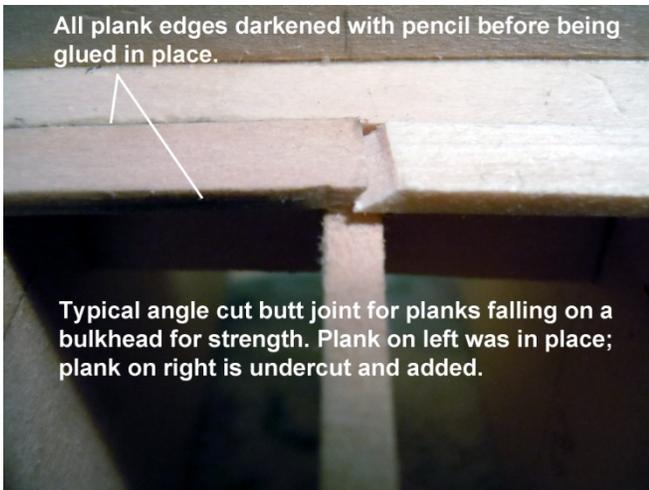


First plank cut curve at bow spanning two bulkheads and tight fit into rabbet.



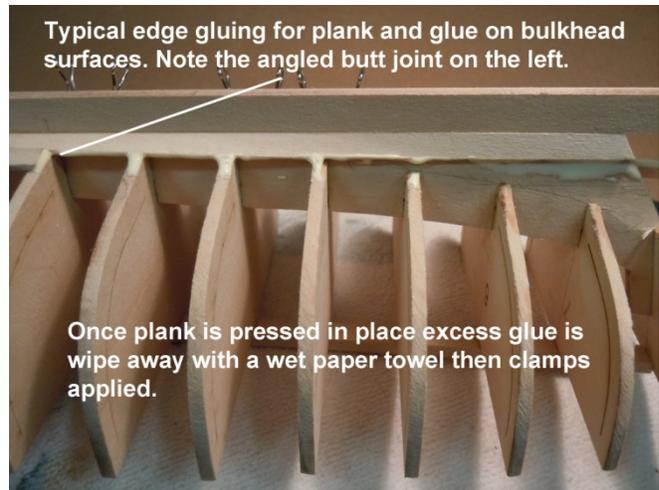
Second planks being added one on each side, planks were soaked and edge bent to match the cut curve on the first plank.

Forward curves to index into rabbet were cut first then angle cut at bulkhead 1 for the first butt joint.



All plank edges darkened with pencil before being glued in place.

Typical angle cut butt joint for planks falling on a bulkhead for strength. Plank on left was in place; plank on right is undercut and added.



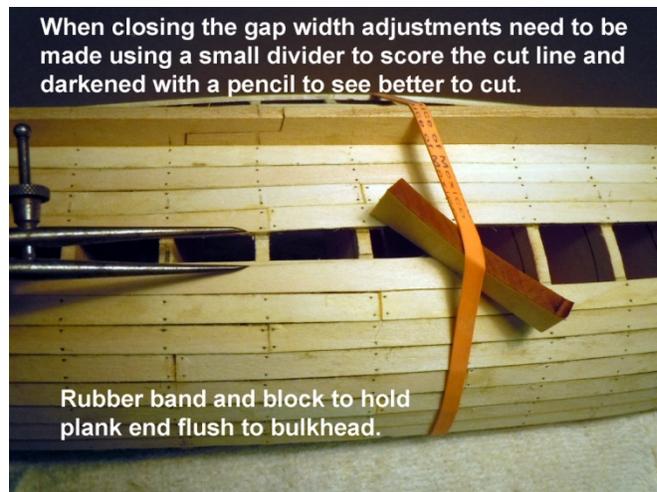
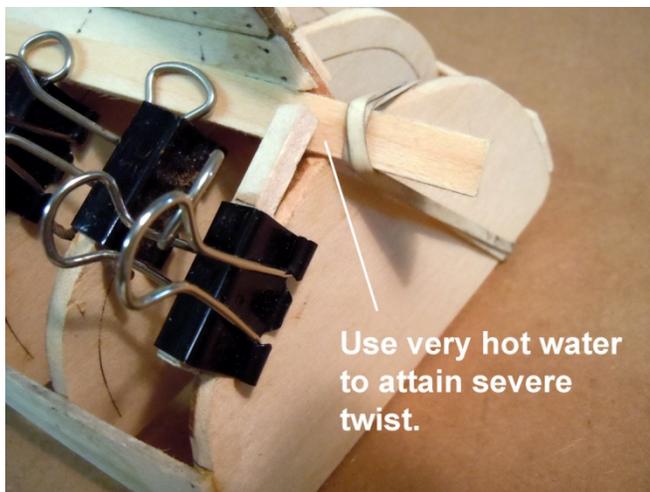
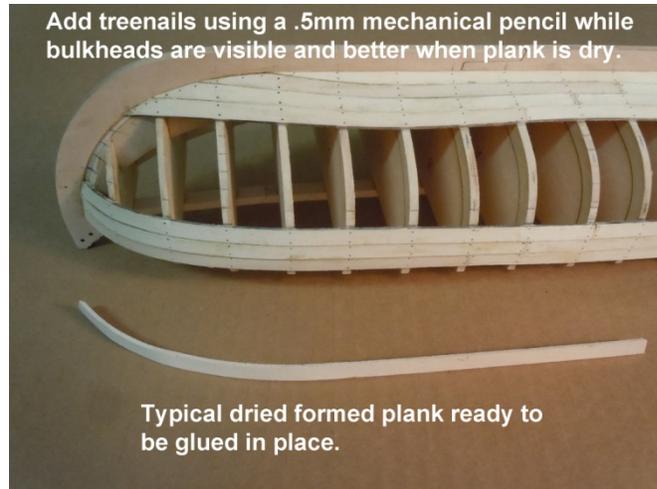
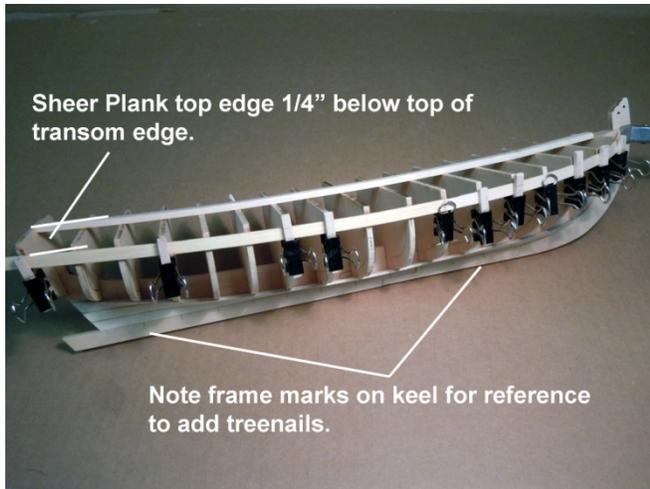
Typical edge gluing for plank and glue on bulkhead surfaces. Note the angled butt joint on the left.

Once plank is pressed in place excess glue is wipe away with a wet paper towel then clamps applied.

Next add the third set of planks using the same method as used for the second set of planks. Now is a good time to add the treenail marks (pegs on real boats) in the planks while waiting for wet planks to set or glue to dry and the **Bulkhead** edges are visible. Use a Pentel P205 mechanical pencil with .5mm lead size and press straight down so as not to break the lead and while pressing twist the pencil at the same time in the plank aligned with the center of the **Bulkhead**.

Now with plank cut-offs mark from the lower plank edges 10 plank locations on **Bulkhead 0** up to the top of the **Bulkhead** on both sides of the hull. The very top mark will be where the top edge of the top plank (**Sheer Plank**) will align. Plot and mark with vertical lines on each **Bulkhead** where the butt joints for all the planks will be located on each edge. The joints will stagger a **Bulkhead** for four (4) **Bulkheads** and then repeat. See photo on next page.





With the four (4) lower planks #'s 1, 2, 3, and 6 in place the balance of the planks #7 to 13 will now be added working down from the top with the last three planks #'s 11 to 13 having to be cut and fitted to the remaining space with the differences being less visible being on the bottom of the hull. **Plank 11** on both sides of the hull will be cut tapering from the bow being 3/16" to **Bulkhead 0** being 1/4." The stern plank will be the full 1/4." width. Now looking at the remaining two plank spaces for #12 and 13 carefully select any uneven curve relationship within the spaces and carefully trim the existing in place plank edges to even out the curves. Mark center marks at the bow, stern and **Bulkhead 0**. The gaps may be slightly larger than the 1/4" planks due to the accumulation of the chamfer cuts. Select four (4) 1/16" x 3/8" x 12" planks and soak them. Start at the bow rabbet cut and mark the center distance then mark the distance at **Bulkhead 0** then cut and form the plank #12 in the space. Remember to mark the butt joint line.

Work from the bow to the stern and allowing the planks to run past the stern and being cut to match the **Stern Post**. Remember to darken plank edges and add treenail marks while glue is setting.

Now for the last wet plank #13 to close up the hull opening; starting with the bow section cut the angle to fit the rabbet then mark the opening on the angle cut and cut the length of the plank about a 1/2' beyond where the butt joint will happen. Now with small dividers transfer the opening marks from the

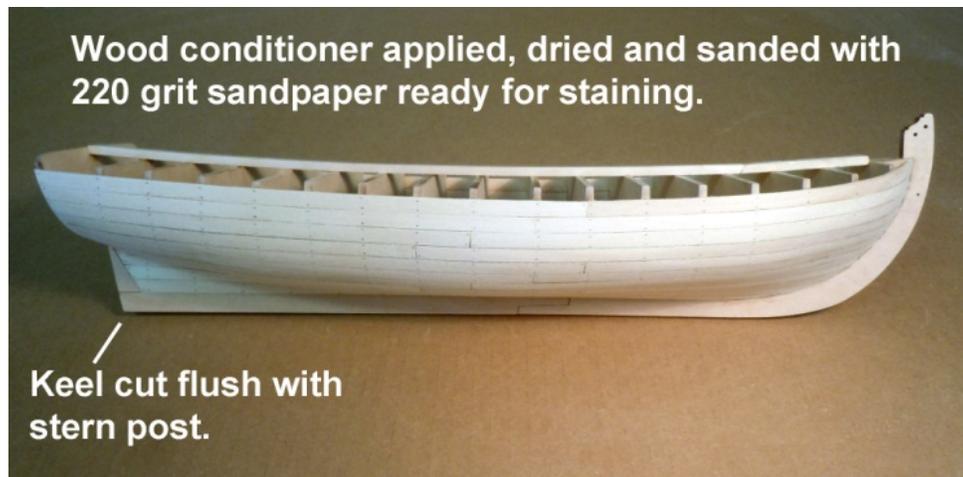
bottom edge to the upper edge of the plank at each bulkhead to the butt joint and mark a line with a pencil joining the dots. Now cut slightly above the marked pencil line; better to be slightly larger than too small on the width. Trim the angled rabbet end to fit tight and then slowly and carefully trim the top edge to fit the hull opening to the butt joint. Once the plank fits mark the butt joint line and cut the plank at an angle to receive the next section. Darken both edges and glue in place and clean the excess glue both inside and outside. Repeat the same process to fit the second aft section of plank in place working slowly and carefully for a tight fit. Cut and sand the plank end flush to the transom once the glue has set. Repeat for the opposite side of the hull. Now add the laser cut stern post. See photo below.

Let the hull completely dry and glue set. Then slowly and carefully start sanding the hull starting with 80 grit sandpaper on a sanding block and be very careful not to sand through the planks or sand deep grooves in the planks. While sanding pay attention to not lose the treenail marks and when sanded away re-mark them. Save the sawdust to be able to make putty by mixing the sawdust with Yellow Glue to fill any gaps that may have occurred planking the hull.

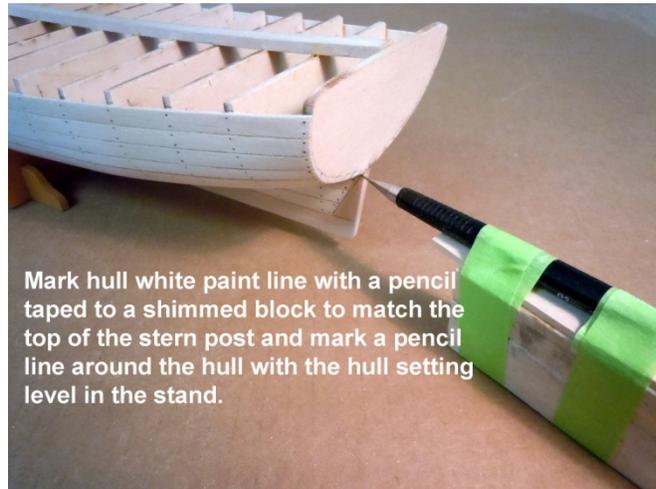
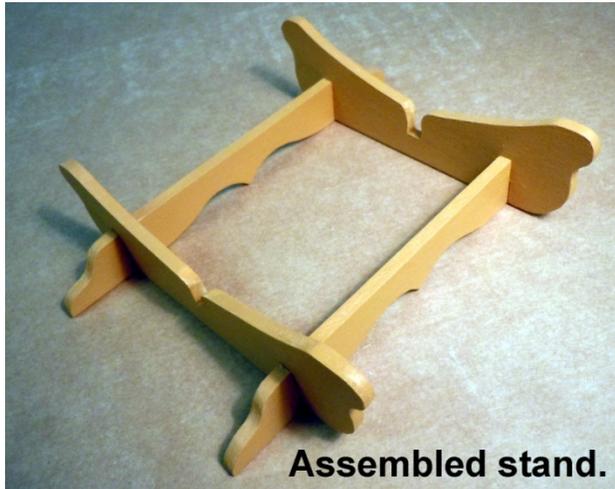


Once smooth then use 120 grit sandpaper for a light finish sanding. To work around the curve make short sanding sticks using 1/4" and 1/2" wood dowels with sandpaper glue to them. These will be handy working around the stern post and blending the **Garboard** (Plank #1) to the keel and stern post. When finished again check the treenail marks and add as necessary. All the treenails should look the same prior to adding the Wood Conditioner.

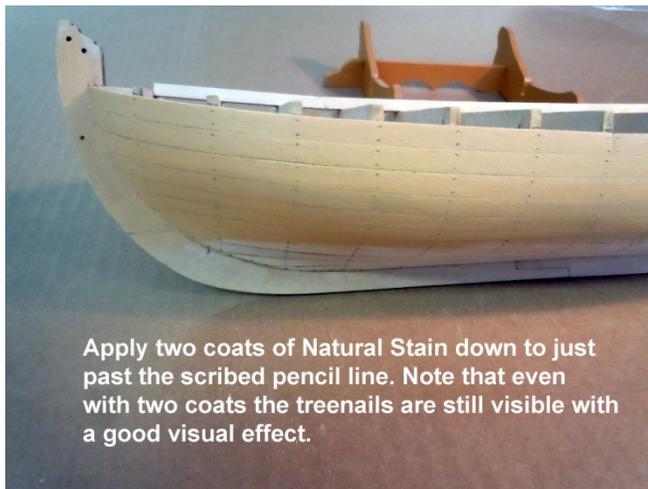
Brush an even coat of Wood Conditioner over the entire hull covering all exposed wood on the hull. The wood conditioner will seal and raise the grain of the wood slightly; so once completely dry lightly sand with 120 grit sandpaper to smooth down the grain.



While waiting for the Wood Conditioner to dry overnight (if possible) build the **Stand** next. This **Stand** will be needed to draw the water line and provide a **Stand** to set the boat in for the rest of the build. The **Stand** consists of four (4) laser cut parts that index together with slots; glue the **Stand** together and weigh down on a flat surface to make sure it sits flat when completed. Sand the char from all edges before gluing the parts together. Paint the **Stand** Yellow Ochre (2 coats) and set aside to allow the paint to dry. Test fit the hull to make sure it fits snugly and completely into the slots on the stand. If necessary trim the slots as needed.



With the hull sitting level in the stand slots on a flat surface draw the waterline using a pencil taped to wood blocks and shimmed to the height on the transom **Stern Post** and hull intersect. See photo above.



