For Sue and Olga

With thanks to Kurt

AN INTRODUCTION TO "SCRATCH" BUILDING

My Build of an East Coast Oyster Sharpie

Circa 1880 - 1890

First off, let's forget about the continuing rhetoric of which is the more deserving of a "Best of" recognition" from judging in ship model contest entries - the one that starts off from a kit, or the one that is scratch built from the beginning. My position on this debate is simple: I don't care how it was built! A beautiful model is a beautiful model and I try to build each of my models to very best I can at the time I build them. The only critic that I care about is the guy I shave with every few days, (I'm retired so I have that luxury!), and when he gazes back at me with that look of "who are you kidding, "I know you – you can do better!" I take a second look, and it's back to the Shop for a little "problem" solving.

The nice thing about "problem solving" is all the help that is out there, most of whom are very willing to share their knowledge and experiences with you, to help you with the learning curve you are constantly undergoing. They won't build your model, and, I assume, you don't want them to, but having this help makes your model, **your model** to the best of **your current ability**, which will continue to grow with each effort whether you realize it or not.

If you're like me, you want to build models of vessels that have some connections with who you are – maybe its trip to Mystic (a New Haven Sharpie), a vessel you toured as a Boy Scout (a WWII destroyer) or a fishing trawler you came across in a magazine (Boston Typhoon). So, you do some research and find that what you want to build isn't available in any over-the-counter commercial production, but do find a set of plans that can be ordered. The latter two acquisitions were easy, and I thank Revell and Mount Fleet Models, however, Mystic's 35"4" was made from a sheet plan and lots of pictures. So, if you can find a commercial kit for your build, good! But if all you can find are plans of what you seek, "scratch building" can be your answer. **And it need not be intimidating!**

I have my own definition of what it means to "scratch build." I pick a project, I find the plan that I need, I make a list of what I need in all materials need, and put them in a plastic storage container. NOTE (To achieve my goal, I do not deny myself a few commercial components when I don't want to take the time to make a component, or when making that component is not currently been addressed by my learning curve. This is my kit! it's my goal to be "Best of, Am I entering the model in a contest? Yes, I am – with my shaving friend as my judge. Let's let the judging begin!

What scratch building means to me

My experiences in scratch building a model have an upside I really enjoy – it's a challenge in thought, action, artistry, and even frustration, for there will be frustration to overcome. You learn quickly that you must approach the build, knowing that expectations go hand in hand with the growth of your position on the "learning curve". So, when you get exasperated, and you will, don't take yourself too seriously. Relax! Take a break! Then put on your favorite music and take up the challenge and go back to having fun, and remember the immortal NIKE commandment "Just Do it! Try with a fresh start." This is where "thought" comes in. When I run into "a screw up", of my own doing, I want to know what went wrong. So, I look for resources, in the form of other ship modelers, "the NRG's Model Ship World Forum" , my library, a picture, and I have even sought an opinion from my wife. It's uncanny how easy it is to overlook your own work and not see your own errors. A second set of eyes is always helpful. Ever had a spouse says to you, "This here doesn't look right and shouldn't that piece be a bit longer?" My wife, Sue, knows me and my work and she knows when both the work and person are "a little off."

I hold "action" as not being afraid to take up the challenge. Move ahead as best you can. Nothing will happen unless you are willing make the attempt. Think of it as taking an open book test. Success in the open book test was a result of doing your homework. The fix is out there; you just need some help finding it.

This brings us to "artistry." When I can step back after a work session and like what I see, I know I'm on the right track, and I feel good! However, if I see what I have done just doesn't satisfy me, I work to get right. Most of the time the cause is not in the learning curve mastery. Somewhere between "thought and action" you get off track. It could have been lack of motivation (other thoughts on my mind), or "racing against the clock," (Why? It's a hobby, don't make it work), or just frustration (doubting yourself and not recognizing that this form of building takes time and a willingness to "hang in there!"). Suggestion: Work through the process when the "good vibes" are there. When there not, take the day off.

Frustration is a funny thing: it can be a discouragement or a motivation. Because I know I'm working hard and enjoying it, I'm doing something wrong, I'm fighting the task at hand. So, I put the task aside and do something else for a while. In the meantime, I accept the "frustrating task" as a challenge. That pause lets me reflect or "brain storm the problem, and I usually come up with a solution. An example: I use my scroll saw quite a bit in my modeling, and when I I start scrolling, I know in a few minutes, if the "love-hate affair" we have at times, is love, or hate. When hate has raised its objection to my using my machine, I shut it down and head to a friendlier environment. When love wins out, I go back to it, and will keep going back, because "all is right" in my shop and my head.

These plans and instructions are guidelines. They are written specifically for a beginning scratch ship modeler or one seeking a little assistance. I'll outline mistakes that I make and tell you how I fixed them to my satisfaction and my desire to keep running up **my** learning curve. The nice thing about scratch building is the control **you** have over the model's construction. I'm no longer stuck with inadequate plans, inadequate materials, poorly written instructions, out of scale components, laser cuts that do not fit. That having been said, II still build from kits, but the builds are greatly modified to produce my vision of a successful model to my standards and I can now transfer the artistry into the model and that is because I got on the scratching building learning curve and took the next step forward.

Bill Strachan, January 5, 2018

Getting Started

Here are some things that you should know about these plans and instruction manual:

1) **I am going tell you how I am building this model.** You have many options to proceed in any way you may feel more comfortable with, from previous modeling experiences. Note, however, that I will progress in systematic fashion. I like to call it my "I hope I won't get caught with my back to the ceiling planks with no way out of the hold," method."

2) When I use a tool or machine that you might not own or have access to, I will try to offer you an alternative route to accomplish the task at hand. I will admit, that if you are a serious modeler with a desire to put the time into this hobby, that you will find there are a few basic tools that you might want to add to you shop. A purchase of these tools can increase your accuracy, your options on how to approach a project, and a tremendous saver of time.

3) These plans and instructions are designed to meet the needs of a ship modeler "making the leap" into a scratch build. The drawings not only show you the construction details but are accompanied by a series of building templates to make your build process easier and better understood. In addition, the set contains a second set of template sheets so you don't have to photocopy or cut up the original set of plans.

4) I owe a great deal of thanks to the research aides provided by Howard Chapelle and the others, whose works are listed in the Bibliography. I will share that research with you as the build proceeds. You will find that you have some options, at times, to vary the build to add components that "changed" the sharpie design through the decades of the late nineteenth century. Remember, this is a generic build using historically accurate components. My build era is circa the 1880's.

5) So, the first order of business is to study the plans and read ahead. I break down the build into phases. With each phase comes a set sequence of how to proceed. It may not always be clear as to what exactly is the best systematic sequence procedure. I encourage you to read ahead and understand the logic of my progression, it may be helpful in developing your own analysis of how to take a plan and logically transform it into a beautiful model,

Recommended Reading

Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, pp. **100-133.**

Chapelle, Howard I., **American Sailing Craft**, Bonanza Books, New York, 1936, pp. **3-16**

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **25-271**.

Did you know...

"The rules for sharpie proportions and form are approximately as follows:

1) The beam on the bottom should be about 1/6th the overall length.

2) The flare amidships should be 3 ½ inches to 4 inches per foot of depth – less if speed alone is desired, more if seaworthiness and safety are important factors.

3) The freeboard should be low, but a rather strong sheer is highly desirable.

4) The displacement must be as light as possible, with the usual sharpie construction; outside ballast, heavy keels, and heavy displacement must be avoided.

5) The chine line, in elevation, must appear as follows: the heel of the stem should be above the water line; the chine runs straight for about one-third the overall length of the hull abaft the stem, sloping downwards toward the midsection. The chine then curves gently to the point of greatest draft, and runs upward to the stern in a flat, gentle curve. A long run is important.

6) A light rig is necessary for safety. Due to the narrow beam and lack of ballast, the multiple-masted rigs with low centers of effort are best; one-masted sharpies, of the proper proportions of hull, are not sufficiently canvased for high speed in light airs. For the best results in the sharpie type the hull weights and spars should be light." [1]

Plan Title Block Descriptions:

Sheet 1 of 11 – Shear, Body, and Full Breadth views, Construction Building **Jig 1**, Station Templates

Sheet 2 of 11 – Structural Components of a Sharpie at Bottom, Side, and Center, and Deck, at all 11 Station Lines

Sheet 3 of 11 – Framing Details at All Station Lines, Centerboard Assembly, and Removeable Bottom Flooring.

Sheet 4 of 11 – Building Board Construction **Jig 2**

Sheet 5 of 11 – The side planking

Sheet 6 of 11 – The structural details

Sheet 7 of 11 – Masting & Rigging, Option 1 (a Gaff rig)

Sheet 8 of 11 – Masting & Rigging, Option 2 (a simple sprit rig)

Sheet A1 of 11 – Building **Jig 1** and **Jig 2**, Building Board Patterns (for your use in the Construction of Phase 1 and Phase II (for your use)

Sheet A2 of 11 - Building Board Construction **Jig 2 (**for your use**).**

Sheet A3 of 11 – Miscellaneous building patterns (for your use)

[1] Chapelle, Howard I., **American Sailing Craft**, Bonanza Books, New York, 1936, pp. **8.**

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Phase 2: The Bottom Framing: or the "bottom's up" phase of the build

Using Jig #2 (BJ2) to construct the keelson:

The keelson, chines, & flat-bottom planking

Phase 3:

Phase 4:

Phase 5:

Bibliography

Books & Periodicals:

Alford, Michael B., **A Story of Shoal Waters and a Connecticut Yankee - Sharpies in the Carolinas.** Woodenboat, Issue 137, pp. 62-71.

Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, pp. **100-133.**

Chapelle, Howard I., **American Sailing Craft**, Bonanza Books, New York, 1936, pp. **3-16**

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **25-271**.

Chapelle, Howard I., **The Migration of an American Boat Type,** Contributions from The Museum of History and Technology: Paper 25,

Erikson, Emiliano, **The SAILMAKER'S APPRENTICE**, International Marine, A Guide for the Self-Reliant Sailor, (Camden, Maine), 2001, John M.

Kochiss John M., **Oystering from New York to Boston,** Wesleyan University Press for Mystic Seaport, Inc., 1974

Leather, John, **The GAFF RIG Handbook,** Woodenboat Books, (Brooklin, Maine, USA), 2004 (reprint)

MacCormack, John S., **North Carolina Oyster Sharpie Schooner,** Nautical Research Journal, 27: 3-8.

Oughtred, Iain, **SPRIT RIGS**, Wooden Boats magazine, May/June 1987, pp. 80-86

Rogers, Steve and Staby-Rogers, **Patricia, Model Boat Building Made Simple,** Schiffer Publishing, Ltd, West Chester, PA, 1992.

Time Life Books: **The Classic Boat,** (Alexandria, Virginia) 1977.

Plans referenced:

Hampton Mariner Museum, **"Idie" N.C. Sailing Sharpie**, 3 sheets, (Scale: 1" = 1' 0")

Mystic Seaport, sheet #1 (#351.4206), **16 ft. New Haven Sharpie,** (Scale: 1-1/2" = 1' 0").