After the water line is drawn with a pencil then apply two (2) coats of **Natural Stain** from the top of the hull down to slightly over the waterline mark.. Apply the first coat of stain with the 1/2" flat brush let set for three (3) minutes and wipe clean and allow to dry at least two (2) hours. In the meantime, should any joint lines or gaps become visible very carefully fill them with glue using a sharp piece of scrap wood and wipe the glue with your finger lengthwise with the gap or joint until filled. One can also use Weldwood Wood Filler which is stainable.

Apply the second coat of stain per instructions and wipe with a clean cloth and allow drying completely. Keep in mind that stain penetrates the wood surface while paint lies on top of the surface. Paint can be applied over stain but not stain over paint.

**Hull Interior: Important follow the numbered step sequence.**

**Bulkheads, Step 1:** First, break loose the 1/8" x 1/4" x hull length center **Strong Back** brace by soaking glue joints with Acetone to loosen the joints.

The next step is to now remove the bulkhead center bracing areas by using a small saw blade and cutting straight down to the laser cut. Start with **Bulkhead 0** and carefully work fore and aft with each bulkhead center area removed providing more space to work in. Once a bulkhead is cut loose with the saw, bend the bulkhead area back and forth to break the center area out at the keel. The breaks will happen with the wood grain. Do not discard #7 it will be needed later in the build.

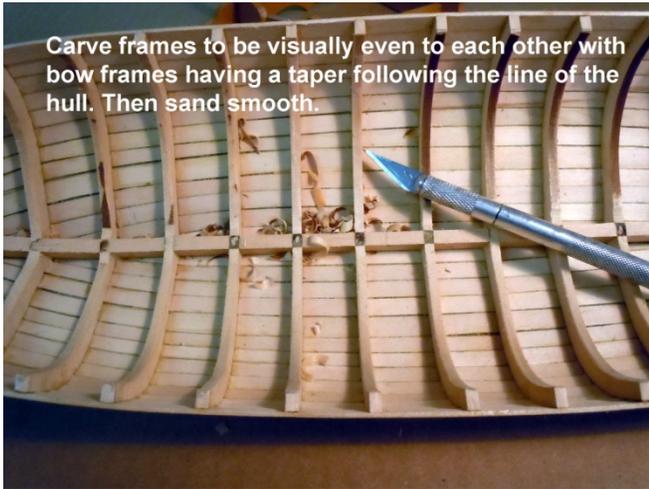
After all the bulkhead center areas are removed there will be excess bulkhead material still down in the **Keel** slot, at the laser cut insert the tip of the hobby blade and twist releasing the material. Next at **Bulkhead 0** plunge cut on both sides of the **Keel** as deep as possible and break the section loose with pliers. Now with a chisel blade, start cutting away the rest of the **Keel** section by cutting from the ends with the #17 blade laid flat cutting into the ends. Plunge cuts will be necessary at the curved keel bow sections. Once all the center **Bulkhead** areas are removed the remaining sections are now referred to as **Frames**.

Now cut the tops of the **Frames** flush to the **Sheer Plank** by laying a sharp blade flat on the top edge of the **Sheer Plank** (see Plan Sheet) and slowly cut away the top. It may help to lay a ruler across from side to side and mark both **Frames** with a pencil line for a guide. Once all are cut, sand all flush to the **Sheer Plank** without sanding away any of the **Sheer Plank**. **IMPORTANT** the **Sheer Plank** must remain a full 1/4" wide the full length for brass decorations to fit. See pictures of finished boat. Keep in mind the **Cap Rail** will glue to the tops of the **Frames** and **Sheer Plank** later on.



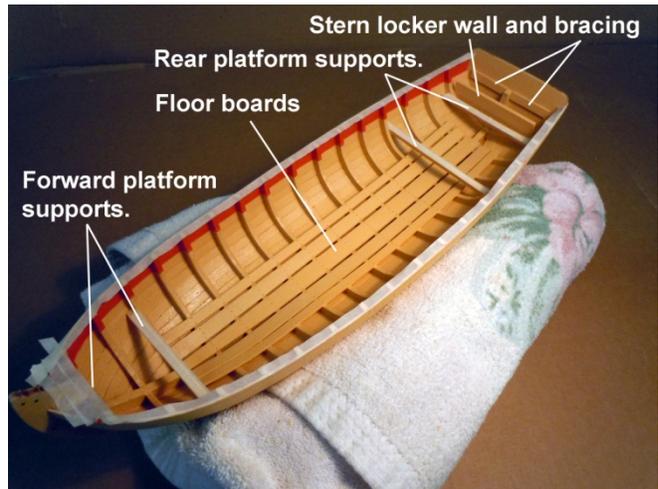
Next the inside edges of the **Frames** must now be faired to match the curve of the hull; especially at the bow. First, mark on top of the **Frames** 1/4" from the **outside** of the hull; then with a sharp #11 blade slowly and carefully starting at **Frame 0** to get the feel, start at the top and carve down to the **Keel**. The goal is to "fair" cut evenly following the curve of the hull. Multiple small slicing cuts will get the job done. See photos next page. Once all **Frames** are carved, sand all **Frames** edges and **Keel** top surface to

match. When cutting and sanding, rest the hull on a rolled up towel so as not to scratch or damage the outer hull.



Once sanding is completed now apply wood conditioner to the entire inner hull surfaces including **Keel**, bow and **Transom** (see Plan Sheet) surfaces. When dry then apply two (2) coats of Natural Stain with no need to wipe with cloth. After the first coat is applied if any imperfections need to be sanded or cut away like fussy edges from sanding do so before applying the second coat.

After the stain has set very carefully with Gun Carriage Red paint the inner hull top two (2) planks and bulkheads using the plank joint line as a guide with a #7 round paint brush. Two coats will be necessary. Make sure to clean brush with soapy hot water.



**Floor Boards, Step 2:** The floor boards are made up of five boards: one (1) 1/16" x 1/2' x 12"; two (2) 1/16" x 3/8" x 12" and two (2) 1/16" x 1/4" x 12". Start with the center board that will align bow to stern centered on the exposed **Keel**. Cut to a length of 11" then add a light pencil mark down 3" down from one end. Next mark the end on centerline two marks totaling 5/16" wide. Now draw a slight curve from the 5/16" marks down to the 3" marks on each edge and then cut away the taper following the curved

line. The curved edge on one of the laser cut cockpit seats can be used as a guide to draw the needed curve.

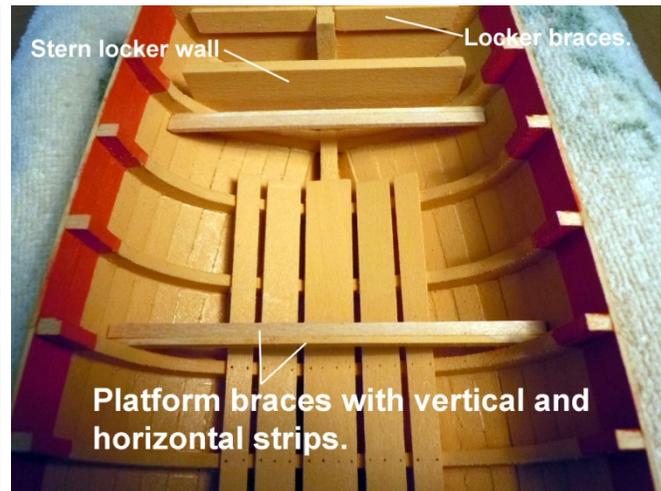
Sand the edges of the center board and very carefully dry form the curve to match the keel using just fingers and working slowly the length of the board. This will take out the spring and make it easier to glue in place. When satisfied with the fit move on to the next set of boards. The 1/16" x 3/8" x 12" will need to have one end soaked in water to edge form and bend to needed shape. Edge bend slowly to match the edge of the center board by pressing the wet end on a flat surface and slowly bend working the wet length. The dry end should match the end of the center board and mark the wet end to be cut off at 11". Repeat for second board.

Repeat the above steps for the third set of floor boards that are 1/16" x 1/4" x 12". See photo and plans.

Let all boards dry completely and then apply two (2) coats of stain and set aside to dry.

Once the paint is dry, check the fit and adjust as needed then using Medium CA glue the center board in place with the bow end aligned on the center of the **Keel** at **Frame F**. Once glue has set using 1/16" scrap spacers add the 1/16" x 3/8" x 11" set. Check and adjust fit as needed and then glue in place. When the CA glue has set; repeat for the 1/16" x 1/4" x 11" set of floor boards. Lastly, add the treenails using the mechanical pencil. See photo below.

**Stern Locker, Step 3:** The **Stern Locker** is located at the stern of the longboat. Cut 2 pieces of 1/16" x 1/4" x 1- 3/8" and stain them before gluing in place 3/8" below the top edge of the **Sheer Plank**. Cut a scrap piece of strip to fit across the width of the hull near the **Transom Wall** to be used as a reference gauge for measuring down. When stained pieces have dried, glue in place using the gauge. See photo below.



Next, using the center area of **Frame # 6** section that was removed earlier cut and trim a wall that butts up against the stern wall of **Frame #7** making sure the top edge aligns 3/8" below the top edge of **Sheer Plank** using the wood strip gauge. Stain before gluing in place. See photo above.

**Platforms Step 4:** Cut and fit platform support braces to the stern side of **Frame #4** and bow side of **Frame #7** using 1/16" x 1/8" x cut to fit across the hull about (4-3/16") 7/8" down from the **Sheer Plank**.

Once the cross braces are glued in place add a horizontal stiffener to the back/front edges of the cross braces. Repeat bracing at the bow starting at the bow side of **Frame F** and a small 1/16" x 1/4" x 5/16" at **Frame H**.

Using card stock create two (2) templates; one for the bow and the second for the stern. Start both by cutting two pieces of card stock the width needed from each **Frame**. The stern would be the front edge of **Frame #4** back to the **Transom Wall**; the bow would be the rear edge of **Frame # F** forward to the **Bow Stem**. Each piece then held on top of the hull and the hull outline marked onto the card stock. Select one edge and mark and cut out slots for the **Frames** and then trim the outline of the opposite edge by about a 1/4" and mark and cut out the **Frame** slots. Keep trimming until the template sits flat on the **Support Braces**. See photos below.



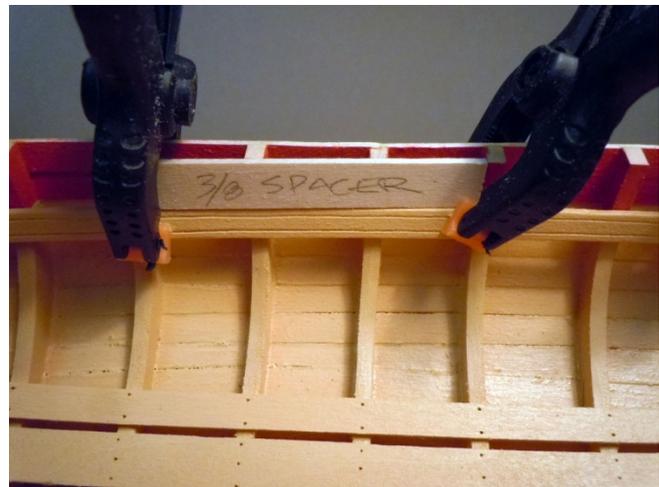
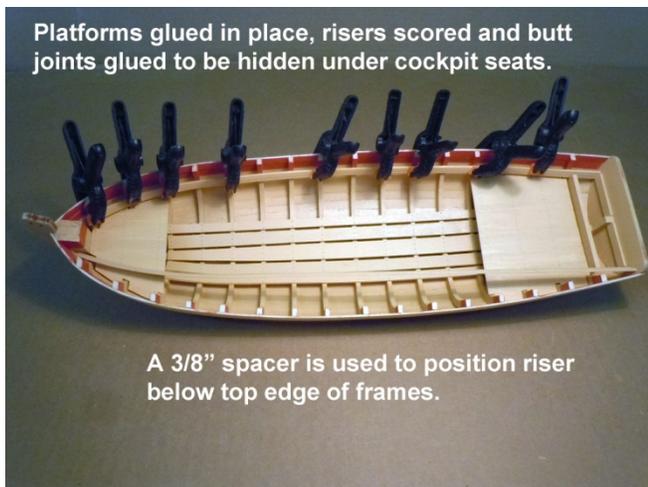
Now gather all the hull planking cut-offs, place the card stock templates under a folded piece of wax paper and glue the planks using a straight edge and triangle to keep the strips square when gluing and cover the templates with glued together cut-offs inside the folded wax paper. Once all the pieces are glued fold the wax paper over the glued section and weight down to keep flat until dried. The wax paper protects the section from being glued to the weights. See photo below.



When both sections are glued; then using the template trace the outline onto the wood section and then cut and fit to each position fitting flat on the **Braces**. Once fitted, sand the top surfaces smooth to remove any excess glue, mark treenails across the individual boards aligning to the backside of the **Frames**. Apply wood conditioner and stain. The sections may buckle up, after stain is wiped, place the stained side on a plastic zip lock bag and weigh down until dry. Once stained twice glue in place to **Braces**, use plastic clamps on **Braces** to hold until glue sets.

**Thwart Risers, Step 5: Thwart** (seat benches) **Risers** need to be made by gluing 1/16" x 1/4" x 12" strip with a bevel cut to a piece 2-5/8" long to run the full inside length of the hull 3/8" below the bulkhead tops. The **short end** will locate at the stern of the hull so cut the short end (2-5/8") at an angle to match the **Transom Wall**. Set the bow end in hot water and soak for forming. Once soaked 5 minutes align the **Transom** end and using small plastic clamps and a 3/8" spacer clamp the **Thwart Riser** in place while slowly bending and clamping in place moving forward to the bow. Allow both sides of the **Thwart Risers** to dry completely before removing. Using a small divider spaced at 1/16" very slowly and carefully score an embossed decorative line down both top and bottom edges. One tip follows the outside edge and holding at an angle press the other edge lightly into the wood using short strokes. Once one line is completely scored, repeat and press a little deeper. Practice on a scrap piece of wood to get the feel of doing it before doing the **Riser**. Apply Wood Conditioner and let dry then apply Natural Stain to both **Thwart Risers**. Repeat the line scoring once the stain has set to better define the lines using the back edge of a pick.

Make a 1/16" x 3/8" x 2-1/2" spacer gauge. Add a drop of CA glue just below the red marks on each **Frame** and starting at the stern using the spacer gauge glue the **Thwart Riser** in place on one side. Clamp as needed working forward to the bow making sure to maintain the 3/8" distance down at each **Frame** top using the gauge. Allow the CA glue to set completely before removing the clamps. Repeat with the second **Thwart Riser** on the other side. Now add the tree nails with the mechanical pencil at each **Frame** in the scored line. See photos.



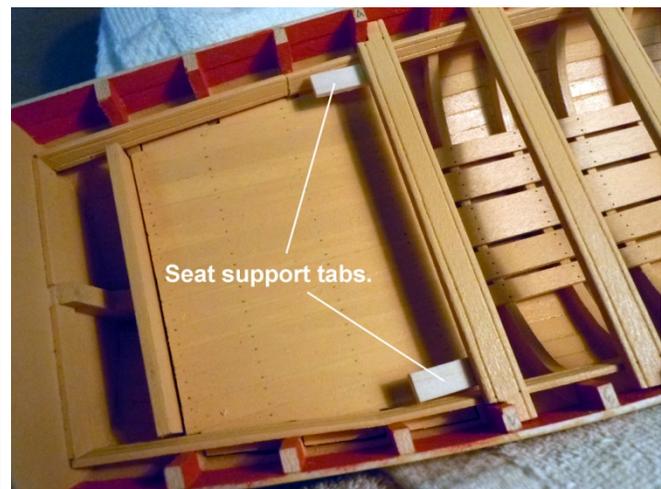
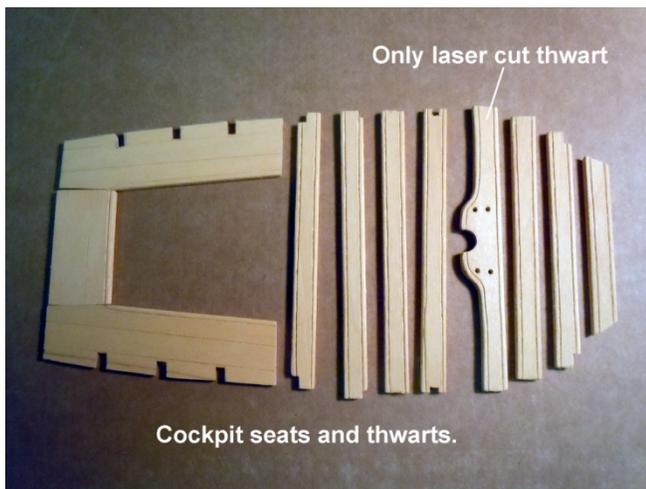
**Thwarts, Step 6:** Use two (2) 1/8" x 3/8" x 12" Basswood strips to make the seven (7) **Thwarts** (seats); the **Mast Thwart** is laser cut. Use the small dividers set at 1/16" and score the decorative trim line like done above for the **Risers**. Once scored, sand the edges to slightly round rather than a sharp edge. Apply wood conditioner and two coats of Natural Stain.

To help with locating **Thwarts**, mark the top of the **Frames** with their respective number or letter based upon the plans. Set the laser cut **Mast Thwart** in place adjacent to **Frame C** (see Plan) and **DO NOT GLUE** this one. Then from the **Mast Thwart** move to the stern cutting, trimming and dry fitting the four (4) aft **Thwarts**. Then cut, trim and dry fit the forward three (3) **Thwarts**. Add the tree nails using the mechanical pencil above the **Risers**.

Glue the three (3) forward **Thwarts** in place. Skip the **Mast Thwart** for now and glue the first three aft **Thwarts**; but not the last **Thwart** at **Frame 4**. Cut two support tabs  $1/16"$  x  $1/4"$  x  $1/2"$  and glue them to the underside of **Thwart 4** facing towards the stern  $3/8"$  in from the ends of the **Thwart**. These tabs will support the **Cockpit Seats**. Once glue has set on tabs glue the **Thwart** in place with the back edges of the **Frame** and **Thwart** aligned. See photo below.

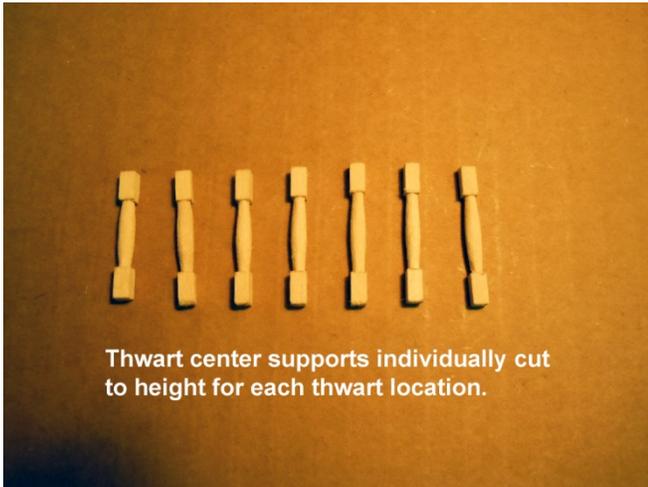
**Thwarts Step 6a:** Fit the **Mast Support Iron Bracket** to **Mast Thwart** and adjust as needed centered on the laser cut half round shape in the **Mast Thwart**. Test fit the  $5/16"$  diameter mast dowel for clearance. When satisfied with dry fit, first glue the **Mast Support Iron Bracket** in place on the **Mast Thwart**, then glue the **Mast Thwart** in place on the risers against **Bulkhead C**. See photo below.

Remove laser cut **Mast Foot** from carrier sheet and remove char. Locate four (4) **7mm nails** and cut just a little shorter than the thickness of the **Mast Foot** so that the **Mast Foot** will sit flat when glued in place. Paint the **Nails** Black and glue into the hole locations in the corners. With the **Mast Foot** setting on the center board; insert the  $5/16"$  **Mast** dowel into the **Mast** bracket and **Mast Foot**. Center the **Mast Foot** "port to starboard" on the center floor board and using a small triangle resting on the **Thwarts** true the **Mast** fore and aft. Once in place, mark on the front edge of the **Mast Foot** a pencil reference line. Remove the dowel and glue with CA the **Mast Foot** in place aligning to the reference mark.



**Thwarts Step 6b:** Originally, **Thwart center Supports** were turned wood supports. However, with  $1/8"$  x  $1/8"$  Basswood strip cut seven (7) lengths for each **Thwart** support from the underside of the **Thwart** edge to the center floor board. Ideally, each **Support** should press fit into place between the **Thwart** and center floor board. Mark each cut support  $1/4"$  on all four (4) sides on both ends. Carefully with the tip of the blade cut  $1/32"$  deep on each marked line. Now starting at about  $1/3$  the length of the **Support**

on each corner cut down towards the cut lines removing the wood. Once all corner cuts are made then make the same cuts on the sides of both ends. Now with a small needle file and sand paper shape to simulate a turned part. See photo below. Repeat for all **Thwart Supports**. Apply Natural Stain to all **Supports** and when dry glue in place with Medium CA applied to the top end of the **Support** that will glue to the underside of the **Thwart** surface and index the top in place and press fit to center floor board. See photo below.

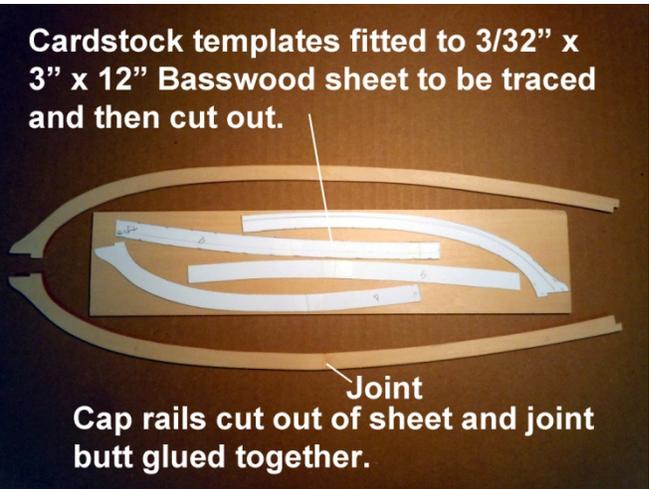


**Cockpit Seats, Step 7:** Paint the top edge and inner **Transom Wall** with two coats of Carriage Red down to the braces glued to the **Transom Wall**.

Cut the three (3) laser cut **Cockpit Seat** parts, two (2) **Sides** and one (1) **Stern** from their 1/8" carrier sheet. Sand the edges to remove the laser char. **Note:** these parts are purposely slightly over sized to be cut and fitted to each individual build. The decorative score line and joint lines are laser traced for reference. Take one side part and check the angled orientation to the **Transom** wall and aft **Thwart** and angle cut the **Transom** edge to match the **Transom Wall**. Fit tight against the **Transom Wall** and mark a line to match the rear **Thwart** and cut to fit. Now mark and cut the slots to index into the **Frames**; cut slots carefully to achieve as tight a fit as possible. See photo below. Repeat for the opposite side. Once both **Sides** are in place cut and fit the **Stern** part. This part is the lid for the locker. Once all three (3) seat parts are in place, using the dividers set at the laser line along the edges cut deeper the decorative line. Lightly cut with just the tip of the hobby knife blade to enhance the laser traced board joint lines and lid hinge line. Then score the hinge lid line to be a little thicker than the board joint lines. Add the tree nail marks aligning to the aft of the **Frames**. See photo below. Apply two coats of Natural Stain and let dry completely. Glue the parts in place using Medium CA.



Cockpit seats in place.



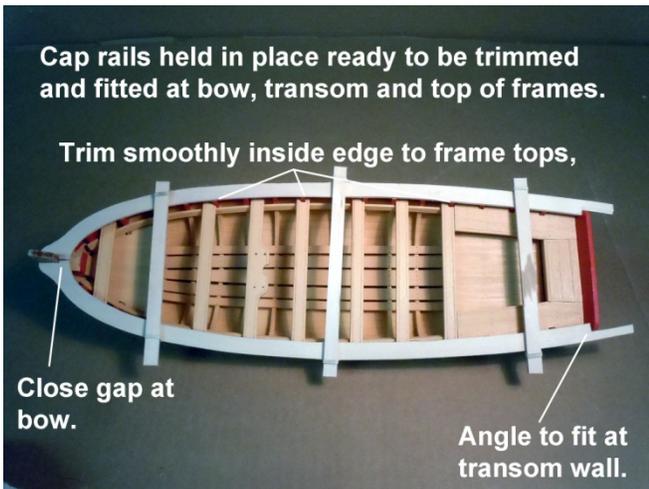
Cardstock templates fitted to 3/32" x 3" x 12" Basswood sheet to be traced and then cut out.

Joint

Cap rails cut out of sheet and joint butt glued together.

**Cap Rails Step 8:** Tape two (2) pieces of card stock cut as needed to trace the upper perimeter of the hull together to create templates for the **Cap Rails**. See photo above. Once traced, mark a line parallel to the hull line 1/2" wide the length of the hull line and tapering to the bow stem. Refer to the plan sheet to guide the shape particularly at the bow and extend the stern lines 1" beyond the **Transom** to be cut to length later. This is purposely over sized to be trimmed accurately to the **Transom**. Now mark with a "P" and "S" for the port and starboard sides. Cut out both templates with scissors and then cut both at the center from the bow perpendicular to the lines and add the "P" and "S" to the shorter pieces. Locate the Basswood sheet 3/32" x 3" x 12" and place and adjust the four (4) parts to fit on the sheet and trace them carefully onto the wood sheet. Cut with a sharp blade the parts from the Basswood sheet along the traced lines. Lightly sand and clean all edges as necessary keeping square edges. Cut the butt joint mating edges at 45 degree angles and with Yellow Glue, glue the parts together and let set completely. See photo above.

Add the **Cap Rails** to the hull holding both in place using rubber bands and trim the bow, **Transom Wall** and inner edges against the **Frame** edges for a smooth transition bow to stern. Then using a 1/8" thick strip as a gauge, mark a line the entire length of the **Cap Rails**. Remove from hull and cut to achieve an even 1/8" distance from the hull smooth edge. Finally round over the top and bottom edges.

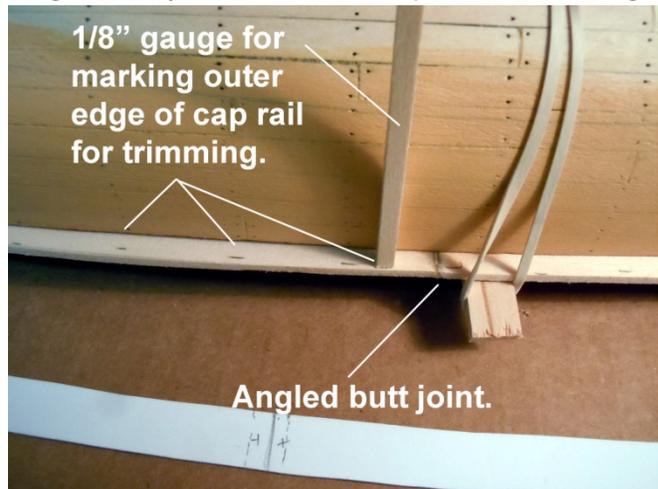


Cap rails held in place ready to be trimmed and fitted at bow, transom and top of frames.

Trim smoothly inside edge to frame tops,

Close gap at bow.

Angle to fit at transom wall.



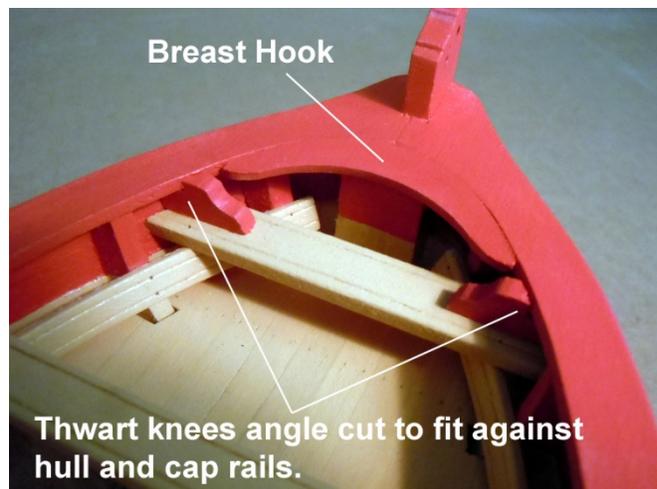
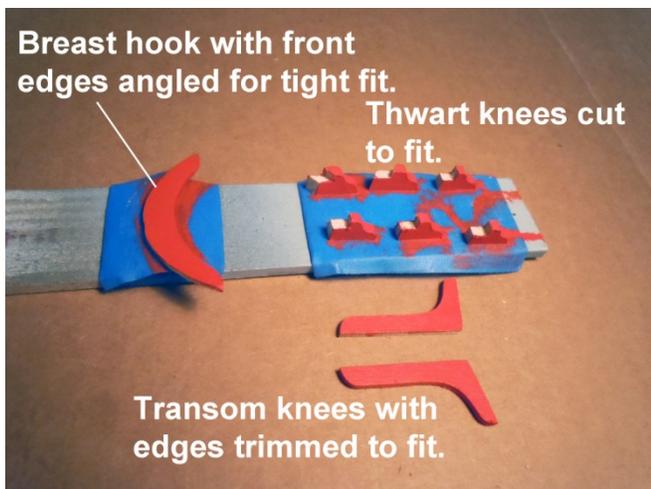
1/8" gauge for marking outer edge of cap rail for trimming.

Angled butt joint.



Once satisfied with fit and finish treat both **Cap Rail** parts with Wood Conditioner but **DO NOT** treat the bottom gluing surface. Then paint one (1) coat of Red on the top and side edges only; do not paint the bottom surface that will be the glued surface to the tops of the **Frames** and **Sheer Plank** edges. When Red paint has set index the two (2) **Cap Rails** in position and starting at the bow using wood strips and rubber bands hold the **Cap Rails** in place. Use as many rubber band braces for a tight fit, however to hold the bow end of the **Cap Rails** flat on the **Bow Stem** a spring clamp should be used on the **Keel** to keep the rubber band from slipping forward under the tension needed. See photo above. Then carefully align the inner edge of one **Cap Rail** with the edges of the **Frame** tops and once aligned glue in place carefully using instant CA by holding the hull up right so that the CA can run down the **Sheer Plank** joint when applied. Do short sections at a time starting at the bow or stern whichever is easiest. Allow the CA to set then carefully apply the CA to the top of each **Frame** to **Cap Rail**. Repeat gluing the other **Cap Rail** in place and while still held with rubber bands set the hull aside for the glue to set completely before removing the rubber bands.

**Interior Hull Fittings, Step 9:** With the **Cap Rails** in place, remove the laser cut **Breast Hook**, **Thwart** and **Transom Knees** from the carrier sheets. All edges to have the char removed and all parts painted one (1) coat of Red paint once dry fitted to their respective locations. **Note** there are a couple of extra parts if needed for the **Thwart Knees**.





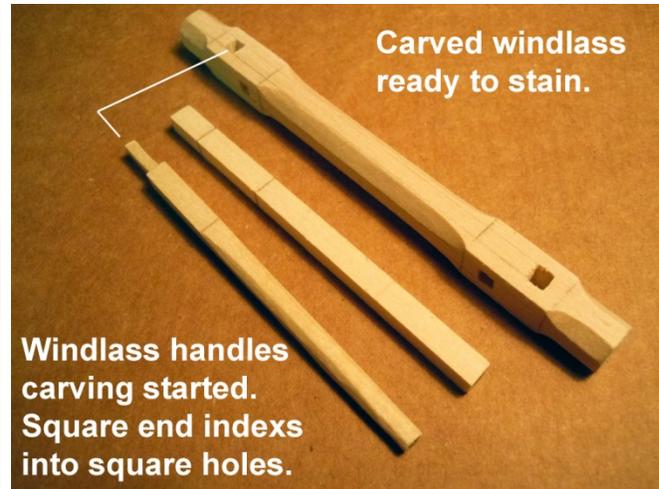
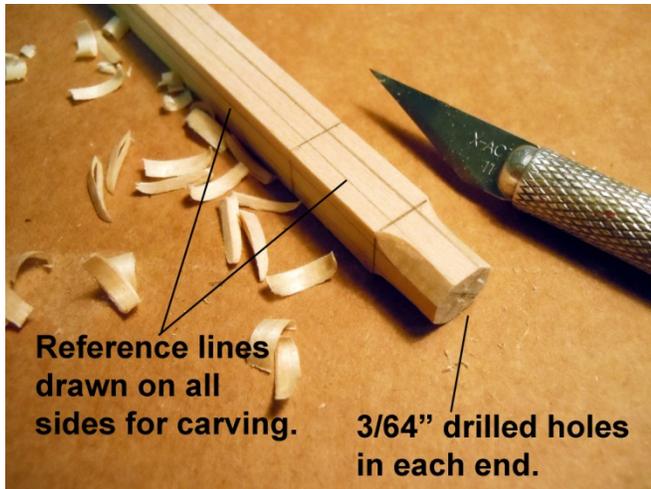
The bow **Breast Hook (1)** will need to have the front curved mating surface sanded to fit the **Cap Rails**. Sand the curved forward edge at a slight downward angle for a tighter fit.