Mystic Seaport, sheet #1 (#47.597), **35' 4" New Haven Sharpie,** (Scale: 3/4" = 1' 0").

PHASE 1

The Bottom Framing: or the "upside down" phase of the build

To lead off the build, I would like to acknowledge how simple this will be. Howard Chapelle, himself, agrees:

"**The construction is very simple.** The backbone consists of the long centerboard case, and a log keelson aft. This is made of three 2" x 8" timbers on edge, tapered aft. The sides are wide planks; usually three or four strakes are used. There is no rabbet on the stem, the planks being fastened to a triangular stem piece, and beveled together the hole being covered by a brass plate serving as a cut-water. If round, it (the stern), is stayed vertically with narrow stuff, on two stern frames. The bottom is always cross-planked, fastened to the sides and to the chine logs themselves……Oyster boats have but one bulkhead, just forward of the centerboard case. Stock of 1-1/2 inches is used throughout, mostly white pine; as a rule, the bottom is of yellow pine**." (the bold print in mine)**[1]

So, on that note of optimism – Off we go.

In this Phase, we are going build a construction jig upon which the hull framing will begin. The jig will be fixed to a base board that will have a sheet template attached to its surface showing all the information you will need to complete this phase. Below, is a list of abbreviations that will be used throughout to avoid carpel tunnel syndrome. I discovered the using BB1 in place of building board 1, yields a savings of 79% in key strokes needed.

Abbreviations: Phase I

BB1 = The building board to which the Construction Plan A template drawing is attached, will secure the perfect alignment of plan to jig as the build proceeds.

BJ1 = The building jig on which the models bottom framing and planking will be formed.

PBJ1 = The base of the BJ! To support the **ST's**.

C/L = Any reference to the centerline of the plans, the jigs, and/or the model.

ST = The station templates, used to build the frame patterns.

ST1 to 11 = The identification of the individual frame supports which will fashion the keelson, chines, and bottom planking. When **ST9** is extended with an **F (STF9): F** if facing forward, an **A** if facing aft.

TA1 = The construction template A as drawn on the plans for your use (plan sheet **A 1** of **3**).

[1] Chapelle, Howard I., **American Sailing Craft**, Bonanza Books, New York, 1936, pp.12-13.

The Plans:

NOTE: For the first phase, you need to be familiar with first 3 sheets. They should be studied carefully. In addition, you will need the TA1 on Sheet A1.

Sheet #1 – Shear, Body, and Full Breadth views, Construction Building Jig 1, Station Templates

Sheet #2 – Structural Components of a Sharpie at Bottom, Side, and Center, and Deck, at all 11 Station Lines

Sheet #3 – Framing Details at All Station Lines, Centerboard Assembly, and Removeable Bottom Flooring.

Sheet #A1 – Building Jig 1 and Jig 2, Building Board Patterns (for your use in the Construction of Phase 1 and Phase II)

The Sections write-ups for Phase 1:

1.0 The Building Board Base (**BB1**)

1.1 The Building Jig 1 ‘s Base (**PBJ1**)

1.2 Notching the Jig 1 (**PBJ1**) to receive the individual station templates (**ST**)

1.3 The anatomy of the station template

1.4 The life and times of **ST-9F**

1.5 Final assembly of Jig 1 (**BJ1**)

Phase 1: Building boards and construction jigs begin

An Outline:

1) The actual building process, described by Chapelle, is based upon an actual building support system that is “upside down.” For Phase I, we will do the same, so this phase will entail the set-up and actual build of the sharpie’s bottom framing and planking. It includes:

2) A suitable building board (**BB1**) upon which Construction Plan A (**TA1**) template will be adhered.

3) A Phase 1 building board Jig **(PBJ1**/**BJ1**) which will be fashioned and secured in position over the drawing labeled “Bottom Structure Showing Keelson.”

4) Making 11 station frame vertical support patterns and fitting them to the **PBJ1**

5) At this point, (remember I said some phases overlap), to complete the keelson, the Phase 2 Building Board Jig (**BJ2**) will be begin construction at the end of the Phase 1 instructions.

6) Using the pattern provided, we will construct the keelson, and then the chines (2), securing each to the **BJ1.**

7) The laying of the bottom planking “upside down” to the need to continue “right side up”, hence the need of the completion of the **BJ2**.

1.0 The BB1:

Materials that will be needed for the current Phase I Construction:

BJ1– 3/4 “x 1-1 2” pine or similar (my need was 16 1/2”).

Base material – 3/4” Plywood or MDC board as needed (see below).

Station Templates (ST) – 1 sheet 1/8” x 12” x24” Midwest craft plywood or aircraft plywood and 11, 1/4” sq. x 1 1/2” basswood, template supports

The build starts with a suitable working surface, nothing fancy, just that it lies flat, and can accommodate your first template: **Phase 1 – Construction Plan Template A (TA1)**. The dimensions for my base were established at 18” x 24” x 3/4” and I chose MDC board. If you’re like me, working on a model is a refined process of cluttering a work area, so I chose a little larger sized surface, for this template has all the visual construction drawings needed, right in front of you. I then placed some heavy duty felt “cushions” to the underside of the four corners of the base so as not to be accused of scratching the dining room table, which I have inadvertently done before. Next attach the **TA1** to the base surface. I chose to attach templates in their proper alignment, so I first drew a line across the bottom of the base, about an inch and half from the bottom, and to assure the line is parallel to the straight edge positioned on the **BB1**. This gave me an edge to guide the **TA1** when gluing it in place. The spray glue used was 3M 77 brand.

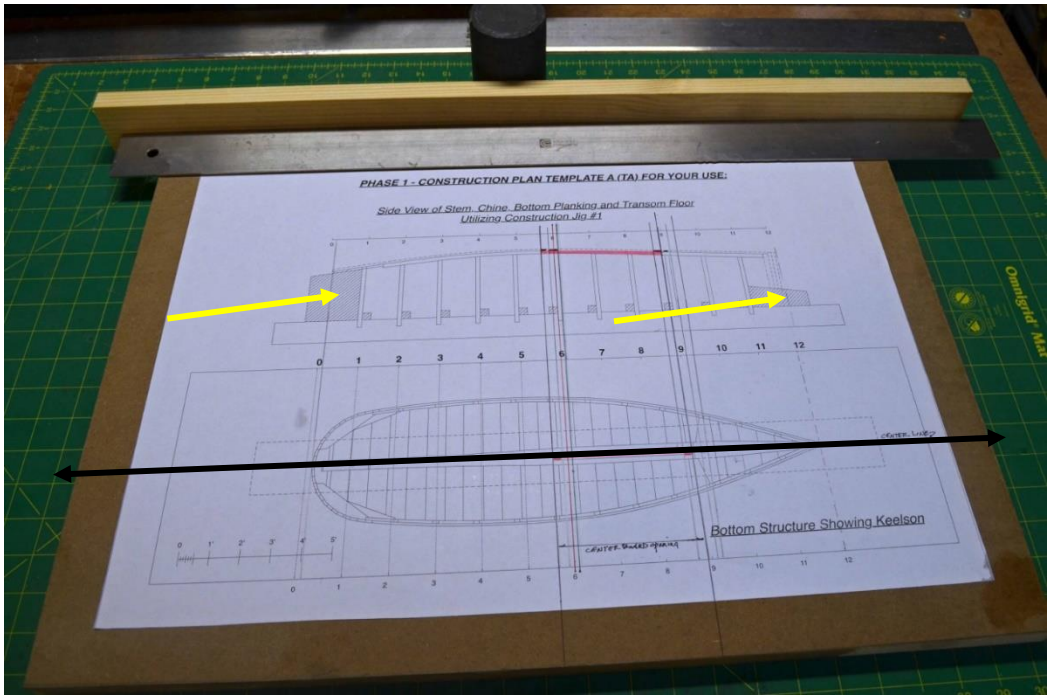


Illustration 1: The **BB1** and **TA1.**

1.1 The BJ1's pine base (PBJ1)

1) Mark a centerline (**C/L**) the full length of the pine base and extend the **C/L** down at each end. This will assure, that when you finish the pine base, you will have no problem accurately seating it onto the **BB1.** There are two templates in your plans for this build: **TA1** shows the side view of the finished **BJ1**. (**NOTE**: The side view on the board surface you see in **Illustration 1** has been revised. The **yellow arrows** point to support blocks which proved to be unnecessary.) Though the template has the station positions numbered and clearly delineated, before gluing the **TA1** to the **BB!** Surface, we are goings to add a few reference lines to make the build a lot easier.

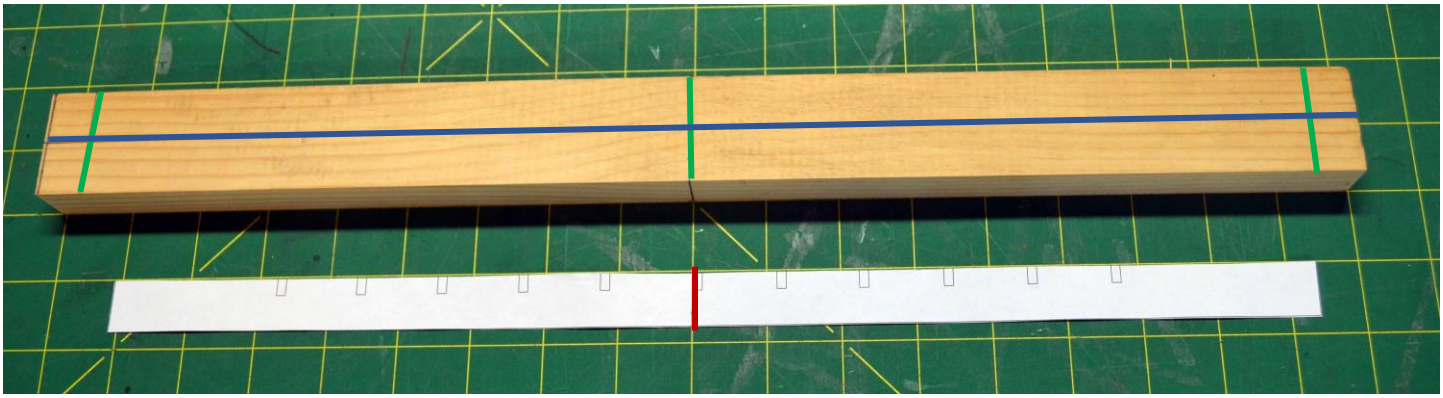


Illustration 2: Steps 1 - 3.

2) At the plan ("Bottom-Line Showing Keelson"), extend the **C/L** to the edges of the **PBJ1.** This will assure perfect alignment when fastening the **BJ1.**

3) At the plan ("Bottom-Line Showing Keelson"), extend the **C/L** to the edges of the **PBJ1** so that once the base is positioned over the plan, a **C/L** attachment is secured. Note the straight edge with the pine board and weight to hold the board fast, when the template was positioned at gluing. (**Illustration 1**).