The stern **Transom Knees (2)** will have the edge butting to the **Transom** sanded at an angle for a snug fit against the **Transom Wall** and when glued in place the edge parallel to the top edge of the **Transom**. See photo above.

The **Thwart Knees (6)** locations are specified on the plan. **Note** that there are two (2) different **Knee** sizes; the larger two (2) are for the bow **Thwart** and will have to be cut at angles to match the **Hull** and **Cap Rail** mating surfaces. The smaller four (4) may only need the mating surface to the **Cap Rail** fitted.

Paint all nine (9) parts one coat of Red avoiding gluing surfaces and glue in place. Fill any gap at the bow Breast Hook with putty and touch up with paint. See photo above.

**Windlass, Step10:** Measure the distance between the **Risers at Frame 0**. Then cut the 5/16" x 5/16" strip to this dimension minus 1/32" for clearance. Drill a 3/64" hole in each end on center for brass rod axles. Lightly mark lines completely around the **Windlass** at 3/8" and 1" from both ends. Now mark lengthwise on all four (4) sides 3/32" in from the edges eight (8) lines that will be used for reference when carving. See photo below. Now mark drill hole center marks 1/2" from the ends on one side; then 3/4" from the end on the next side. Now drill 3/32" holes through the **Windlass** at the four (4) locations. With a sharp point of a #11 hobby blade cut the holes square as possible. With care they can be squared completely with the knife blade. Once holes are drilled and squared with a sharp blade using the reference lines marked completely around carve the square into a hexagon. See photo below. Cut slowly with slicing cuts to the lengthwise reference lines. When completed the cross section of the ends and center should be a hexagon. Apply two (2) coats of Natural Stain. Then insert the 3/64" brass rod into drill hole in the end and cut off with 5/32" sticking out of the end. Then insert the rod in the other end and cut off with 3/32" sticking out and with a needle file round off the short end to help slide in place.



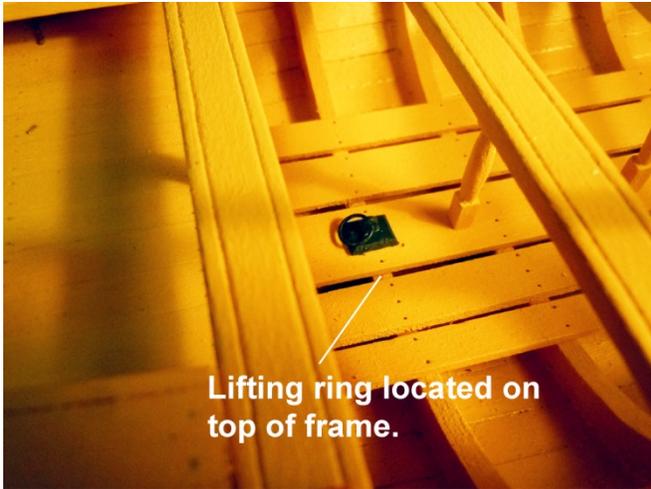
**Windlass Handles, Step 10a:** Cut two (2) lengths of 5/32" x 5/32" x 3" wood strips. Mark completely around the sides two reference marks at 3/8" and 3/4" from one end. At the 3/8" mark press the blade down evenly about 1/32" on the marked lines and then carve a square section to fit into the square holes of the **Windlass**. Check the fit in all the square holes. At the 3/4" mark, taper cut to the end cutting a taper hexagon cutting the edges first and then the sides and finally sand round to blend. See photo below. Stain with two (2) coats and then paint the ends Red 3/8" down from the ends.

Drill two (2) 3/64" holes in the **Thwart Risers** centered vertically just forward of **Frame 0**; insert the 5/32" end in hole on one side and then very carefully press/slide the 3/32" end down the **Thwart Riser** into the drilled hole. Once in place it should turn freely. See photo below.

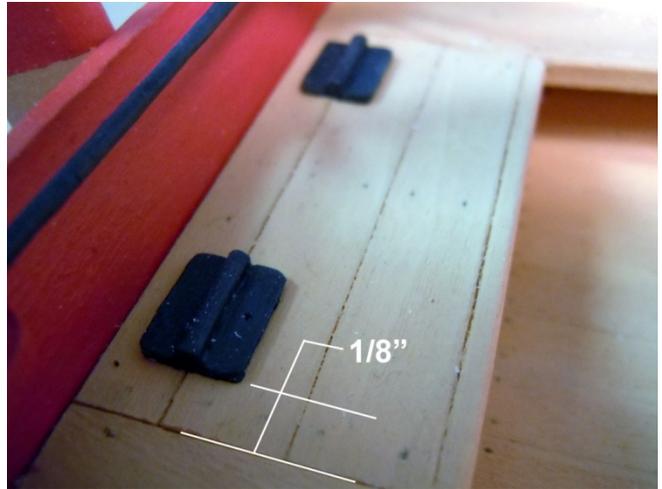
**Lifting Rings, Step 11:** Clean/drill the holes in the rings of the **Lifting Ring** bases and then add the **6mm Split Rings**. Then prime and paint the parts if not already painted. Once paint has set glue them to the center floor board on top of the **Frame** location per the plans; **Frames E** (Bow) and **6** (stern).

**Hinges:** Clean prime and paint the two (2) **Locker Hinges**. Glue in place 1/8" from each side edge of locker lid. See photo on next page.



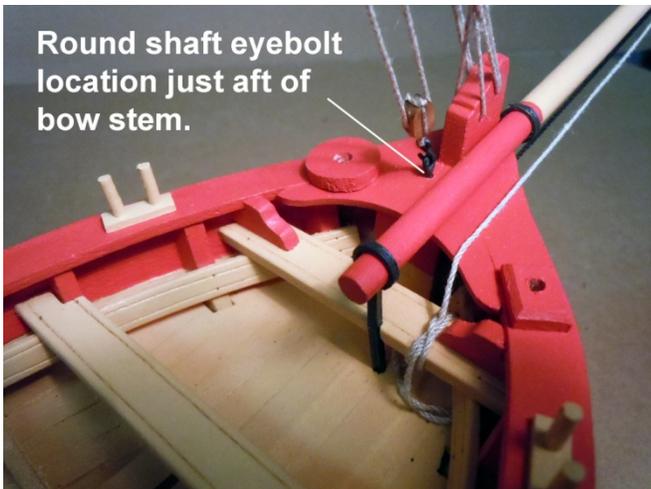


Lifting ring located on top of frame.



1/8"

**Eyebolt:** Clean the cast **Eyebolt** then prime and paint it Iron Cannon Black. (**Note:** There are two (2) cast **Eyebolts** with round shafts. The cast **Eyebolt** with the rectangular shaft is for the **Rudder**.) Drill a 3/64" hole just aft of the **Bow Stem**. Dry fit and cut the eyebolt shaft to length so that the eye is just above the surface and then glue in place.



Round shaft eyebolt location just aft of bow stem.



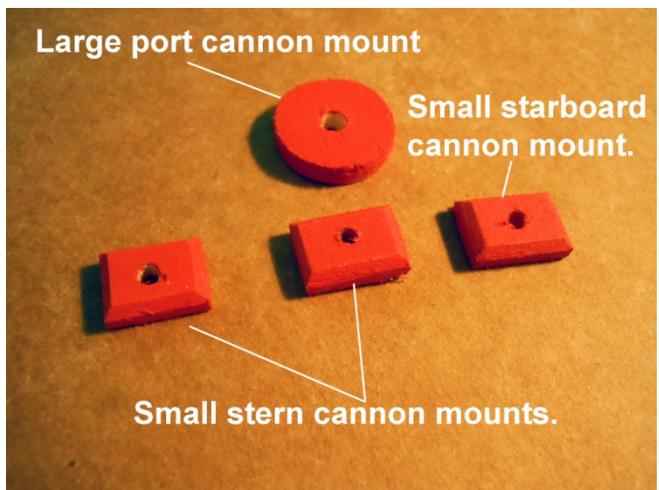
Horse formed using 3/64" rod around a 1/4" drill bit.

Ends trimmed to 1/2" length.



Horse fitted in place ready to be painted.

Stern small cannon mounts.



Large port cannon mount

Small starboard cannon mount.

Small stern cannon mounts.

**Horse, Step 12:** The **Horse** is a metal bar that spans across the stern just forward of the **Transom**. Referring to the plans bend the 3/64" brass rod to the **Horse** shape and file the cut ends. Using the **Horse** as a guide locate and drill two (2) holes to receive the **Horse** in the **Cap Rail**. Paint the **Horse** Black and install in place but **Do Not Glue** into holes; it will need to be removed later when rigging the **Boom**.

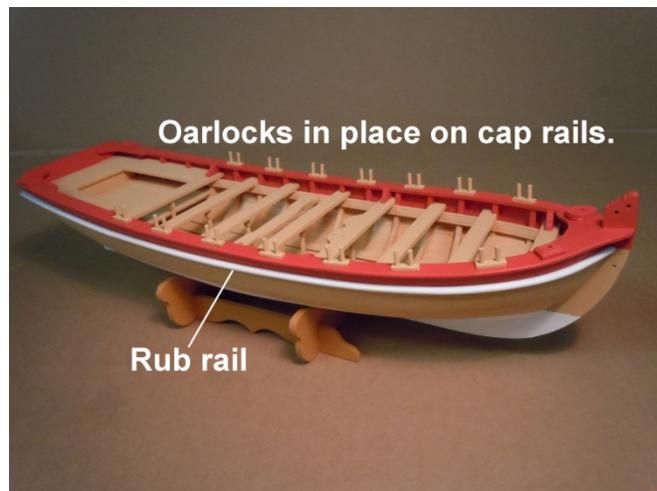
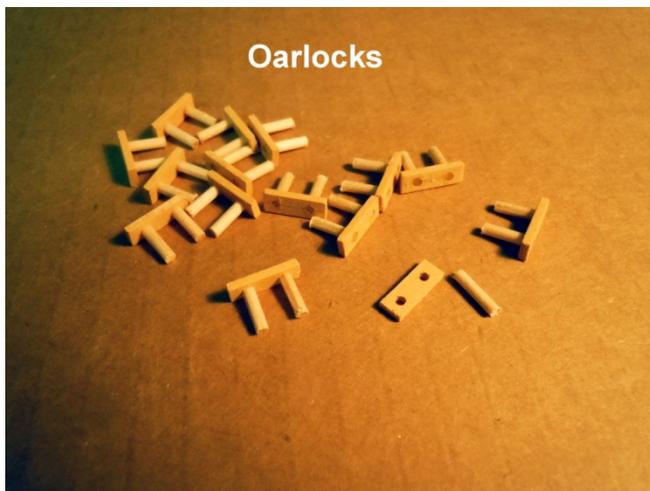
**Cannon Mounts, Step 13:** Remove the four (4) **Cannon Mounts**; three (3) rectangular and one (1) round from the laser cut carrier sheet and remove the char from all the edges. On the three rectangular mounts angle cut the edges to a chamfer. See photo above. Once cut paint all four (4) Gun Carriage Red. Refer to the plans for the locations to glue in place with Medium CA; the round at the port bow, two (2) rectangles at the stern and one (1) at the starboard bow. See photos above.

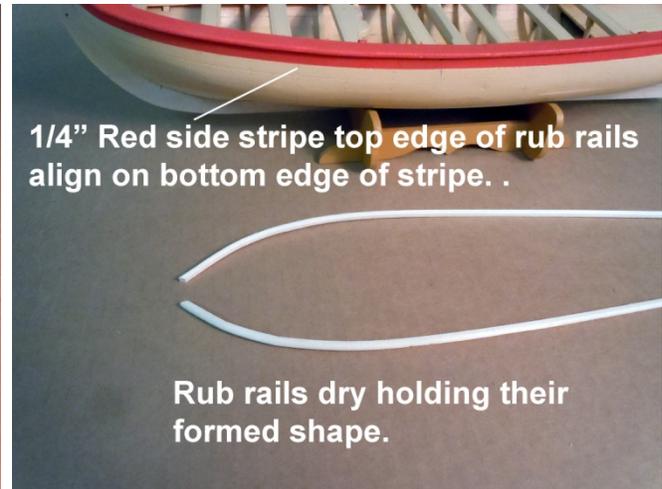
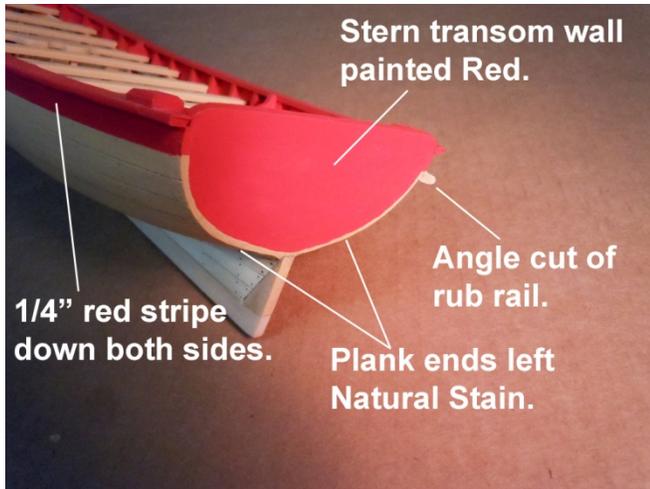
Once the **Cannon Mounts** are in place, drill out the holes through the **Cap Rail**. Use a 3/32" for the small and 1/8" for the large. Apply a second coat of Gun Carriage Red to the **Cap Rail**.

**Oar Locks Step 14:** Remove the fourteen (14) laser cut **Oarlock Mounts** from the carrier sheet and sand the char from all the edges. Cut twenty eight (28) 3/8" long **Oarlocks** using the 1/16" dowel. Insert and glue the cut **Oarlocks** into the **Mounts**, adjust the holes with a round file if necessary and use CA glue on the bottom side. Once all are glued and set, then stain all with the Natural Stain two (2) coats. When stain has set, glue in place visually centered between the **Thwarts** and centered on the **Cap Rail**. See photos below.

**Hull Exterior, Step 15: Important follow the numbered step sequence.**

**Paint, Step 15a:** Mask off 1/4" below the **Cap Rail** from the bow to the stern for a Gun Carriage Red stripe which will be the background color for the **Brass Decorations**. **IMPORTANT** the masked strip **MUST** be an even 1/4" all the way for the decorations to fit. Keep the paint line at the bow stem parallel to ground/waterline. Look at photos. The 1/4" plank sheer joint may be used as a guide. Then carefully paint two coats of Gun Carriage Red and when dry remove masking tape. Next paint the outside **Transom** surface leaving the ends of the **Hull Planks** Natural Stain. Thin the Red paint with a few drops of water to thin the viscosity for free hand painting the curves around the ends of the **Hull Planks**. Paint two (2) coats of Red paint on the **Transom**. See photo below.





**Rub Rails Step 15b:** Remove the brass half round molding **Cutter** from the P.E. (Photo Etched) brass sheet. Then with the **Cutter** and the four (4) 1/8" x 1/8" x 12" strips, slowly scrape the half round **Rub Rail** on a hard surface. **TIP:** Due to wood grain issues and variations test one end of the strip and then the other end to see which end scraps easiest and smoothest. Use short even pulls with a little bit at a time until the complete half round is formed. See photos.