4) Mark the two end lines across the base surface, 5/8" in from each end. Where they cross the **C/L**, tap a starter hole for a drill bit with an awl or small nail.

5) Test fit the template on the side surface. This template will have a good chance of "stretching" if pulled at the ends in the gluing process. Stretching is not good. I use a lighter spray of glue to the template. You can also use rubber cement) Your alignment point is station line 6, and not the end (0 and 12). I then pick up the paper by pinching with thumb and index finger on both sides of C/L, in the position shown below. When side and surface are aligned press down firmly to lock the center into position. Then very carefully, holding the end of the paper up off the surface with one hand, lay down the paper surface from the center out. It is less difficult than it sounds. The lighter touch with the spray glue does enable you to smooth out "bubbles" or correct misalignment.

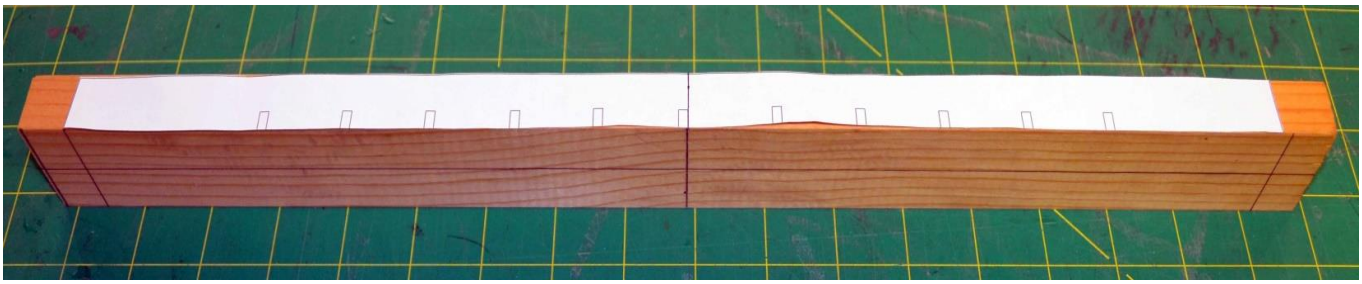


Illustration 3: Centered and ready for glue.

4) Repeat the procedure with the surface template. Test fit to assure alignment with the side template and start the gluing application with at station **6**. You should also note that this template contains only the 11 stations

5) With a square, extend all the station lines across the surface and down the sides of pine base.

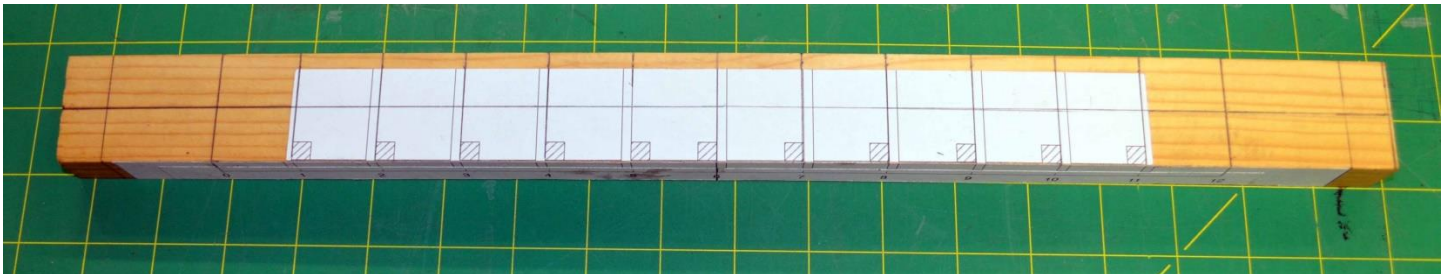


Illustration 4: The second template**.**

6) Now, place the pine base on the **BB1** matching the station lines **PBJ1** to the **TA1** and test how well you did. If you are off, maybe from paper stretch, take a red or blue fine point marker, and re-draw to the true position. If you're off, it shouldn't be by much.

7) The **red arrows** in **Illustration 4** indicate the location of the 1" drywall screw fasteners I intend to use later. So now I drill the starter holes with counter sink to accept them.

1.2 Finishing and mounting the PBJ1

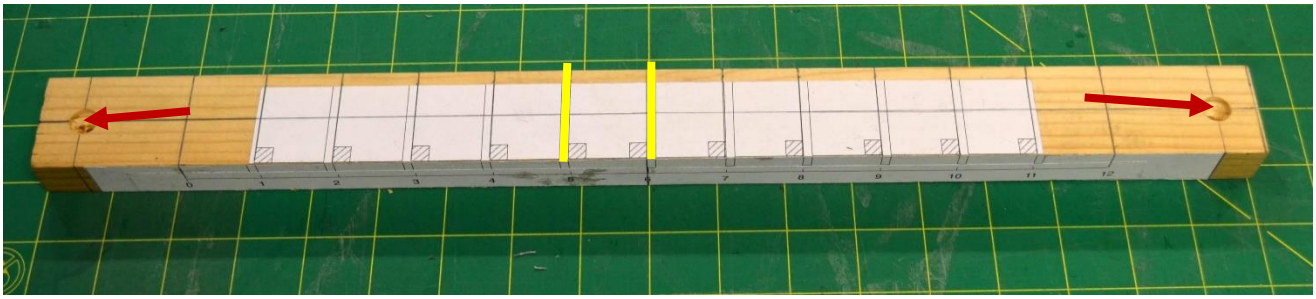


Illustration 5: The drywall screw location positioned.

The Individual Station Templates (**ST's)** will be received into the **PBJ1** by creating a notch at the proper location, either fore or aft, of the individual station template's location. Each station line has a forward face and an aft face. The aft station lines, #**1** thru #**5**, face forward, meaning the rear face of these templates butts up against the line itself (**yellow lines**), thus the notch is forward and the face template applied faces forward. The reverse is true for #**6** thru #**11** where the notch is aft of the station line and the face template applied faces aft. These positions will make will assure proper fairing of the templates from stem to stern. The exact position of the **PBJ1** is on the upper drawing on the **TA** (The Station Template & Jig – Side View). With this done; the **PJB1** was removed, flipped upside down set on my table saw. **(If no table saw is available, see NOTE next page.)**

I selected Midwest's 1/8” Craft plywood for the **ST’s** stock and set aside a small piece of scrap as a test fit tool. The table saw blade was set to depth of 1/4” and, with the miter gauge, the **PBJ1** was run through a first pass along the **ST’s** station line at the A face or F face of the **ST** location. The second pass through the notch is to the opposite side of the notch along the line. If necessary, make a third pass in the center to clear the notch. Using the scrap ply, test for a tight, but not forced, fit. If the fit is too tight, trim the edge of second pass and leave the **ST** line alone. If you find the notch is too wide it will be adjusted with the actual seating of the **ST** at each station.

NOTE: If you do not have a table saw, you can still complete this task, but without the notching. To do this go back to the original materials list need for 11 1/4” x 1 ½” template support timbers and change that need to 22-1/2” x ¼” x 1 ½” template support braces. The **ST’s** will sit atop the **PBJ1**. The procedure will be outlined in **section 1.16** when we finalize the jig for building. For now, go ahead with the **ST**’’s construction. Leave the **PBJ1**as is.

1) Now I attached the pine base to the to the MDC board, on the **C/L’s**, one last time; checking that all the station lines are lined with those on the **TA.**

2) I weight the center of the **PBJ1** down and carefully continued the pilot hole drilling into the **BB1**.

3) Start one screw, slowly to keep the **C/L’s** aligned, and then start the other hole. Tighten gradually going back and forth until all is secure. **NOTE: If you find your offline screwing the base down, the easiest fix is to remove said screws and glue the base down. If you glue it down, go with a small amount of glue at each end and a dab in the middle. This will allow you to easily remove the jig when done (remember your gluing to paper) and re-use the BB1 as BB2.**

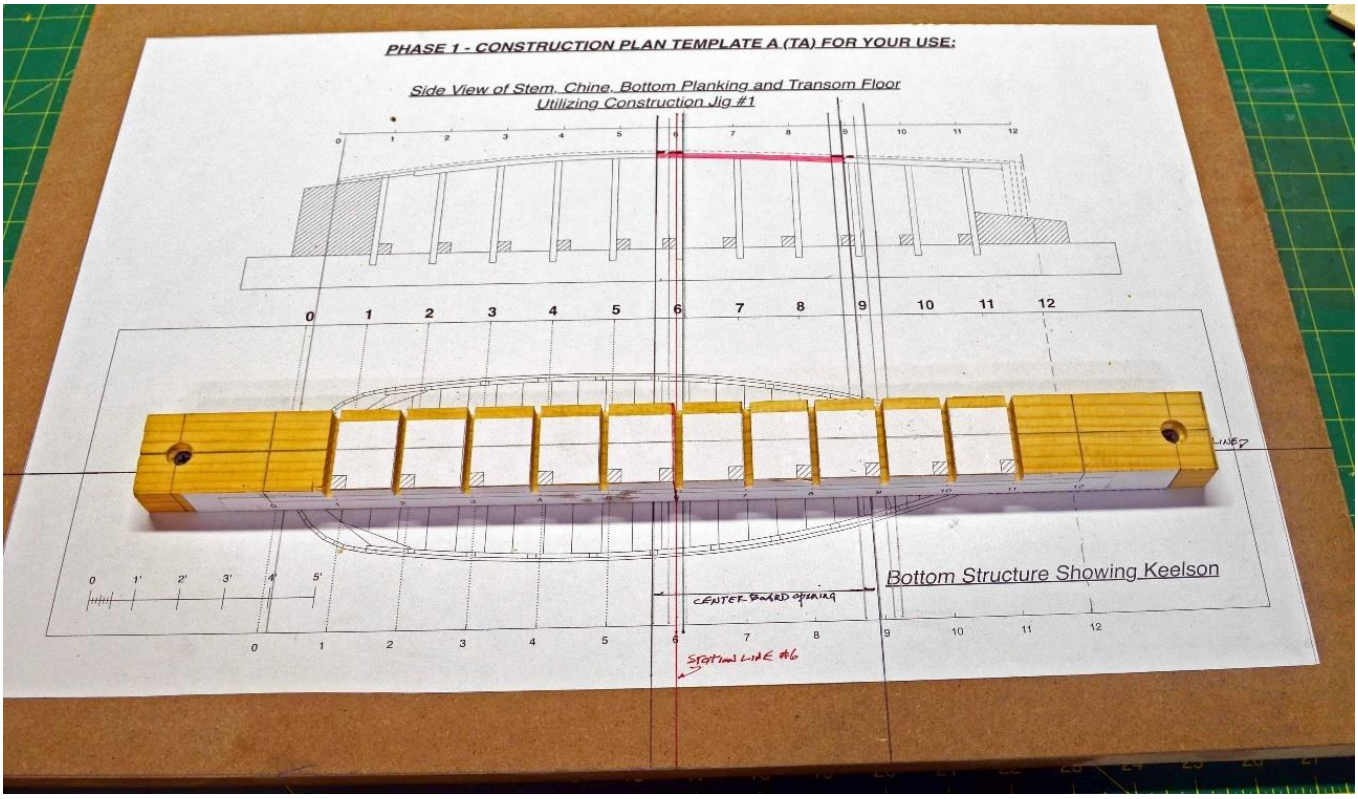


Illustration 6: Completed and attached.

1.3 Anatomy of the Station Template

This is a critical section of the build. These 11-station template will receive the keelson, the chines, and the bottom planking, the back bone of your model. All the information you need has been transferred for you to the paper templates. First step is

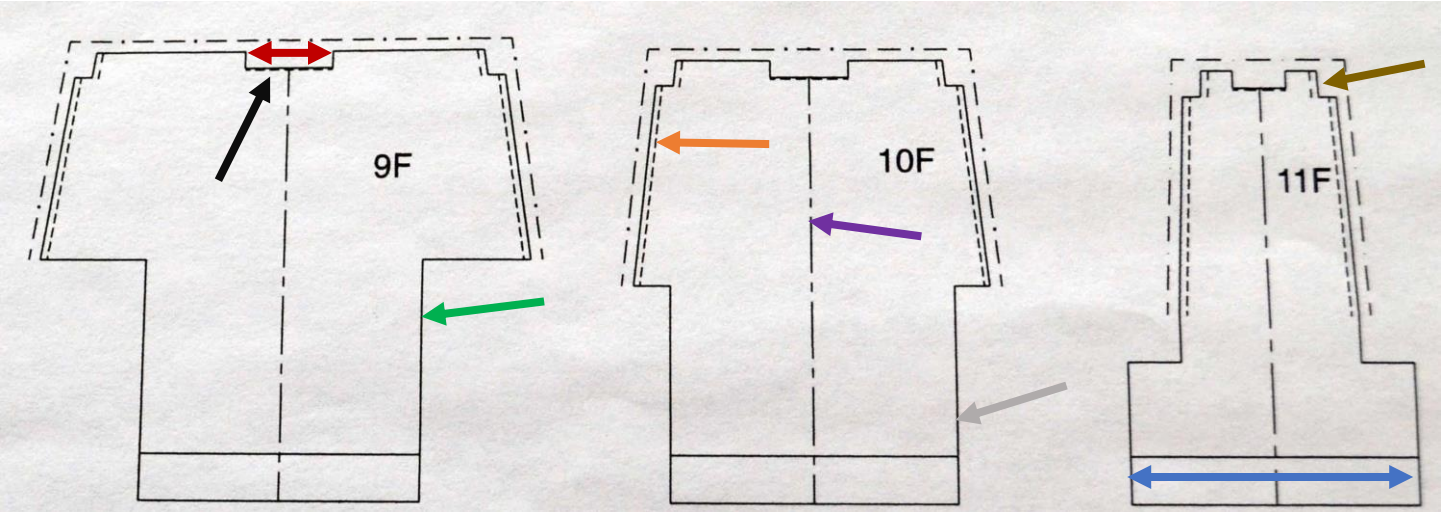


Illustration 7: T-shirt row!

to understand the 11 ST's, one at a time.

You will note above the different lines associated with each frame pattern:

9F: the **green arrow** - outer edge of a finished **ST**.

9F: the **red arrows - t**he keelson notch

9F: the **black arrow** – **-** the keelson notch **hidden bevel line.**

10F: the **orange arrow** - the outer edge of the **hidden bevel line.**

10F: the **purple arrow** - the **ST C/L**

10F the **gray arrow** - the outer edge of the outer and bottom planking.

11F: the **brown arrow** - the chine notch

11F: the **sea blue arrow -** the inserted portion of the **ST** into the **BJ1**

NOTE: I made my **ST's** with the aid of the following power tools: Scroll Saw (PS Wood Machines), 5" Disk Sander (Byrnes). miniature table saw (Microlux), and my Table Saw (Jet). You may own or have access to some, or even all of them, but if you don't I will attempt to tell you how you can accomplish this task with hand tools.

1.4 Presenting "The Life and Times of ST-9F" or "A Procedure for taking a single paper station template pattern through to a finished Vertical Station Support and see it inserted in the PBJ1 notch successfully" It just occurred to me: A PB&J makes a great sandwich.

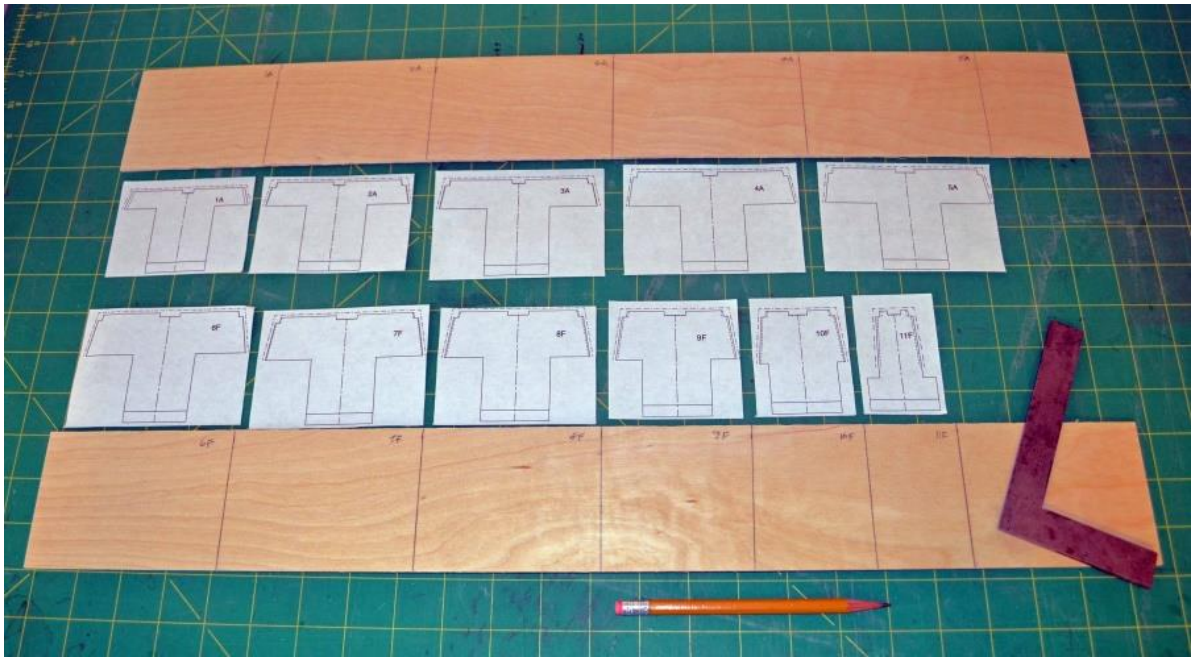


Illustration 8: The team assembled.

1) I've cut two, 3" x 24" strips from the 1/8" plywood. With a square, divide the strip in 6 (4") sections. With the 2nd strip, create 3 more sections at 4" and 3 more reduced sections to accommodate **ST's 9**, **10**, and **11**.

2) I then trimmed the 11 **ST** template patterns into squares of the same size as its section blank When trimming, leave a small overhang (1/32") to the paper boarder on the pattern.

3) Now spray glue the station templates in place

4) The patterns were then individually separated using the small table saw.

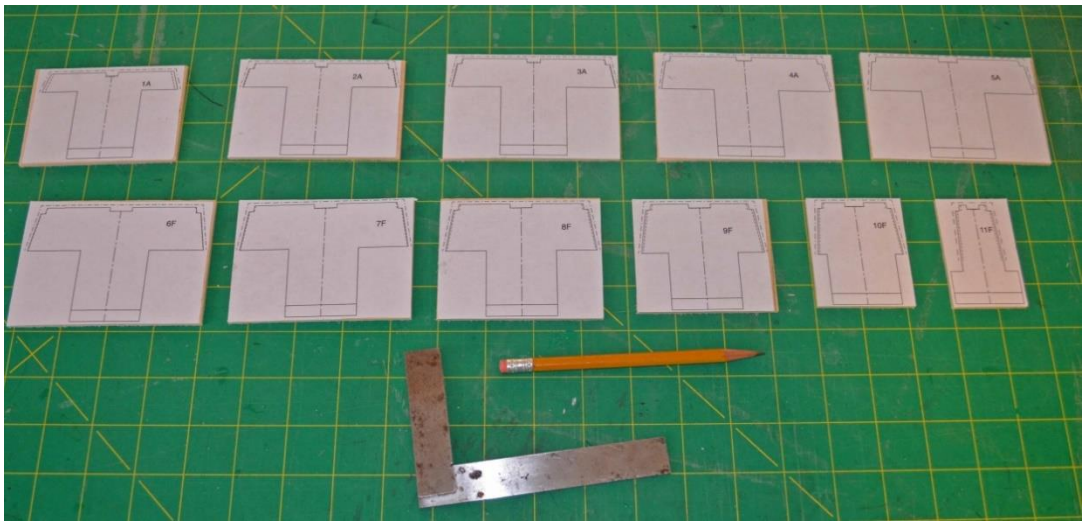


Illustration 9: And all dressed up.

Step 1: Freeing the Stem:

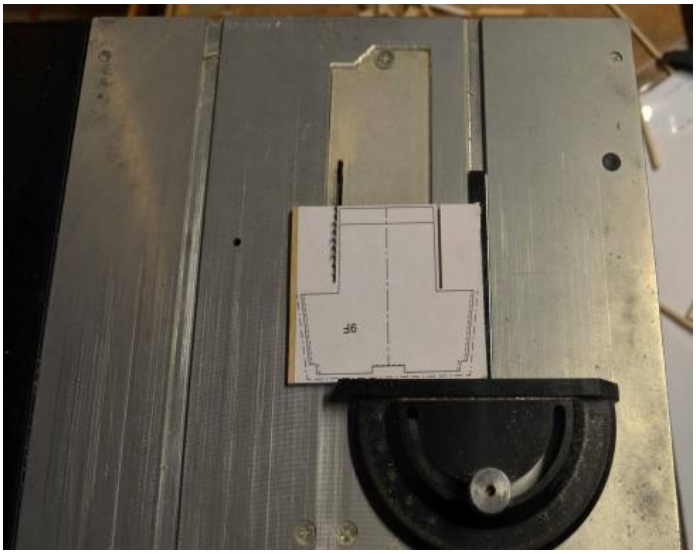


Illustration 10: Using the Microlux, with miter gauge, I run a pass to the top of the frame stem, on both sides, leaving a margin, give or take, of a 1/16".

Illustration 10:

underside. This pass runs to the top of the stem area and frees the stem.