Once all four (4) are cut, soak one end of all strips in hot water to form fit to the bow end first. Allow the strips to soak about 10 minutes and then carefully slowly start to form the bow bend and re-soak as needed. Take care not to break the strips, however, if one breaks it is OK it can be used at the stern end. Once the bend gets close of conforming to the bow hull shape; cut the angle on the end to match the **Bow Stem Post**. Use a spring clip at the **Bow Stem Post** to hold the end when indexed into place and slowly bend the **Rub Rail** to follow the bottom edge of the Red painted strip and add plastic clamps against **Frames** to hold the **Rub Rail** flat against the hull and form the 12" length into place and hold with clamps as needed. Repeat the steps for the **Rub Rail** on the opposite side. With both sides clamped in place wet, form one end of the other two strips to match from the end of the front strip to the stern, which is just a gentle curve. Allow all four (4) parts to dry completely in place on the hull.

Allow both front strips to dry completely before removing the clamps. See photo above.

When dry, paint the strips with two (2) coats of white paint on all parts. Cut the stern ends of the forward strips at a 45 degree angle (stern to bow) using a paper template as a guide for cutting. Clamp the painted front 12" **Rub Rails (2)** in place aligning to the bottom edge of the Red stripe. Then glue with thin CA holding the stern end in the air and adding the glue to the bottom edge of the **Rub Rail** and allowing it to flow down the joint line. If any excess glue is seen on the stained surface, wipe immediately with a Q-tip (ear bud) to remove. Add the CA slowly and watch it fill down the joint line to the bow. Take care not to glue the **Spring Clip** to the **Bow Stem**. Next add the two (2) rear sections by first cutting the 45 degree angles to match those of the forward **Rub Rails**; clamp them in place and mark the **Transom Wall** location for the 45 degree angle cut for the parts that will be added to the **Transom Wall**. Once marked and **both ends** cut at angles glue both rear side **Rub Rails** in place using the same procedure with thin CA. Now cut a length of painted **Rub Rail** a little longer than the width of the **Transom Wall**, mark and cut the angles to match the side **Rub Rails**. **Note:** the matching angles are a little compound due to the angle of the **Transom Wall** and will require a little fussing to

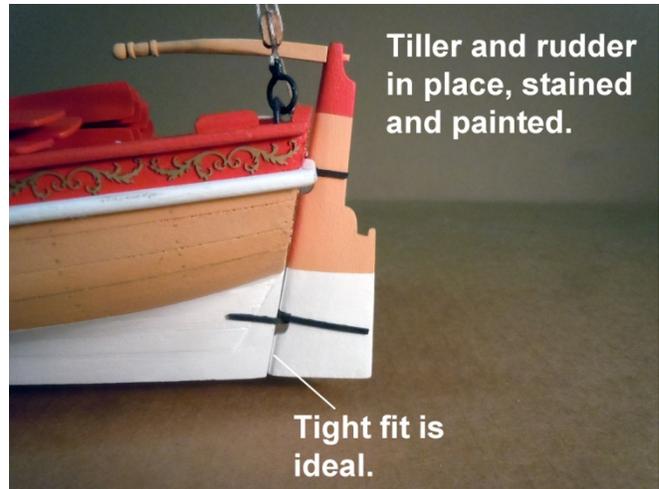
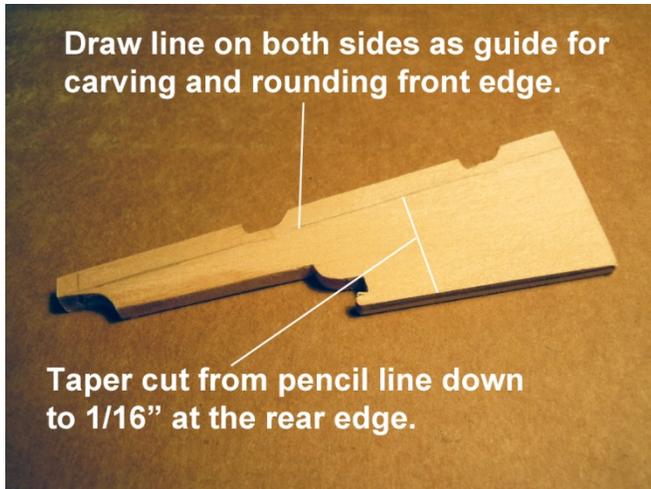
match tightly. Hold in place and mark the center location of the **Rudder** and then cut two 45 degree angles for the clearance for the **Rudder** when moved. Paint the angle cuts and glue the parts in place making sure they align on the **Transom Wall**. See the photo below.



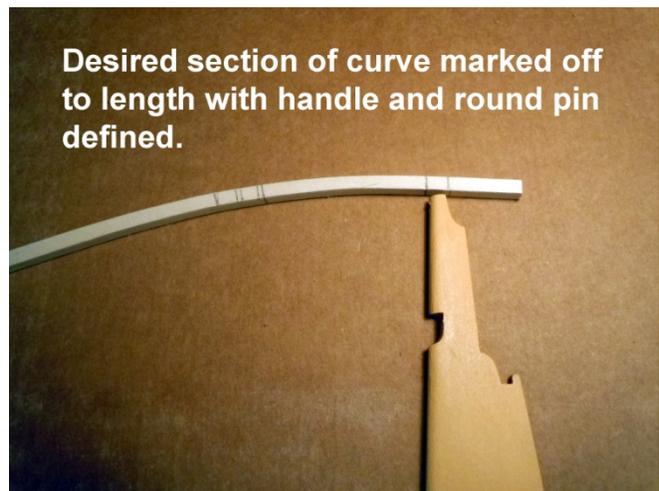
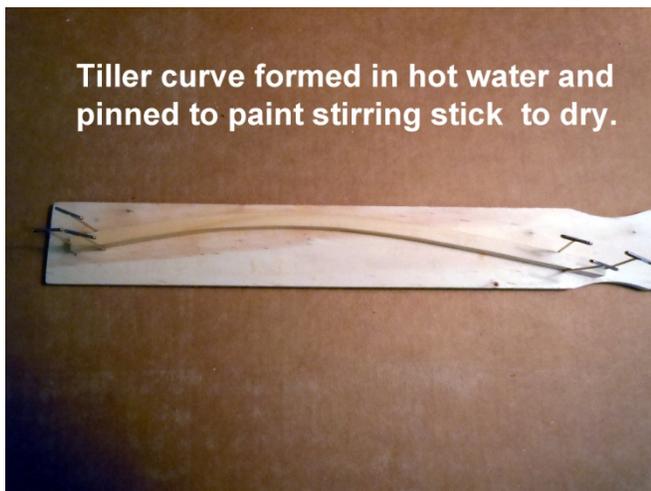
**Painting Hull Bottom, Step 15c:** Mask off the waterline using 1/4" masking tape starting at the bow stem which will run parallel to ground and apply a short piece first. Then carefully apply tape down the sides following the pencil line that should be visible under the Natural Stain. Work slowly through the bow curves to get them correct. Once applied burnish the edges with a fingernail to prevent bleeding under the tape. As a precaution a second line of tape should be applied to further protect the **Natural Stain**.

Apply two (2) coats of White paint to the masked off area allowing sufficient drying time between coats for the best results. Let the paint set completely before putting back in the stand. See photo above.

**Rudder and Tiller, Step 16:** Remove the laser cut **Rudder** from the carrier sheet and remove the char from all edges. Draw a reference line for carving and rounding the front edge and taper cutting to 1/16" at the rear edge. Once cuts are completed sand **Rudder** to a smooth finish. Apply two coats of **Natural Stain** to all surfaces of the **Rudder**. Dry fit and form the two (2) cast **Pintles** (Male) to their respective locations; the short one on top and long one on bottom notches in the rudder flush with the front edge as well as perpendicular to the front edge. See Photos. **IMPORTANT STEP:** Now align bottom edge of **Rudder** with bottom edge of **Keel** and mark on the transom wall centerline the location for the cast **Rudder Eyebolt**. Drill a 3/64" hole at mark on center just in line with the white **Rub Rail** between the angle cuts. Dry fit the **Eyebolt** in place, ideally a press fit and add the **Rudder** with the hinge pin on the **Pintle** indexed into the hole in the **Eyebolt** and check for the bottom edges aligning. Now mark the **Stern Post** at the bottom edge of the lower **Pintle** where the top edge of the **Gudgeon** (Female) will fit to form the lower portion of the **Rudder** hinge point. The cast **Gudgeon** is cast to conform to the hull curve so orient it in place with the more **open side up** and press into place on the hull; add the **Rudder** indexing the pins top and bottom with the **Rudder** having a tight fit against the **Transom Wall**. Adjust as needed then glue both the **Eyebolt** and the **Gudgeon** in place by adding thin CA to the bottom edges. Check for tight glue joint on parts.

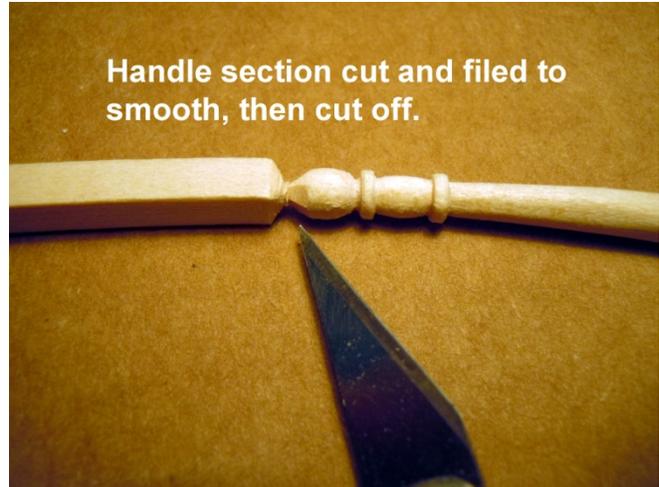


Now Drill a 3/64" hole through the top edge of the **Rudder** to receive the **Tiller**. The **Tiller** is formed and carved using a length of 5/32" square Basswood strip. Soak one end of the basswood strip in hot water and carefully hand form a slight curve using the plan as a guide. Pin the wet curved strip to a scrap piece of wood to hold shape until dry. Cut the desired section of curved strip longer than needed around 3 -1/2"; this allows a couple attempts at carving the indexing pin on the end of the **Tiller**. Now very carefully carve the 3/64" x 1/4" round indexing pin on the end and test fit into **Rudder**. Next, mark the length of the Tiller on the strip at 2-1/2" and at 3/4" from the pin end and mark all four (4) sides of the strip. Add the marks for the ball end and grip handle from the 2-1/2" marks. Score cut around the first handle mark and carve the edges starting at the 3/4" mark. See photos below. Carefully carve down to and then form the first handle grip. At this point a half round needle file may help in the final shaping. Next carve the second grip with a curve between the two. See photos on next page. Finally carve and shape the ball end and cut clean from strip. Apply two (2) coats of **Natural Stain** to the **Tiller** and the **Rudder**. Once the **Rudder** stain is dry fit it back in place and mark the location for the top Red and lower White sections. Mask off perpendicular to the front edge of the **Tiller** mark and apply two (2) coats of each color being careful not to paint the pins. Remove masking tape when dry and paint the **Pintles** and **Gudgeons** Iron Cannon Black.

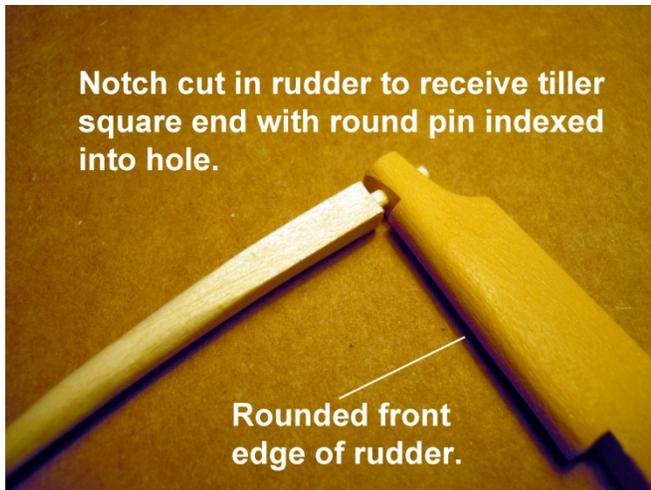




Taper cut on corners down to handle.



Handle section cut and filed to smooth, then cut off.



Notch cut in rudder to receive tiller square end with round pin indexed into hole.

Rounded front edge of rudder.

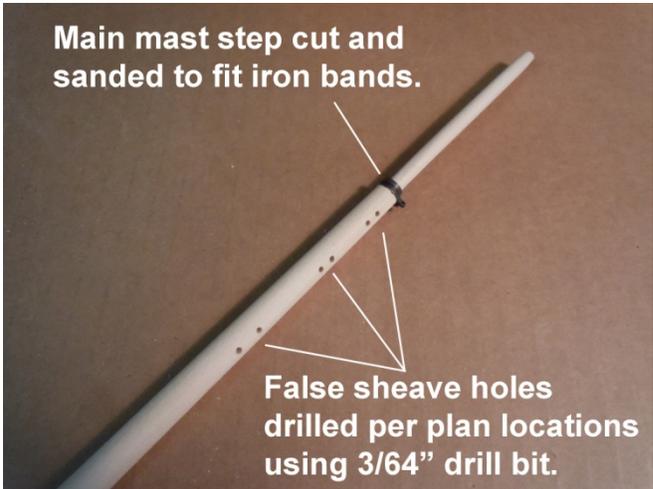
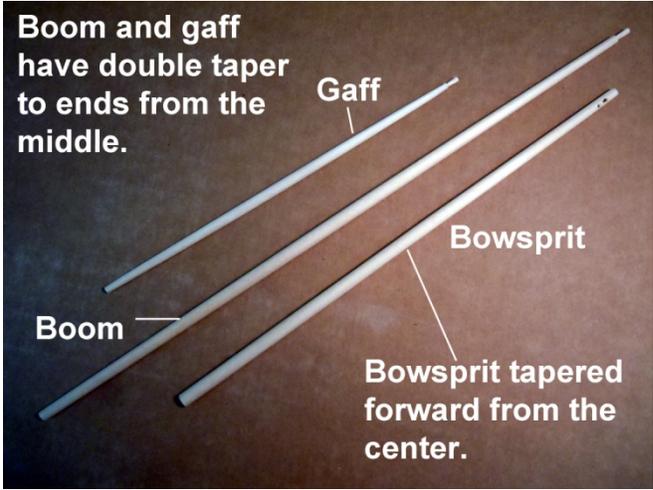
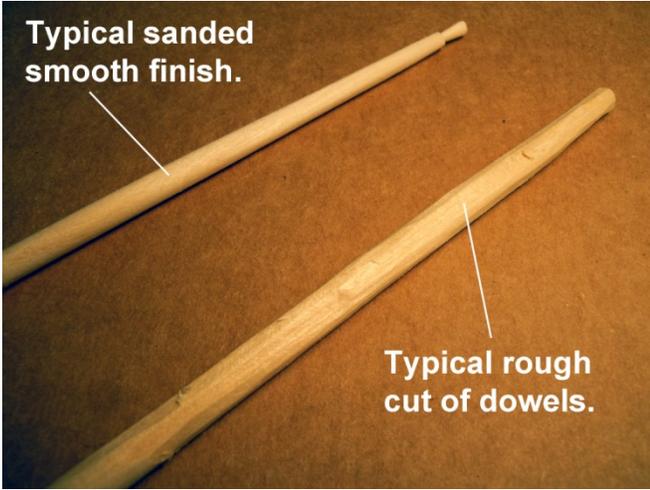


Finished tiller in rudder.

**Mast, Booms and Bowsprit, Step 17:** Re-read the description of dowels at the beginning and do a test cut on the dowel to determine which end to start the taper cutting at. Look at photos and study each part prior to starting. Once the easy cut ends are determined mark a center mark on the end of each dowel size being **Main Mast** 5/16"; **Boom** and **Bowsprit** 1/4"; **Gaff** 3/16". **Note:** The **Main Mast** is provided at the maximum length to fit diagonally into the box.

**Main Mast: 5/16" x 15"** Start cutting the taper with #11 hobby blade or blade of choice and keep in mind that there is a step at 3 inches down from the top. The carving process is slow and tedious for best results working back and forth cutting and sanding round tapers. Shape the overall mast taper the full length of the mast using the **Boom Iron Strap** for a fit gauge. The **Boom Iron Strap** will be located 3 inches up from the bottom of the mast. Keep in mind to allow some tolerance for paint. Next cut the step 3" inches down from the top and use the two (2) **Iron Straps** with holes as gauges and allow for paint. The electric drill option could also be used to form and taper the mast. Using the plans now mark and drill hole locations for the three (3) false sheaves with a 3/64" drill bit. Carefully cut a "V" wedge between the holes and clean the cuts to simulate slots. Drill the top mast end with a 3/64" hole down the center to receive the locating pin for the **Ball Truck**. See photo on next page. Finish sand the entire mast with 220 sandpaper as smooth as possible.