Illustration 11: Repeat this for the frame support

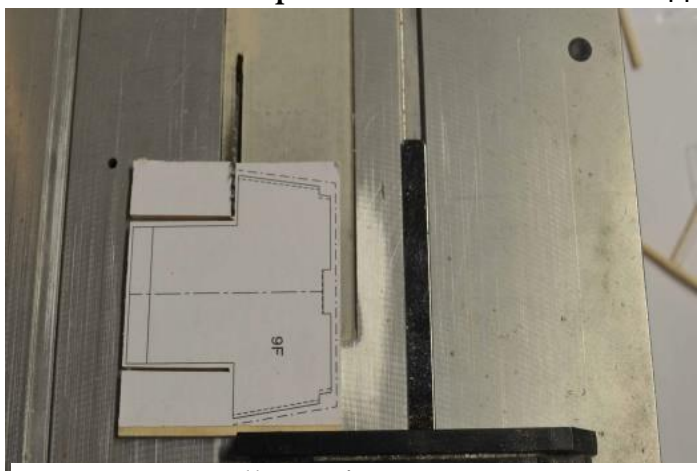


Illustration 11:

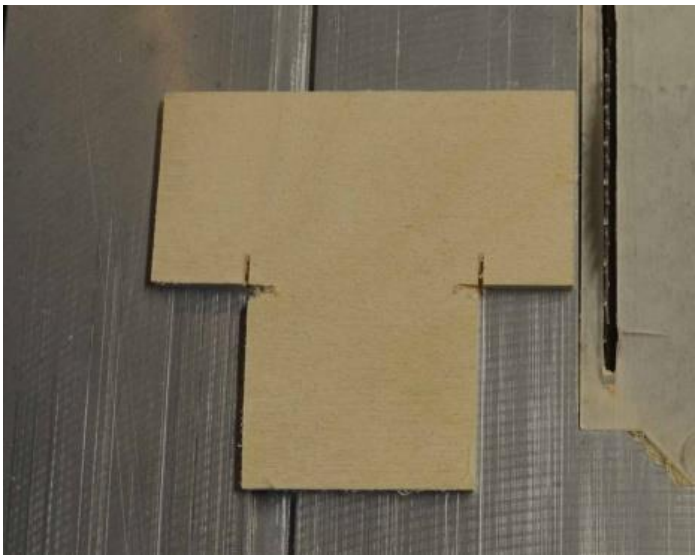


Illustration 12:

Illustration 12: When turned over, you can see the stem area cuts made with the circular saw blade; they will have no negative affect on face side of the pattern

Note: Hand tool alternatives to a small table saw, scroll saw, or band saw:

1) An X-Acto #2 handle with a No. 27 3" Saw Blade
2) A 4 in 1 Multi-purpose Zona saw set
3) A Jeweler's Saw with Jeweler's saw blades (coarse and medium)

Step 2: Getting to the edge of bottom and side planking edge and bringing the stem boundaries to the line.

Illustration 13: To finish the outside borders of the **ST**, I prefer to use my 5" Disk Sander. I rarely use a miter gauge, I just guide the sand area to the disk and gently let the disk do its work – I never force anything. If, at any time I lose sight of line I'm sanding, because of sawdust buildup or the pattern paper shredding, I stop and use a sanding stick to clear visibility.

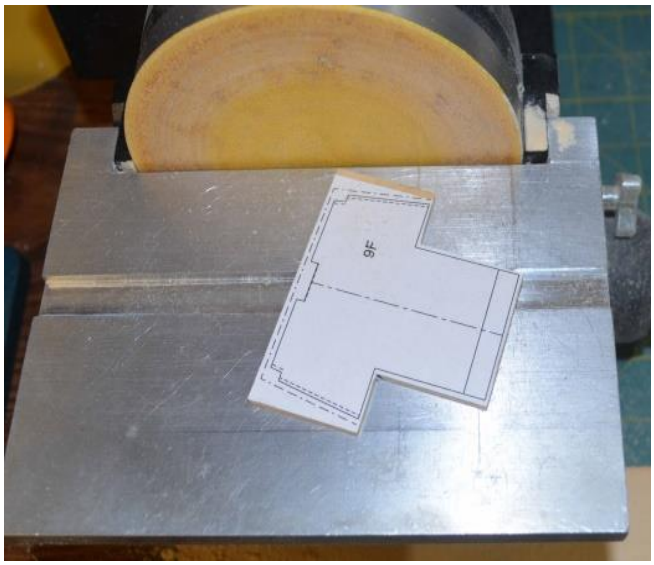


Illustration 13:

Illustrations 14 and 15 show you the positioning of the "finish" sanding of the ST 9 stem to the disk sander face. You are sanding "to the dotted lines". (See **Illustration 16**)

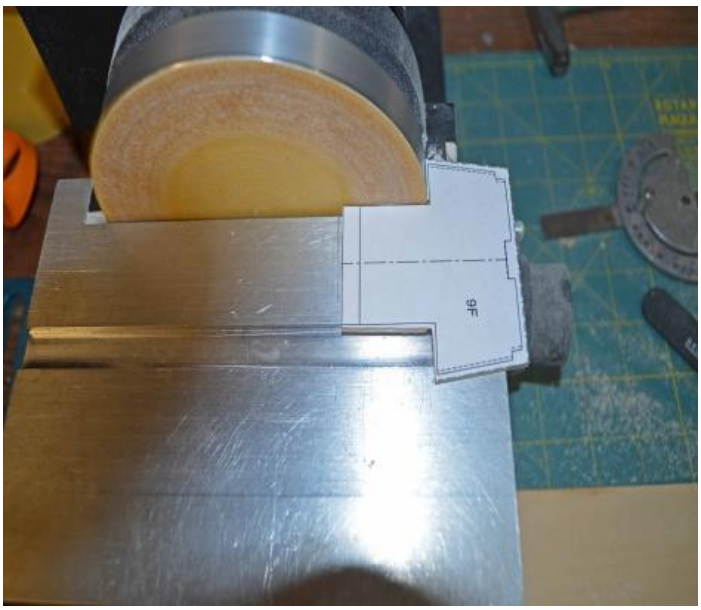


Illustration 14: Right side.

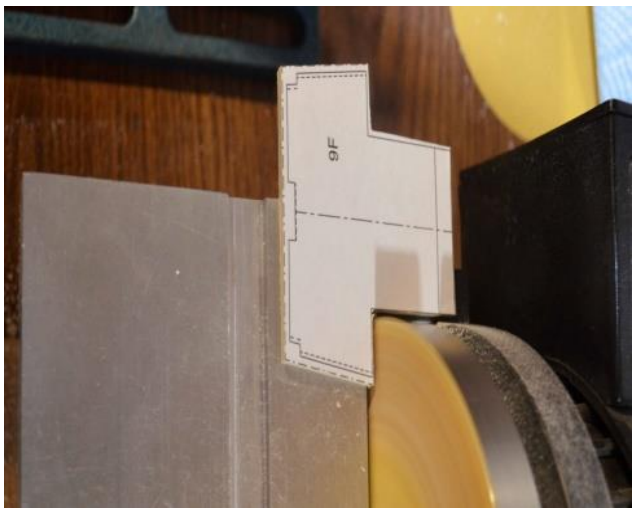


Illustration 15: Under the arm.

Illustration 16: This Illustration is an example of phrase "sanding or cutting **to** the line." The other commonly used phrases are "**thru or on** the line," and "**inside** the line." **Note that you still see the lines**.

Illustration 17: I used my scroll saw next to go outside the line to create the notch for the keelson (center) and the port and starboard chines. **FYI**: I have a plywood surface on my scroll saw table. The hole is obviously for blade clearance, both for sawing and blade changes. When doing small delicate cuts like this I "cut" the blade forward from the circle. This will prevent any wobble and assure the cut "holds the line of the cut".

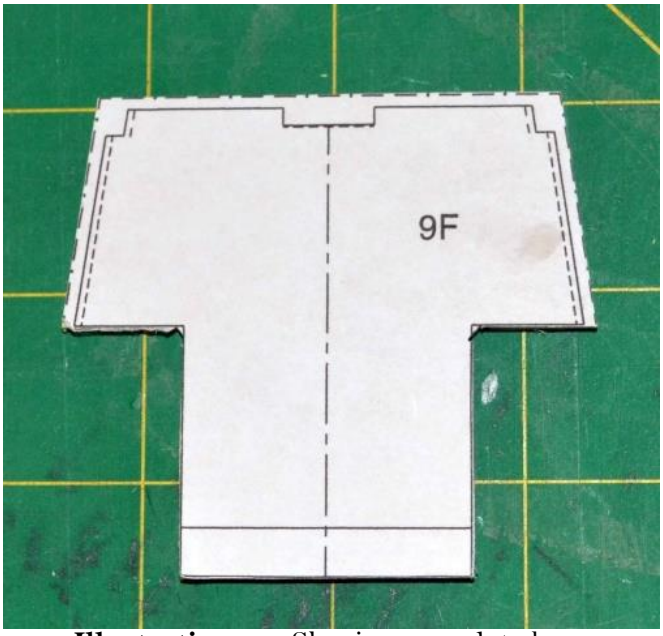


Illustration 16: Shaping completed.

Hand tool alternatives to a disk sander:

1) Using a sanding block with 120 or 150 sand paper.

2) By using a straight edge to line up along the edge line, take an X-Acto knife with a new #11 blade, making several passes with the knife, scribe a line just of the outer edge of the line. Keeping the straight edge in position, you can then guide the Zona or similar saw along the scribed line. It is a little tedious, but it can be down.

3) You could also use the same technique above with the Jeweler's saw.

FYI: I if were to recommend buying any of the power tools I have listed, the 5" Disk Sander would be the one I would suggest as the first buy. It is probably the most used tool in my shop. Second choice would by the oscillating sander. With **ST9** done, you can relax, only 10 more to go**.**

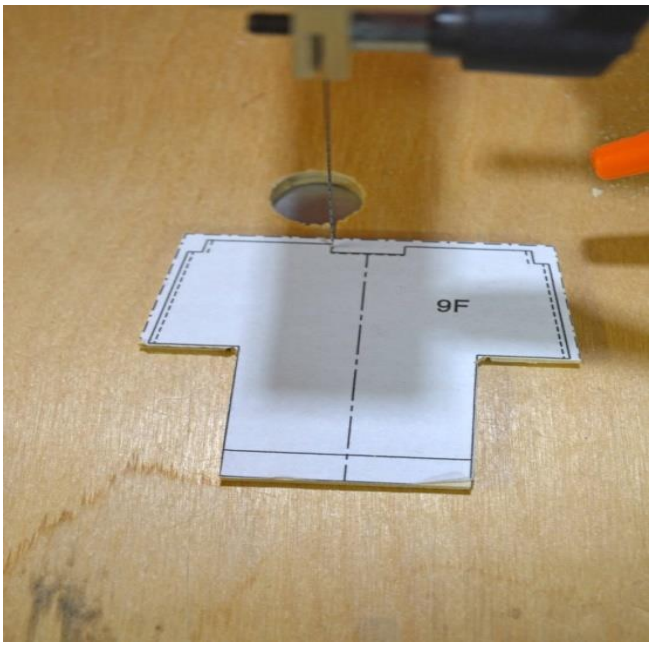


Illustration 17:

Step 3: The meaning of the hidden (- - - - - -). Welcome to jig beveling

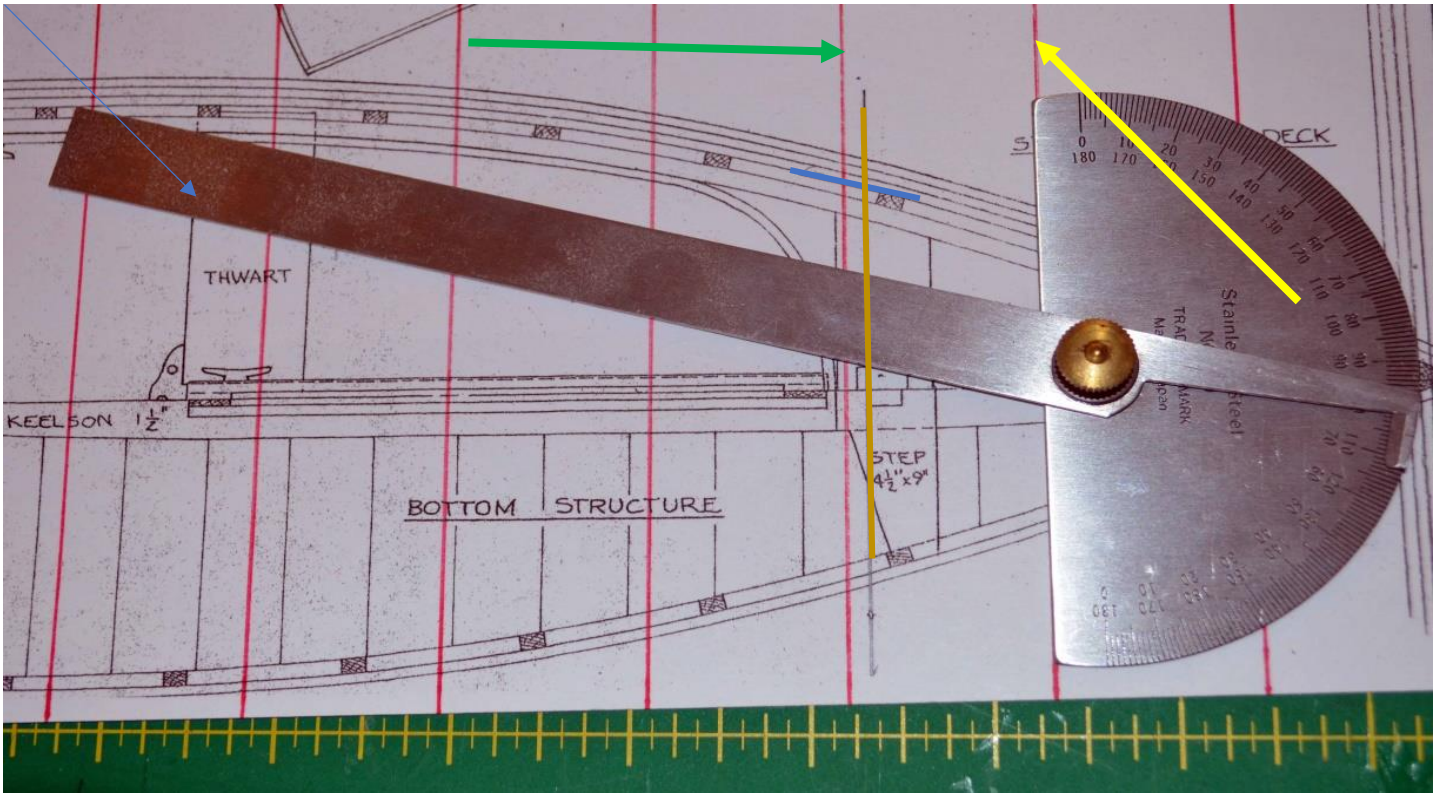


Illustration 18

1) Station line **9F** is indicated by the **green arrow.**

2) The line indicated in **orange** is the forward face **ST9F**.

3) With those two lines drawn, I used a small ship's curve to pencil in the angle of turn at the inside edge of side planking: the **blue line.**

4) You now take the protractor and set the straight edge against the next forward station line (**10**), the **yellow arrow**. Move the protractor upwards along that station line until it meets the angle line

5)). Make sure the arm of protractor lies straight against the **blue line,** and the protractor edge remains straight station line 9.

6) In summary, your angle is where **blue** intersects with **orange.** When you think you've got it, remove, and read the angle indicator.

7) So, there you have it. Here is how you can check your accuracy just to be sure.

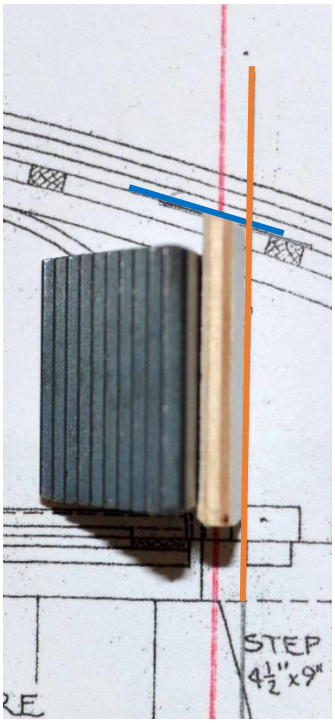


Illustration 19

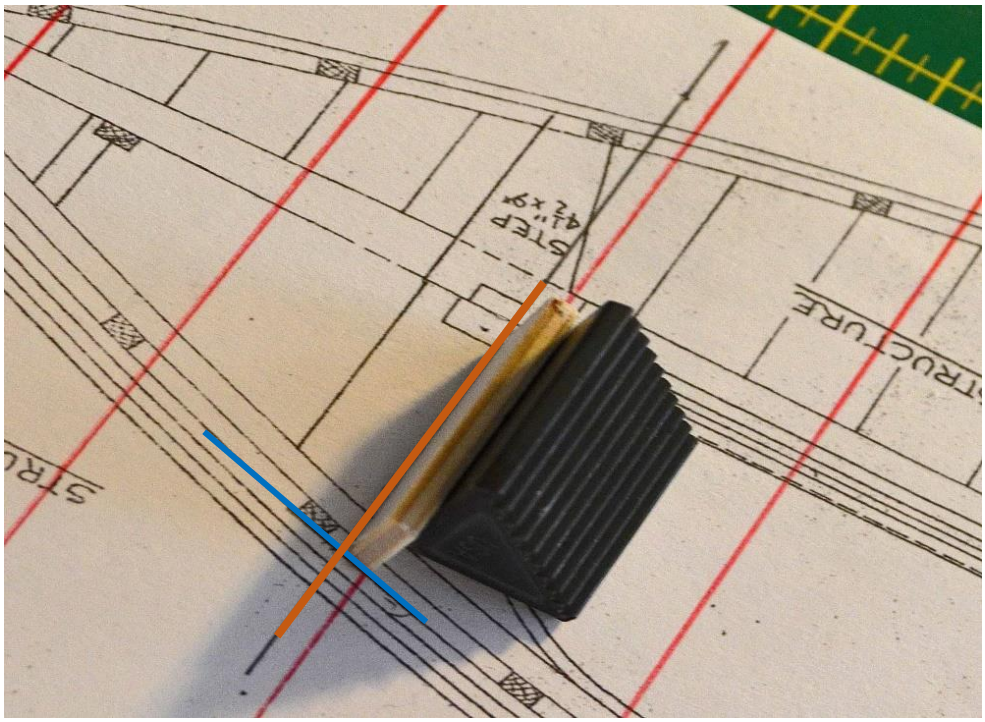


Illustration 20

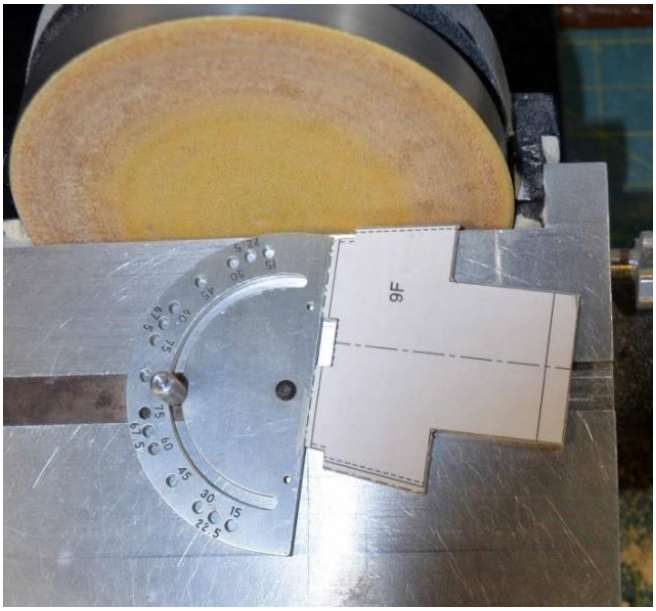
8) Having determined the angle needed at each station template, take small square piece of 1/8-inch plywood, and set the angle onto one edge. I used my disk sander. Set the table accordingly and use the miter gauge to keep the plywood edge at 90-degrees to disk.

9) Use the plywood "angle tester" to make sure your notch angle agrees with your tester. The step block, in **Illustration 19 and 20**, is merely to keep the plywood at 90-degrees when positioned along the station line. Remember, in these small scales, a little 'off' may just be "close enough for horse shoes", and, if necessary, it can be tweaked later. **(Oh - Forget you saw that the angle tester is slightly off its line in the photo. I accidently bumped the table when taking the picture!)**

10) The above method is how I do the figuring of angles. If you go to plan sheet **1** this step has already been calculated compliments of CAD, but you might want to try to determine a station template angle or two, manually, without looking at the cad work first.

11) **Illustrations 21 and 22:** Working carefully, set the sander table to the angle needed and set it into the **ST** from the remaining dotted line, the outer side planking, to the solid line, the fore edge of the ST. We'll bevel the chine area, by hand, next.

12) Picture the station template **ST9F** in your head**.** The paper template faces aft (the **green arrow**). The forward face is the **red arrow** (no paper). The **blue area** represents the chine notch. So when you lay the ST onto the sanding table, the paper will face up and when sanded**, gray** end will be sawdust. Aft, flip the drawing and the **red arrow** faces aft. You can set the miter gauge to same angle if you can maintain full contact with the **ST**.