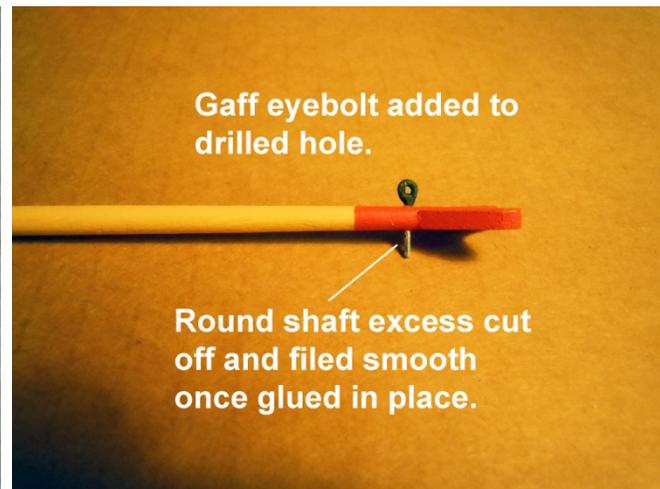
Apply satin to the mast with two (2) coats of **Natural Stain** from the bottom up to the step. Once the stain is dry mask off the portions to be painted **Gun Carriage Red** and apply two coats and test fit the **Iron Bands**; ideally, a slip fit. **DO NOT GLUE** the bands in place yet. If the Bands do not fit sand until fit is accomplished.



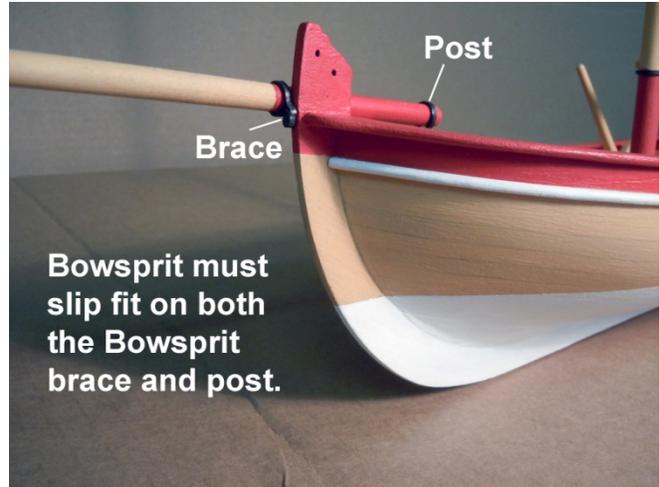
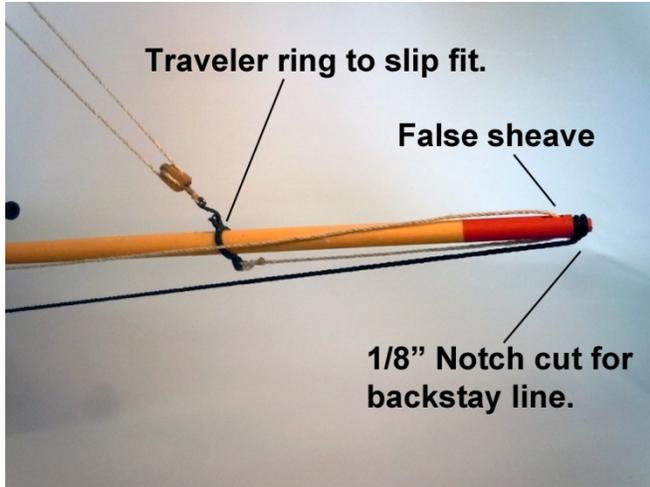
Insert 3/34" x 3/8" long brass rod locating pin in Ball Truck and round edges smooth and stain Natural. Add to mast. Do not glue.

**Boom: 1/4" x 12"** The **Boom** is tapered in two (2) directions starting at the 4 inch mark from the **Hook** end. The **Boom** will be the full length of the 1/4" x 12" dowel. Drill the hard to cut end with a 3/64" drill bit to receive the cast **Hook**. Test fit the **Hook** so that at least 1/4" of the shaft is in the hole and seats to the shoulder of the **Hook**. Now taper cut and sand the 4" hook end down to 3/16" at the end using the drill hole as a centering guide. Next taper cut and sand the 8" length down to 1/8" diameter at the end. Sand the taper smooth and then cut at a reverse angle (away from the end) 5/16" to provide a retaining shoulder notch for the **Topping Lift Rope** to be fitted later. Apply two coats of **Natural Stain** to the entire length of the **Boom**. Once stain is dry mask off stain 3" from the notched end and paint two coats of Gun Carriage Red.

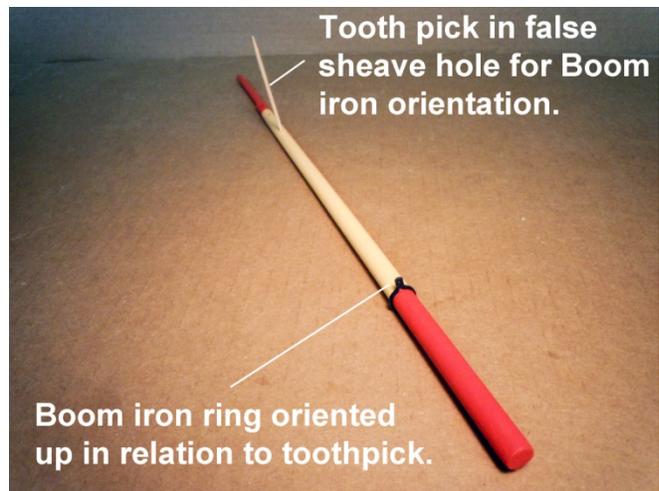
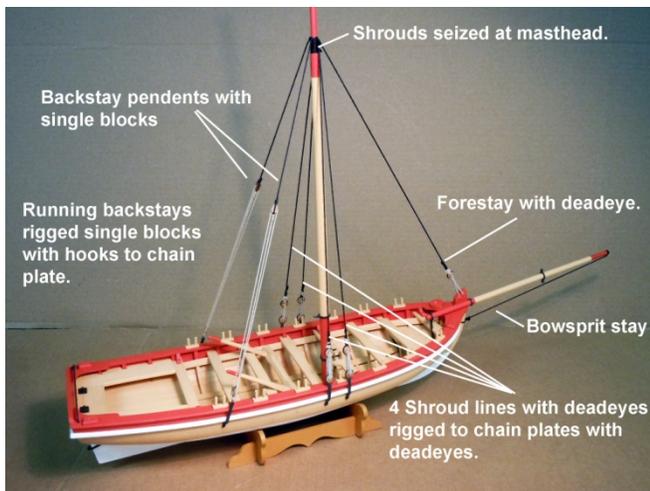
**Gaff: 3/16" x 7-1/2"** Like the **Boom**, the **Gaff** is tapered in two (2) directions but at the 3" mark down to 1/8" at the jaw end and down to 3/32" at the notched end. The reverse cut is 1/4" from the end. Next remove the laser cut **Gaff Jaws** form the carrier sheet, remove the char and glue in place at the 1/8" end. Next drill a 3/64" hole for the **Eyebolt** perpendicular to and even with the ends of the **Jaws**. See photos. Now apply two coats of **Natural Stain**; when stain is dry then paint the ends **Gun Carriage Red**. Mask 1" from the jaw end and 3/8" from the notched end. Prime and paint the cast **Eyebolt** ring and shoulder but not the shaft. Insert **Eyebolt** in the hole and glue; then cut off excess shaft and file smooth and touch up with Red paint. Re-drill to clean the two (2) holes in the jaws if painted shut.



**Bowsprit: 1/4" x 9-1/2"** Locate the cast **Bowsprit Brace** and **Bowsprit Post** to be used as gauges. Taper cut and sand one end of dowel about 4" down the length to a 3/16" diameter and then cut a straight notch 1/16" diameter x 3/16" that the **Bowsprit Stay** line will be tied to later. Now drill two (2) 3/64" holes on 3/16" centers 1/8" from the cut notch. Cut "V" grooves joining the holes to simulate a slot for the false sheave. Cut dowel to 9-1/2" length and using the **Bowsprit Brace** and **Bowsprit Post** as gauges for slip fit sand the dowel to fit with ample tolerances for stain and paint. Sand smooth with 220 sandpaper and stain the length with two coats of **Natural Stain**. Then paint Gun Carriage Red the notched end 1" from the end and the **Post** end 2-1/4" from the end. Test fit the **Bowsprit Brace** and **Bowsprit Post** for slip fit.



**Rigging, Step 18:** Rigging will be completed in two (2) phases; phase one (1) is the **Standing rigging** done with Black line or combination of Black and Tan. These lines are intended to hold things in place, once installed with only occasional adjustment. Phase two (2) will be the **Running rigging** with Tan lines. These lines are the working lines used while under sail to adjust as needed.



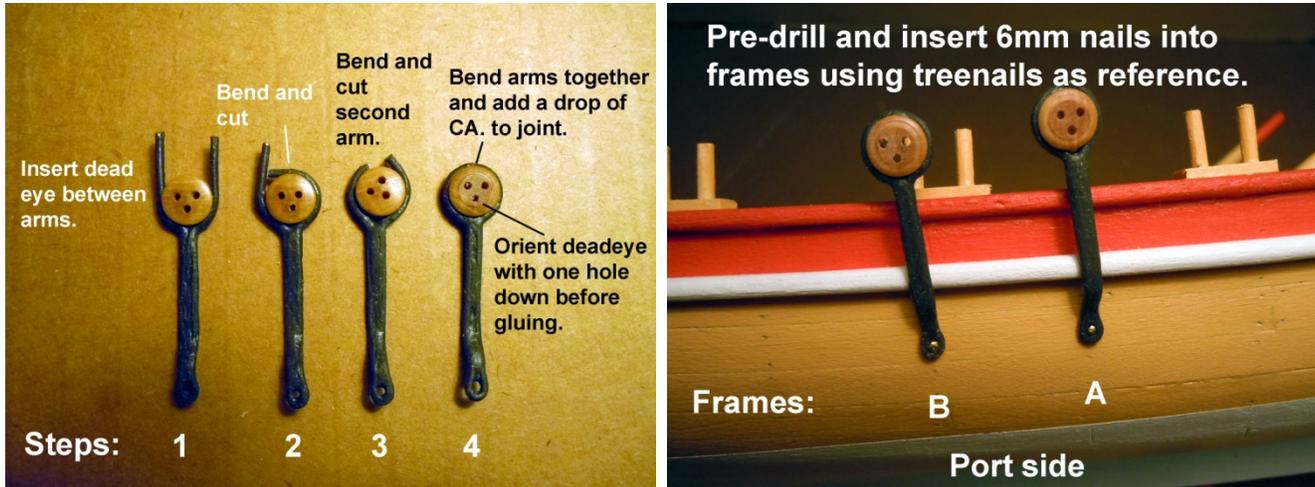
**Standing Rigging:** With the Main Mast insert a tooth pick into a false sheave hole in the upper mast, and then slip the primed and painted cast **Boom Band** into place on the top edge of the Red paint area of the lower **Main Mast** and orient it with the ring aligning with the toothpick. Once aligned glue with thin CA added under the boom ring on the **Boom Band**. See photo above.

Slip the **Main Mast** in place through the **Mast Bracket** into the **Mast Foot** with the **Boom Band** ring facing aft to the stern. **DO NOT GLUE** Mast in place.

Gather four (4) each of the following parts to complete the **Chain Plates**: **7mm Nails**; cast **Chain Plates**; **Deadeyes**. Insert a **Deadeye** down between the **Chain Plate** extended arms for a snug fit with the one hole of the three forming a triangle pointing down. Look at the picture. Then slowly bend one arm around the **Deadeye** and mark the arm at the top of the **Deadeye** with a blade, back off the arm and snip with cutters for a square cut using the flat side of the cutter blades. Bend arm back in place

and now bend the other arm and mark at joint of first arm and cut square and press back in place for a tight butt joint of the two (2) arms. Add a drop of Medium CA on the joint. See photo below.

Repeat the above for the next three (3) **Chain Plates** for a total of four.



Identify the first and second **Frames (A and B)** just aft of the **Main Mast** now using the **Frame** treenail marks on the outer hull on the first full **Plank** below the **Rub Rail** in the middle of the **Plank** mark and drill holes for the **7mm Nails**. The **Nails** should fall on the **Frame** locations, so measure twice and drill once. See photo above. Insert the **7mm Nails** into the holes on the **Chain Plates**, some holes may be too large for the **Nail** heads so carefully with pliers crimp the hole shut onto the **Nail** for a tighter fit. Insert **Nails** into holes and the four (4) Chain Plates should be in place with **Deadeyes** above the **Cap Rail**. See plan view sheet 3 drawing detail.

Cut five (5) 16" lengths of the thicker Black line for the shroud lines. Wrap one end of the line around a **Deadeye** and secure with a small alligator clip. Now seize the **Deadeye** shroud using the thinner Black rope in three (3) locations. See drawing detail on plan sheet. Start the seizing using a Clove Hitch knot and then followed by a series of 4 or 5 half hitches. Carefully touch a drop of thin CA to the rope ends to be cut off. Cut off excess rope ends both thick and thin with sharp scissors being careful not to cut the seizing ropes. **Note:** There is a drawing detail on a plan sheet to tie a **Clove Hitch**.

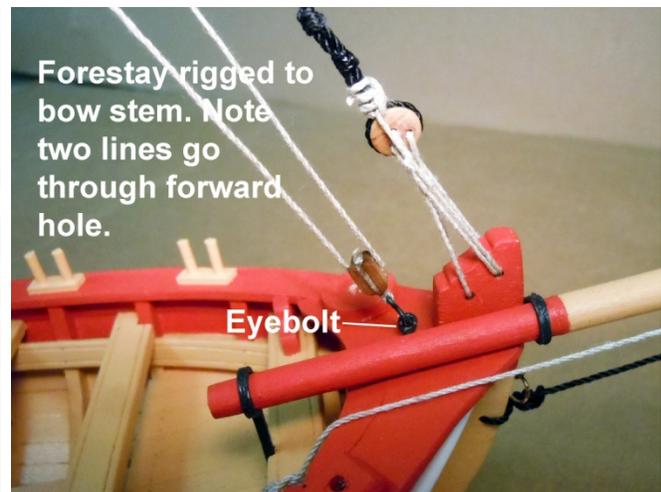
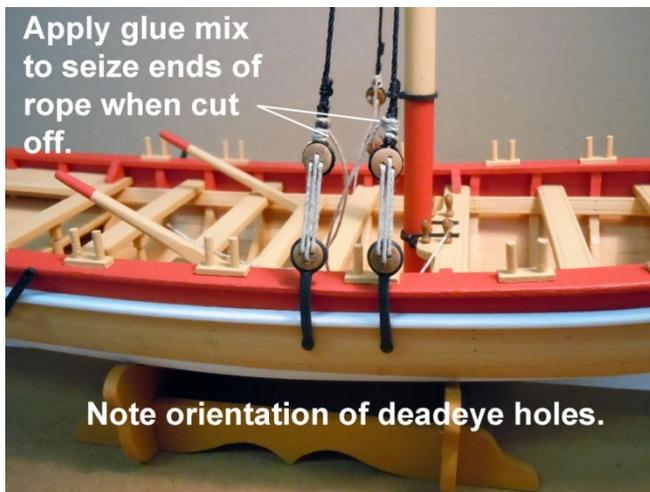
Repeat for the four (4) remaining **Shroud** lines. Note that 4 lines are for **Shroud** lines and 1 for the **Fore Stay** line from the bow.

Cut a 10" length of the Tan rope and touch one end with thin CA to form a needle point by cutting the glued section at an angle with scissors. Now tie a common over hand knot in the other end and carefully touch the side to be cut off and just the knot with thin CA. Once CA has set cut off excess close to the knot. This knot will be the **Stopping Knot** in the **Deadeye**. Now to rig the shroud **Deadeyes** together; study both the picture and the drawing on the plans to understand the threading sequence which is critical.

**Shroud Lines:** Review and study the sketch on Plan View of rigging Deadeye Detail. Starting with the starboard forward **Chain Plate** location, thread the line through the lower right hole in the **Shroud** Black line **Deadeye** from the backside and snug up the **Stopping Knot** that will face inboard; continue by

threading through the corresponding hole in the **Chain Plate Deadeye** from the front side. Now coming up the backside thread through the top center hole and down to the front center hole; now up the backside to the upper left hole threaded through and down to the lower left **Chain Plate Deadeye** and back up. Now tighten all lines between the **Deadeyes** individually with **Deadeyes** roughly 1 inch on center and slowly bend the **Chain Plate** to the hull while tightening the lines. Once in position lash with half hitches just above the **Shroud Line Deadeye**; carefully soak where the line is to be cut off and the lashing with a 50/50 mix of white glue and water. Once dry cut off the excess line with sharp scissors. Now using a Clove Hitch tie the **Shroud Line** to the shoulder on the **Main Mast** keeping in mind the position of the **Mast Boom Band** to the stern. Also do not over tighten to pull the Mast out of plumb, or use to pull into plumb if the **Mast** is not. Leave excess line in place until all four (4) lines are tied in case some adjustment is needed.

Now repeat for the forward port **Shroud Line** and **Chain Plate**; then starboard aft and finally port aft making sure not to over tighten and pull the **Mast** out of plumb. Check all lines and ideally they are all equally taut. Once satisfied apply the white glue mix to the stack of Clove Hitches and lines where to be cut off to avoid unraveling. Apply Medium CA on the **Nail** heads on the **Chain Plates** and thin CA where the bottom of the **Chain Plates** touch the hull to secure in place.



**Fore Stay Line:** With the remaining tied **Shroud** line with **Deadeye**; rig using the same sequence as above with the exception being that the lines will index through the two (2) holes in the **Bow Stem** with two lines going through the **top** hole. Tie off using a Clove Hitch and a taut line above the series of Clove Hitches already tied to the **Main Mast**. See photo above. This line in conjunction with the **Backstay** lines secures the **Mast** in place.

**Backstay Pendants:** Cut a 13" length of the thick Black line and strop two (2) **Single Blocks** to each end by wrapping the line around the **Block** with rope hole in the **Block** facing the line where it is to be seized with the thinner black line. **IMPORTANT:** Keep in mind to add a length of 3/64" brass rod to provide a hole at the bottom of the block for the Tan line to go through. Leave Rod in place until ready to index the Tan line. Once seized with the thinner Black line apply white glue mix to seized knots and where excess line is to be cut off and the rope on the sides of the **Block** to hold in position. Once glue is dry, cut off excess line.

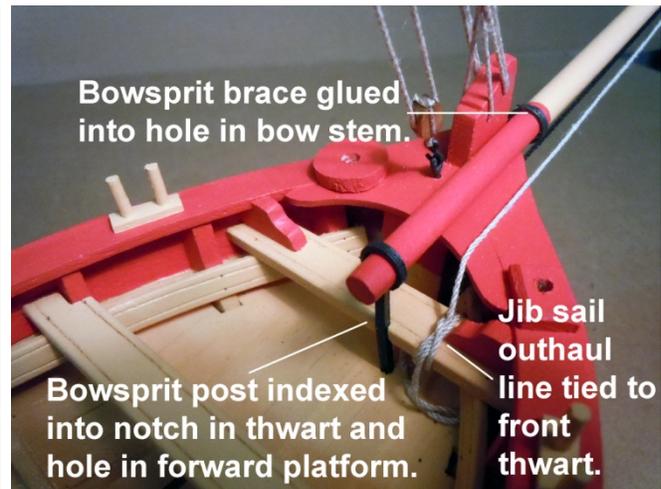
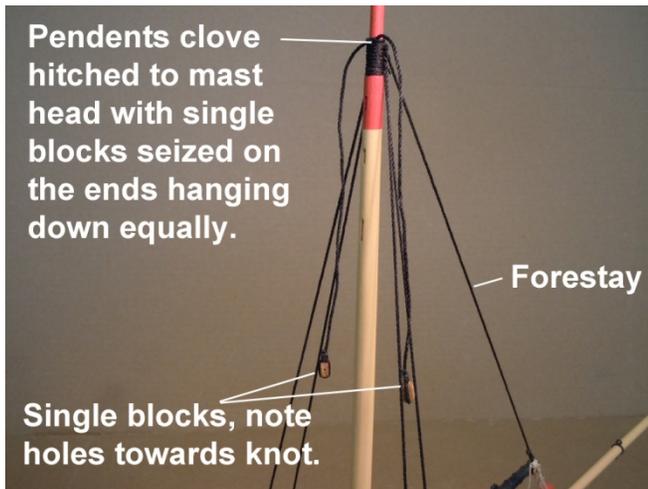
Tie the **Pendants** with a Clove Hitch facing to the rear to the **Main Mast** just above the previous Clove Hitches with the **Pendants** hanging equally in length from the Mast and apply white glue mix to center of Clove hitch to hold in place.

Gather the **Backstay Chain Plates** (2) and two (2) **7mm Nails**. Mark and drill holes for 7mm **Nails** and check hole fit per **Shroud Chain Plates** at **Frame 6** location the same one as the **Lifting Ring**. Insert **Chain Plates** in place.

Now form two (2) **Hooks** using 1/32" brass rod and needle nose pliers. See Photo below. Strop the two (2) **Hooks** to two (2) **Blocks** using Tan line.

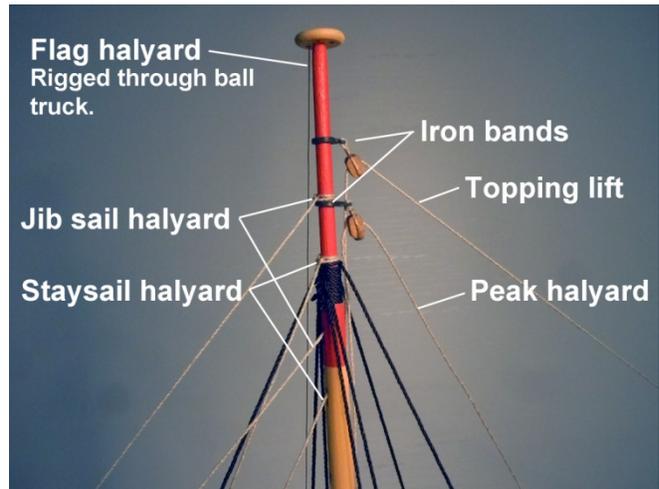
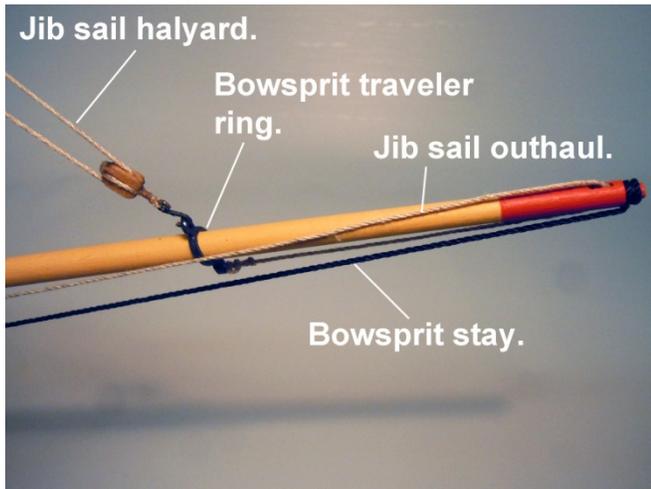
With Tan line add a drop of thin CA and cut to make a needle point and insert end through the hole in the starboard **Pendant Block** once the brass rod is removed. Then seize to the **Block** using the thinner Tan line. Apply white glue mix to seizing ends and line end to be cut off. Now cut the length of rope to about 22" and thin CA the end and cut at an angle. Now insert the line through the hole in the **Hooked Block** and back up to the hole in the **Pendant Block** and then back down; attach the **Hook** into the **Chain Plate** hole and slowly tighten the lines until taut and bend the **Chain Plate** tight to the **Hull**. Once all lines are taut lash the rope end to the **Hook**, apply white glue to the lashing and excess rope to be cut off. When glue has set cut with sharp scissors. See Photos.

Repeat for the Port side **Pendant** and **Chain Plate**.

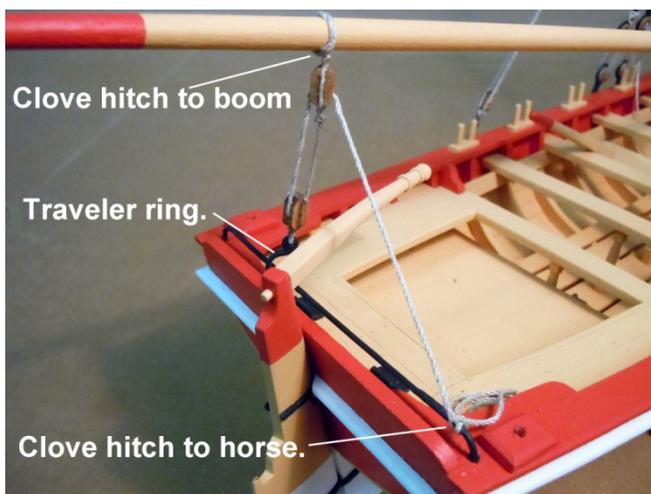


**Bowsprit:** Locate both the cast **Bowsprit Brace** and cast **Bowsprit Post**. Insert the **Bowsprit** into the **Bowsprit Brace** and hold in position flat on the **Cap Rail** on the starboard side of the **Bow Stem** and mark and drill a hole for the locating pin on the **Bowsprit Brace** in the **Bow Stem**. Now glue the pin in place while holding the **Bow Sprit** in position with the inboard end and align with the back edge of the first **Thwart**. Align the **Bowsprit** with the centerline of the boat; slip the **Bow Post** in place and mark to cut a notch in the back edge of the first **Thwart**. Cut the notch the depth of the **Post** and replace the **Post** back in position in the notch and now mark the location to drill a hole in the **Front Platform**. Make sure to align the **Post** vertically when marking. Now drill a 1/16" hole on the mark; clean and dry fit the **Post** in the hole. Once satisfied with the fit glue the **Post** in the hole and at the notch.

**Bowsprit Stay Line:** With the **Bowsprit** in position and the sheave opening facing up and down tie a length of the thicker Black line through the hole in the **Bow Stem** below the **Bowsprit**. See Photo. **Important: Now slip the Traveler Ring onto the Bowsprit.** The **Traveler Ring** is used to set the jib sail in and out on the **Bowsprit** when under sail. With the **Traveler Ring** in place tie a Clove Hitch at the end of the **Bowsprit** indexing on the shoulder cut. The line should be taut and smooth; not hanging or loose. Now all **Black Standing Rigging** is complete.



**Running Rigging, Boom Step 19:** Strop two (2) **Single Blocks** with Tan line and seize to the **Main Mast Iron Bands**. Position both on the **Mast** with the lower **Band 2"** down from the top of the **Mast** and the second **Band 3/4"** above the lower one and glue in place with **Blocks** facing to the stern. Carefully insert the **Boom** hook into the **Iron Band** previously installed on the **Mast**. Attach the large Tan line (**Topping Lift**) to the end of the **Boom** using a Clove Hitch and feed the loose end through the top **Band Single Block** and down to the starboard aft **Belaying Pin** location. Feed the loose end through the hole and insert a tooth pick to hold the line in place. Cut the line below the **Thwart** leaving enough line to be able to pull taut later.

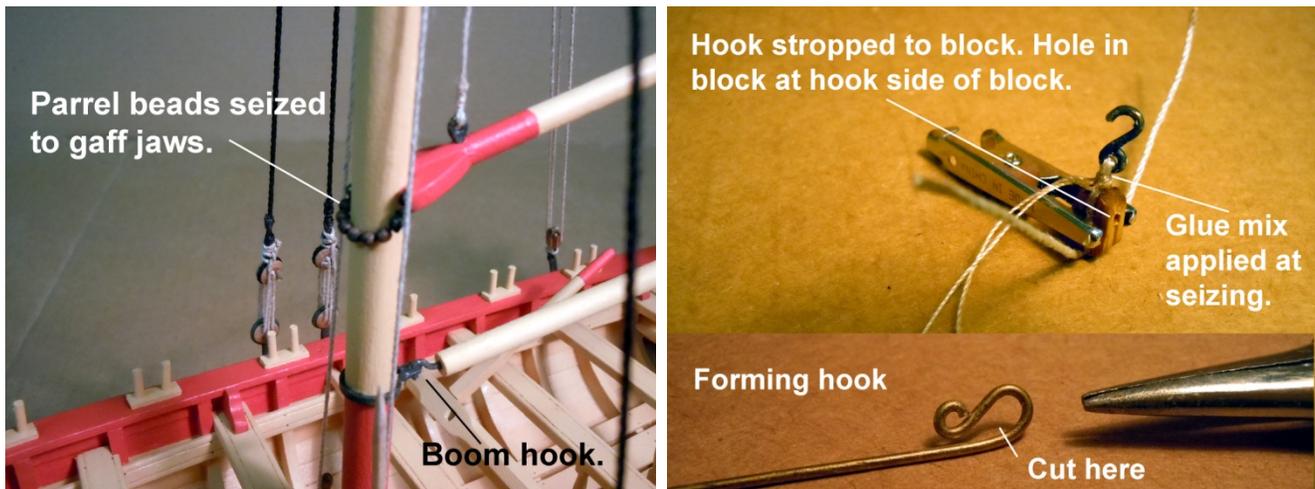


Cut a 12" length of Tan line and strop one end to a **Single Block** and then attach to boom over the **Horse** location. See photo above. Now strop a **Single Block** to the **Horse Traveler Ring**; remove one

end of the **Horse** and slip the **Traveler Ring** with **Block** onto the **Horse**. Now insert the loose end of the Tan line into the **Single Block** attached to the **Traveler Ring** and back up through the **Block** attached to the **Boom** then lash the line to the starboard end of the **Horse** and then drape the balance of the line into a coil laying on the platform in the corner. See Photo.

**Gaff:** Cut a 7" length of Tan line and attach with Clove Hitches to the end of the **Gaff** and then to the middle of the **Gaff**. This will be the **Lift** line for the **Peak Halyard**.

Tie a thin Black line to one of the holes in the **Jaw** of the **Gaff** and then slide 7 or 8 **Parrel** beads on the line and carefully add the **Parrel** line around the **Mast** and tie the end in the other hole in the **Jaw**. With the **Gaff** secured to the **Mast** now tie a Clove Hitch in the center of the Lift line and soak line to be cut off with white glue mix. Now index the loose end (**Peak Halyard**) through the lower **Single Block** and down and through the **Forward Port** belaying pin hole and secure with a belaying pin. Cut the line below the **Thwart** leaving enough line to be able to pull taut later. Repeat with a line secured to the **Eyebolt** aft of the **Gaff Jaws** index the loose end it through the **lowest False Sheave** in the **Mast** and secure with a belying pin in the **Port Aft** hole location. See photo above.