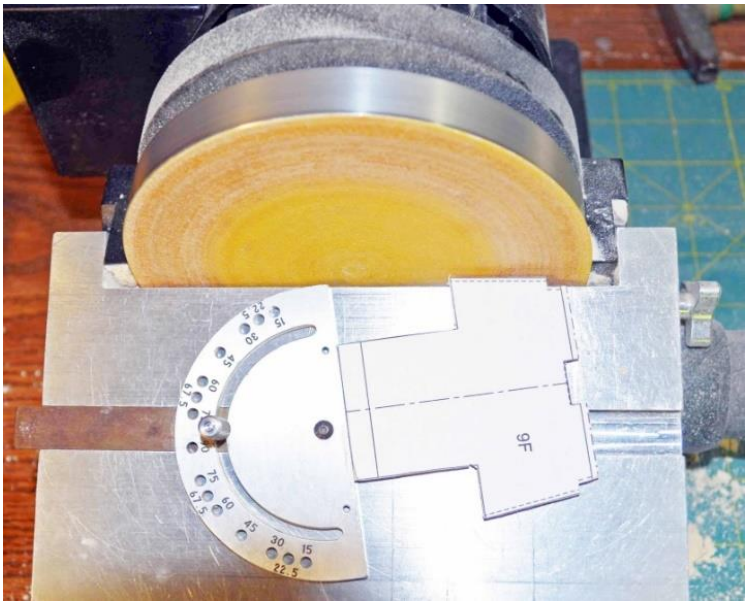


Illustration 21 and 22: The sanding process with the aid of a miter gauge.

Step 4:The ST9 chine notch bevel

1) **Illustration 23**: I hope you saved your plywood angle tester. Clamp the plywood atop the **ST** and run it to the top forward edge of chine notch. With a pencil trace the angle line onto the **ST**, then flip the plywood over and do the same to the other side chine notch.

2) **Illustration 24 (next page)**: Here are the tools I used to complete the **ST9F**: a vise, a small "tap" hammer, a single edged razor blade, the plywood angle tester and a sanding stick.

3) Use a table vice to securely hold the **ST** in place**.** Position the razor blade along the angle scribed, and tap hammer down to the bottom of the chine notch, then move the razor blade horizontally across the bottom of the notch to release the plywood cut. Touch up with the sanding stick.

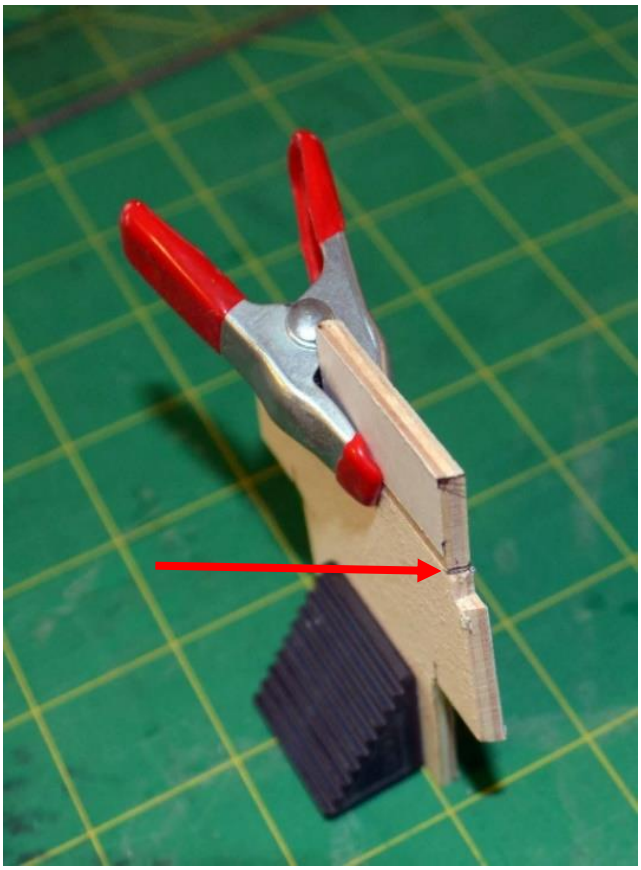


Illustration 23: The line up.

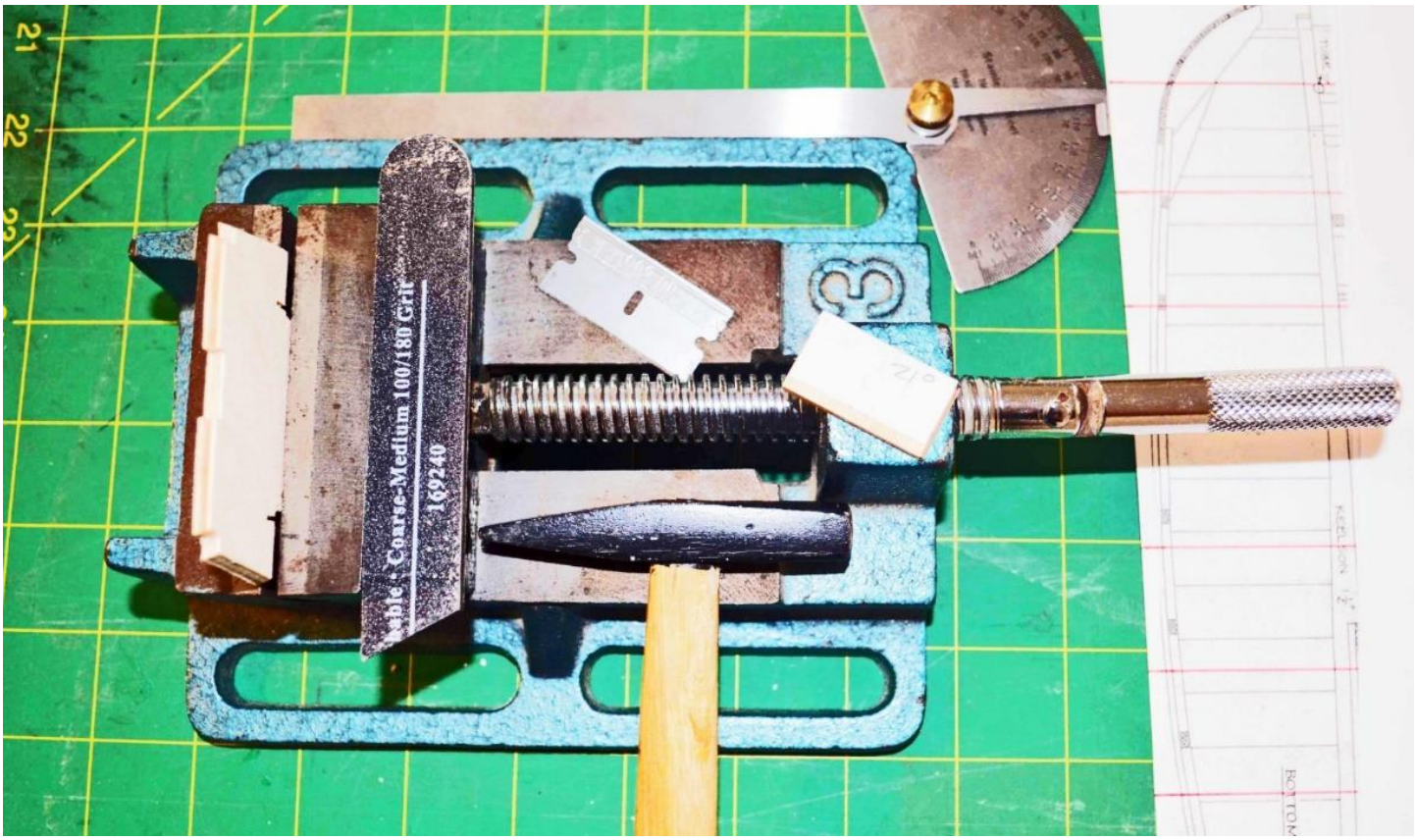


Illustration 24: The tools used.

Once the 11 **ST's** are completed, they are temporarily affixed to the **PBJ1**. As a caution, when each **ST** was completed I re-marked the **C/L** across the top of the template support braces making sure that each matched up with **C/L** on the **PBJ1**. This is the initial testing. I did not glue the **ST's** into their notches. Instead, I set them in with rubber cement to keep them in position while the final checks are proceeding.

NOTE: For those of you, who did not notch your **PBJ1**; make sure the **ST** and temple support pieces are center lined. Remember, you support pieces are ¼" x ½". You can now glue the support piece to each **ST** at the bottom of the stem, lining up the **C/L's**, making sure the glue set's up edge to edge so the finished **ST** will stand alone at 90-degrees.

1.5 Final Assembly of the BJ1

I know it may seem like an extra step, but I made an initial assembly of **BJ1** before gluing. The objective of the first run is to test the alignment of station templates as to the "fairing" the hull structure. So, the first order of business to "dry fit" the **ST's** (with a little help from some rubber cement, if needed) into the base notches.

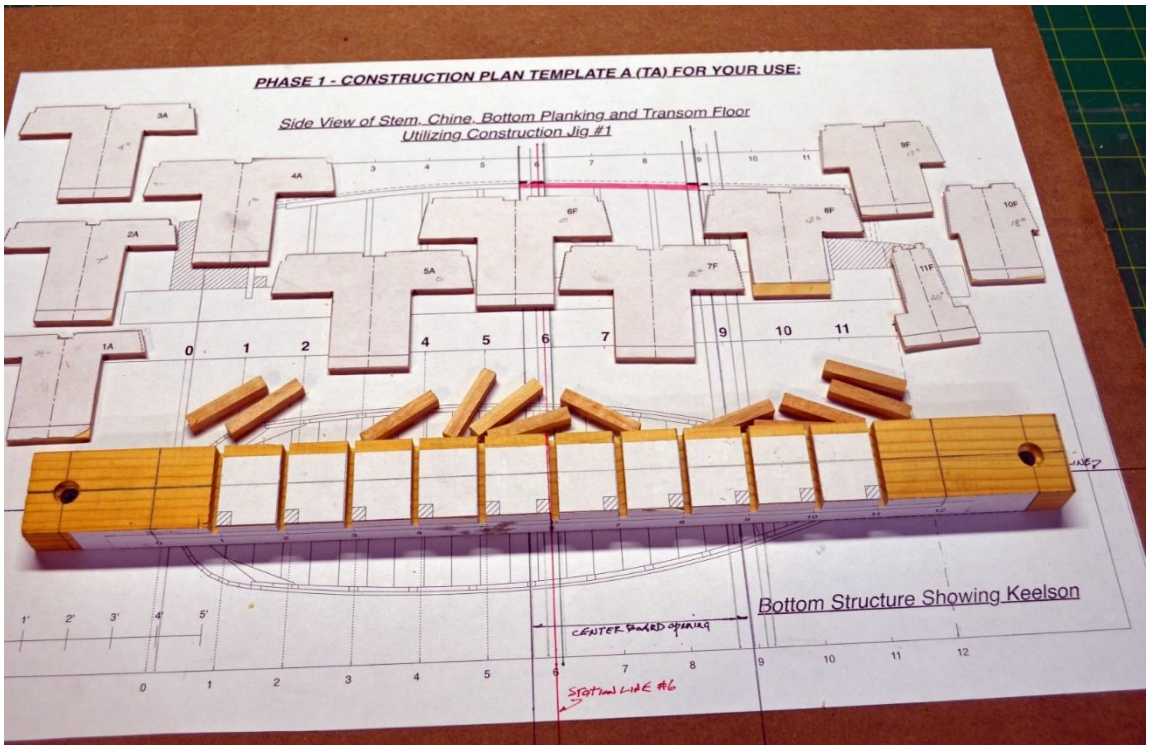


Illustration 25: The jig-saw puzzle.