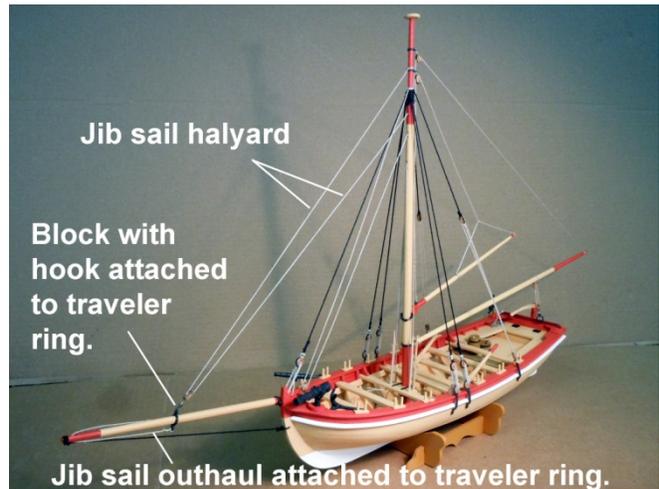
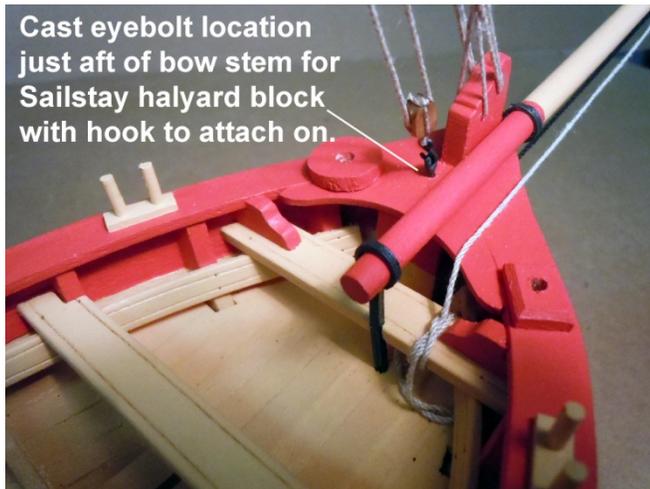


**Staysail Halyard:** With .032" brass rod form two (2) small **Hooks** to be stopped to **Single Blocks**. Use small needle nose pliers to bend the brass rod forming a small tight loop around the tip of the pliers, then cut off the "flat" spot that was held in the plier's jaws with the flat side of the cutters for a square edge. Now carefully with the pliers crimp the loop to form a circle or as best as possible. Next, gripping the shank of the **Hook**, bend the brass rod back around to touch the loop. The size of the loop can be adjusted as needed. Then cut the loop and file the end flat. See photo above.. Prime and paint the **Hooks** black.

When the paint has set, stop both **Hooks** to **Blocks** using the thick Tan line though the **Hook** loops and around the block and glued on the topside of the **Block**. Set both aside for now.

Locate the remaining cast **Eyebolt** and cut the round shank down to about 1/4". Next drill a 3/64" hole 1/8" aft of the **Bow Stem** on the centerline and dry fit the Eyebolt. Glue **Eyebolt** into the hole once fitted with ring opening facing side to side.

At the top of the **Mast** tie a Clove Hitch on top of the stack of black Clove Hitches and soak the end to be cut off with the white glue mix and cut off excess when the glue is set. Insert the loose end of the line through the **Single Block** with a **Hook**; attach the **Hook** to the **Eyebolt** and index the loose end of the line through the **middle False Sheave** drilled in the mast and down to the starboard forward belaying pin location insert it through the hole and secure with a belaying pin. Cut the line below the **Thwart** leaving enough line to be able to pull taut later.

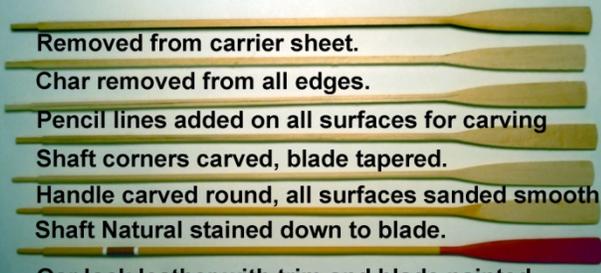


**Jib Sail Halyard:** Tie the thick Tan line using a Clove Hitch just above the lower **Mast Band**. Insert the loose end of the line through the **Single Block** with a **Hook**; attach the **Hook** to one (1) of the loops on the **Bowsprit Traveler Ring** and index the loose end of the line through the **top False Sheave** drilled in the mast and down to the **starboard forward** belaying pin location insert it through the hole and secure with the belaying pin. This belaying pin location **has two (2) lines** to it. Cut the line below the **Thwart** leaving enough line to be able to pull taut later.

**Jib Sail Outhaul:** Tie a loop using the thick Tan line through the lower hole on the **Traveler Ring** below the **Bowsprit** seizing the rope with the thinner Tan rope. Pass the loose end of the rope through the false sheave at the end of the **Bowsprit**. Bring the line back across the **Cap Rail** and using a Clove Hitch secure the line to the first **Thwart** and form a coil with the excess line laying on the **Front Platform**. The **Running Rigging** is now complete. See photos above.

**Oars Step 19:** Remove the **Oars** from the laser cut carrier sheet. Remove the char from all the edges to have a clean surface for pencil lines. Look at the photos below and study what lies ahead. Now mark pencil lines on center completely around the perimeter of the shafts and blades. Then mark the top and bottom of the **Oar** shafts down the center line. Next mark the bottom edge of the **Oar** blade on center with a 1/32" thick dark pencil line to be used as a guide for carving the taper on the blade. See the photos below.

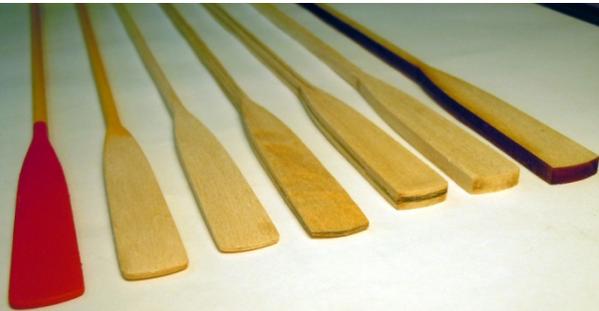
### Sequential steps to make the oars.

- 
- Removed from carrier sheet.
  - Char removed from all edges.
  - Pencil lines added on all surfaces for carving
  - Shaft corners carved, blade tapered.
  - Handle carved round, all surfaces sanded smooth.
  - Shaft Natural stained down to blade.
  - Oar lock leather with trim and blade painted.

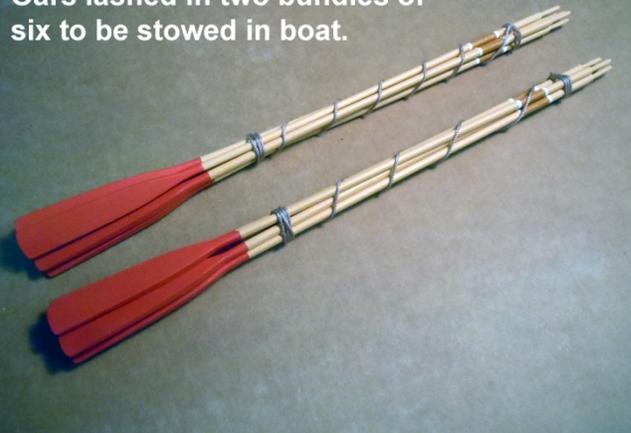
### Oar shaft steps close up.



### End view of oar blade carving steps.



### Oars lashed in two bundles of six to be stowed in boat.



With a sharp hobby knife blade slowly starting at the top of the blade carve down to the 1/32" pencil on one side then turn over and carve the other side. Using 120 grit sandpaper sand smooth and even out any blade cuts on the blade surfaces. Now carve all the rest of the blades.

Very carefully and slowly carve off the corner edges of the shafts to a slight oval shape and then sand smooth using 120, and then 220 grit sandpaper. **Tip:** Carving the corners is easier just using the upper tip half of the hobby knife blade.

Now carve the round **Oar** handles at the end of the shafts. Carefully score a cut line around the handle with the sharp blade and starting at the end carve slowly to the scored cut line. Be very careful not to cut the score line too deep or one may break the handle off. A half round needle file will offer more control to smooth the round handle and round off the end of the handle. See photo above.

Once all are carved and sanded smooth, stain the shafts down to the transition with the blade and apply two coats of Natural Stain. Once the Natural Stain has dried, mask off the shafts 3" up from the tip of the blades and apply two (2) coats of Gun Carriage Red. Once the red paint has dried; mask off a 3/4" section starting down 2-1/4" from the handle end back towards the handle end. Paint the masked

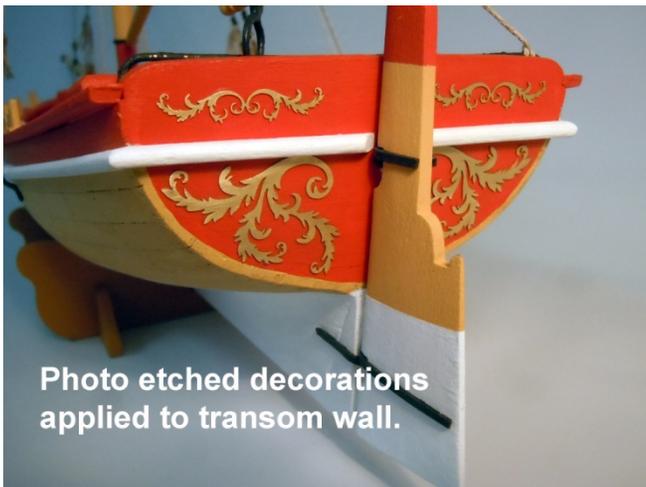
off section white and apply two coats. When the white has dried; paint a Yellow Ochre section leaving two (2) white stripes at each end. See photo above.

For boat storage tie two bundles of six **Oars** together or display later in the **Oar Locks**.

## Decorations Step 20

Before removing any of the parts from the brass carrier sheet gently sand in the horizontal direction of the part design with 120 grit sandpaper both front and back surfaces. Use a small piece folded in half and use the folded edge against the brass sheet so as not to catch any of the part edges. Use light even strokes to remove any surface oxidization.

Study the photos below and always dry fit the parts in their locations before gluing them down. **Note the design orientation of the parts.** Remove the rudder if it is in place. Start with the large stern parts to get use to working with P.E. parts and position it on the **Transom Wall** while the hull is held vertically and with a .020" brass rod add a drop at a time of thin CA to the edges of the part. Let the first drop set and check positioning before adding the rest of the CA drops. Repeat on the opposite side. Next, add two of the smaller decorations above the large ones centered vertically in the space above the white **Rub Rail** and the top edge of the **Transom**. Check to see under bright light for any CA on the surface of the brass and very carefully scrap any off with the back edge of a hobby knife blade. Excess glue on the wood will be hidden when Flat Finish is sprayed when completely finished with all decorations.

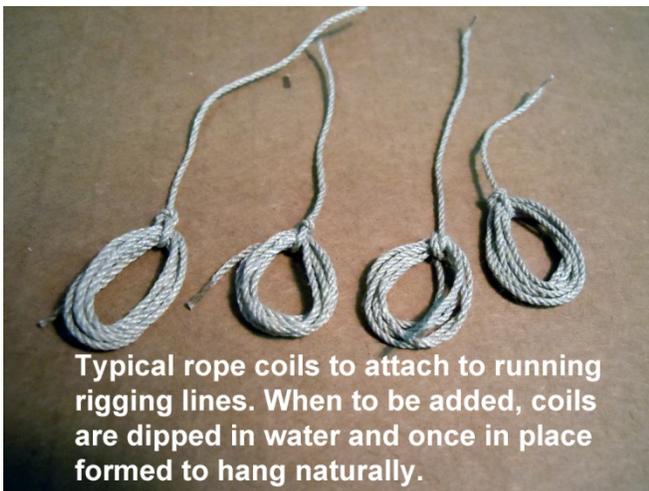


Next apply the side decorations centered between the white **Rub Rail** and the **Cap Rail**. Start 1/64" in from the stern **Transom Wall** and add each part carefully gaping them 1/64" as shown in the photo above. **Note the design orientation of the parts.** It will help greatly if a working cushion is made by rolling up a towel from each end to form a valley for the hull to rest in sideways. This will allow gravity to work with you. Again, dry fit each part and position properly before adding drops of thin CA to the edges. Work slowly and carefully and maintain the correct design orientation. The parts will easily fit under the chain plates while they are in place. When getting to the last four (4) parts at the bow end; dry fit all the parts and a slight curve may be needed for a tight fit against the hull surface. Justify the gaps between the parts so that they are even up to the **Stem Post** at the bow. See photo on next page. Clean and sand all parts of any excess CA on the surface of the parts. Repeat for the other side of the

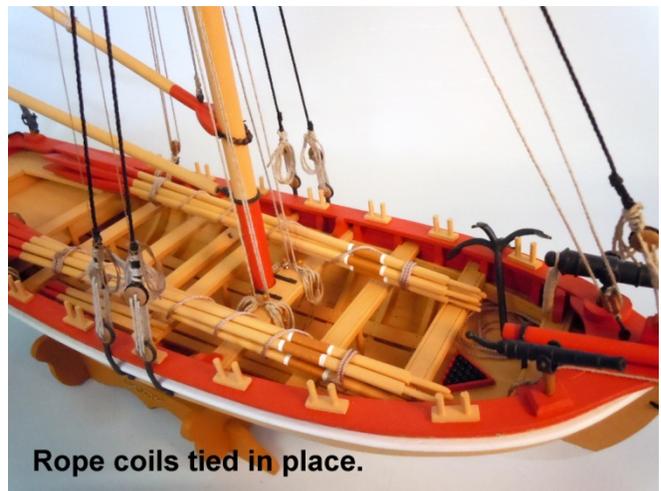
hull. Once all are in place, lightly spray coat the decorations only with a Clear Flat Finish. Shield the other boat parts with sheets of card stock when spraying. Spray two even light coats only. This will help the parts from tarnishing. **Option:** Add two (2) small decorations to the sides of the stand.



Justify the last four parts to the stern post equally.



Typical rope coils to attach to running rigging lines. When to be added, coils are dipped in water and once in place formed to hang naturally.



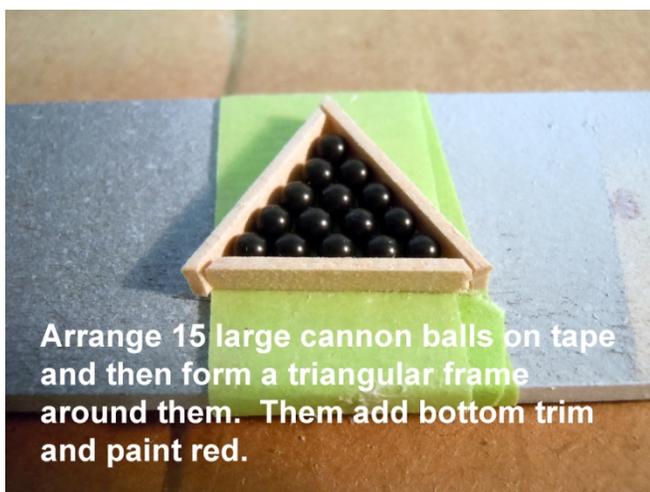
Rope coils tied in place.

**Rope Coils Step 21:** Coils are best formed with wet rope wrapped around a plastic object like a marker or large Sharpie pen that the wet coil can be slipped off. The **Shroud Coils** (6) have only three wraps while the belaying pin coils will have 5-6 wraps. Once wrapped and tied attach with a Clove Hitch to the shroud just above the existing lashing. Position and form them to hang naturally. See photo above.

**Bucket & Barrel, Step 22:** Before priming score the wood joint lines deeper on both the **Bucket** and the **Barrel** with hobby blade tip. Then prime and paint accordingly. **Barrel** straps are Black the wood Brown color is mixed using Yellow Ochre as the base and add drops of Black and mix until the desired Brown color is achieved. Use a small round brush to apply the paint and if thinning is needed use water. The **Barrel** will need a **Cork** carved from a scrap of the 1/16" dowel and inserted in the hole in the end. Place the **Bucket** and **Barrel** where best suited in the cockpit.



**Cannons & Cannon Ball racks, Step 23:** The large **Cannon** has two (2) **Support Mounts** that slip over the trunnions on the side of the barrel; the two flat surfaces mate and the **Slip Ring** holds them together with the flat shoulder riding on the round wood **Cap Rail Mount**. Dry fit once assembled to check for fit into hole and enlarge the hole if necessary. A seized coiled rope may be added to the end of the cannon that would be used to tie down the cannon in rough waters.



The small **Swivel Cannons** consist of a barrel and stand. Carefully spread the **Stand** arms apart enough to insert the **Barrel** trunnions into one side and then the other and then slowly press the arms together to trap the trunnions. The tapered bottom is painted Brown using the Bucket Brown paint. Cut thin strips to form triangular **Cannon Ball Monkey** around 15 cannon balls stuck to tape to hold together. Once frame is glued cut a thin bottom to fit inside triangle. See Photo above. Glue sand and paint Red. Then cut strips to form two small **Cannon Ball** carrier racks with rope handle and painted Red. One located at starboard bow and the second between the **Locker Hinges** against the **Transom Wall**.

Set the longboat in the stand, add all the loose parts; rudder, anchor, cannon, swivel guns, oar bundles, barrel and bucket in their respective locations desired. The longboat is complete.

Following are reference photos of completed armed longboat.