Since we have mitered all the appropriated angles for the side planking and, the chine positioning, and the run of the keelson, we must test to see how well we did. It is much easier to do this testing process before gluing into place and realize later that we are "in the hold with our backs to ceiling planks."

Checking to see if all OK:

1) Make sure the template support timbers have a center line clearly marked and check the all the station templates have the center lines clearly marked. I prefer to mark both sides of the templates in case the paper side comes loose or tears, or otherwise becomes illegible.

2) **Illustration 26:** You're looking for the following to line up correctly:

   a) The centerline of the **ST** to the centerline of the Base (**black arrow**).

   b) The proper position of the paper direction to assure the bevel direction is correct (**green arrow**)

   c) The location of the support timber is located on the proper side of the **ST (red arrow).**

3) The **ST** should hold steady with a press fit, but a 1/8" notch and 1/8'" plywood **ST** may need to be adjusted. If it is "loose," take some rubber cement and apply it to the bottom of the **ST** and reinsert into the notch pressing the paper face of the **ST** hard against the support timber location. If that doesn't do the trick, now, take a support timber and rubber cement it to the base of **ST** on the non-paper side to help hold it in place. If it is too tight, remove the paper designating the area within the notch, and try again. If this doesn't work, use a file, and file against the "rear" edge of the notch, not the paper side of the notch.

4) As you proceed to the **ST** installation, make sure you are assuring that **ST** is at 90-degrees to the base. I use angle blocks with small clamp to hold vertical until the rubber cement holds. (**See illustration 27**)

5) When the assembly of the station frames is completed, I go back to the notches on each frame and mark the **C/L** across the bottom surface of each one.

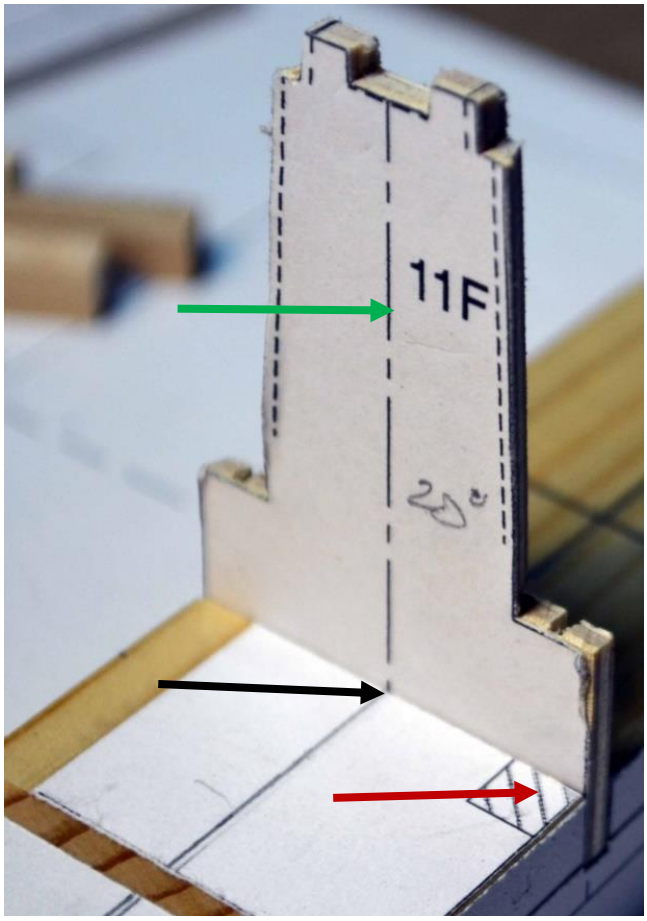


Illustration 26:

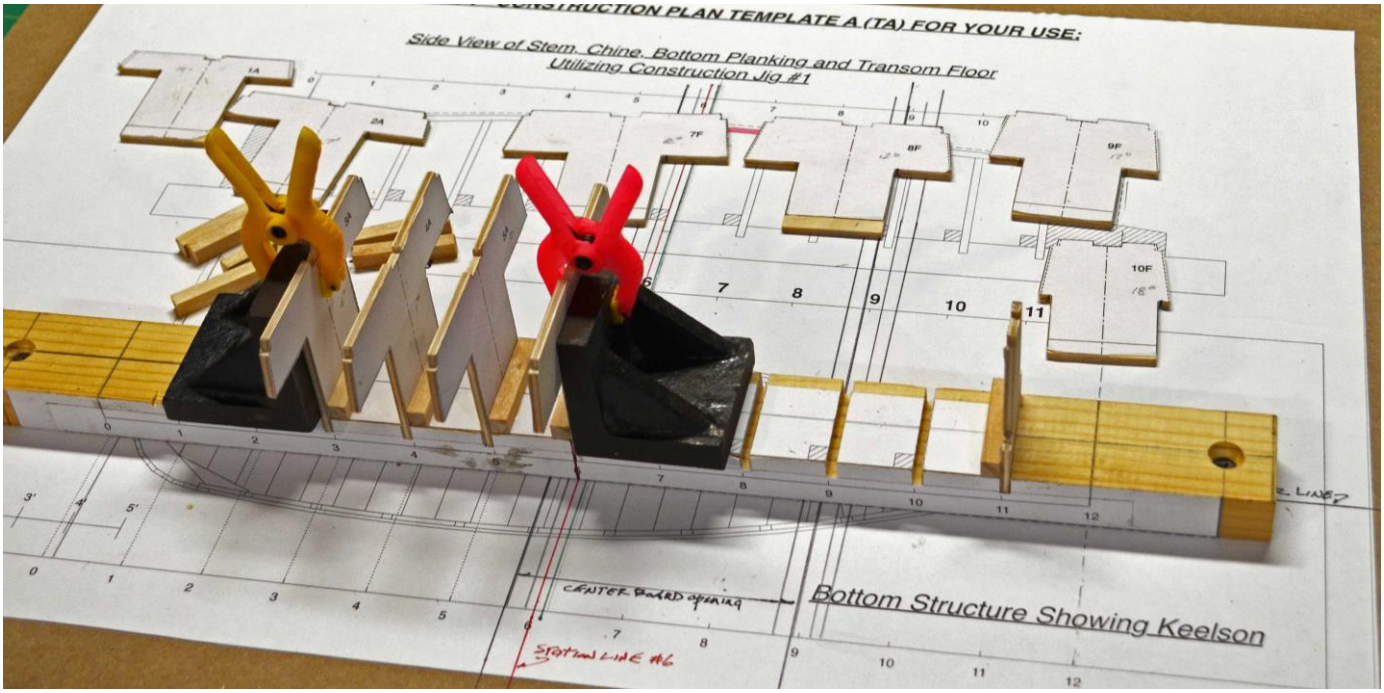


Illustration 27: Note the lone wolf at the right end. The reason I recommend going in only one direction is to allow you use the angle blocks for all 11 **ST's**.

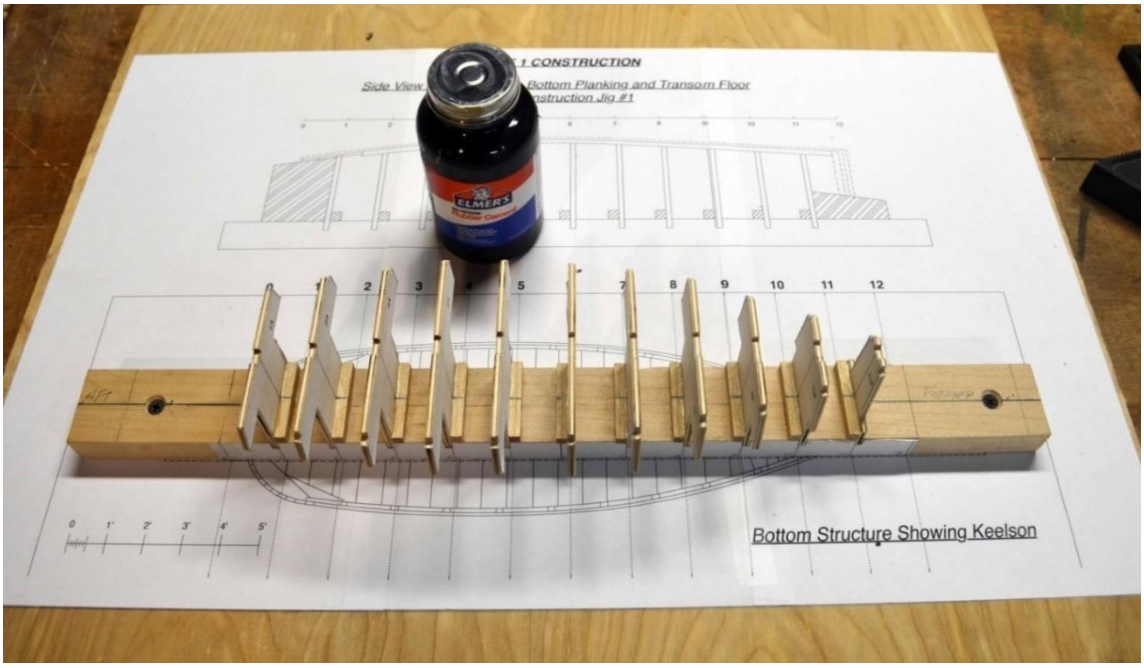


Illustration 28: Mounted and ready to go.

6) You now need two battens, one about 1/16” x 1/8” to run the length of the stations, and one about 3/32” square running the length of the stations. The first batten is laid into the notches of the keelson on center. You can use some small pins to hold it in position or you can clamp it into position. The batten should seat on each keelson station notch bottom surface. Look up. It should mirror the image of the side view on the **BB1** surface template. Most should be OK but there is always a “problem child” that needs attention. Rule of thumb: a slight sag needs raising, a slight bulge lowering. (See **Illustration 30).**

7) If the bump is on an **ST station that has a keelson notch bevel,** take a file, and put a little more bevel to it. Normally, this is done with installation of the keelson, but doing it early might help here. If you find a “distinct” sag you may have taken too much off the stem and, since it is not glued in place, a small shim can be inserted in the notch to correct the problem. There will be further adjustments that will be addressed when the keelson itself is installed.

8) Now take the other batten and test the chine notches. You may find you must tweak your chine notch bevel angle or “seat’ width allowance to even out the curvature of the chine. Be aware, that if you had sag, or a bump in the keelson notch, you will have the same sag or bump to the chine - there on the same level. So, fix the keelson problem first before you do any adjustment to the chine notches. If the sag is eliminated by the shim, the chine notches should be OK. If the chine notch requires a lateral adjustment, check first the **C/L** match-up. The rubber cement may have shifted the frame. Other chine adjustments will occur at installation of the chines.

9) Lastly, at this stage, use the first batten to assess the accuracy of the side plank bevels. If you get batten sag or a batten bump, again, check the centerline position, and then view down from above to check the angle of bevel. Remember, if you accurately formed the templates, any sag or bump to port will have opposite effect too starboard. This will become clearer when you can visualize it first hand, but always work from the center out and not from the center in.

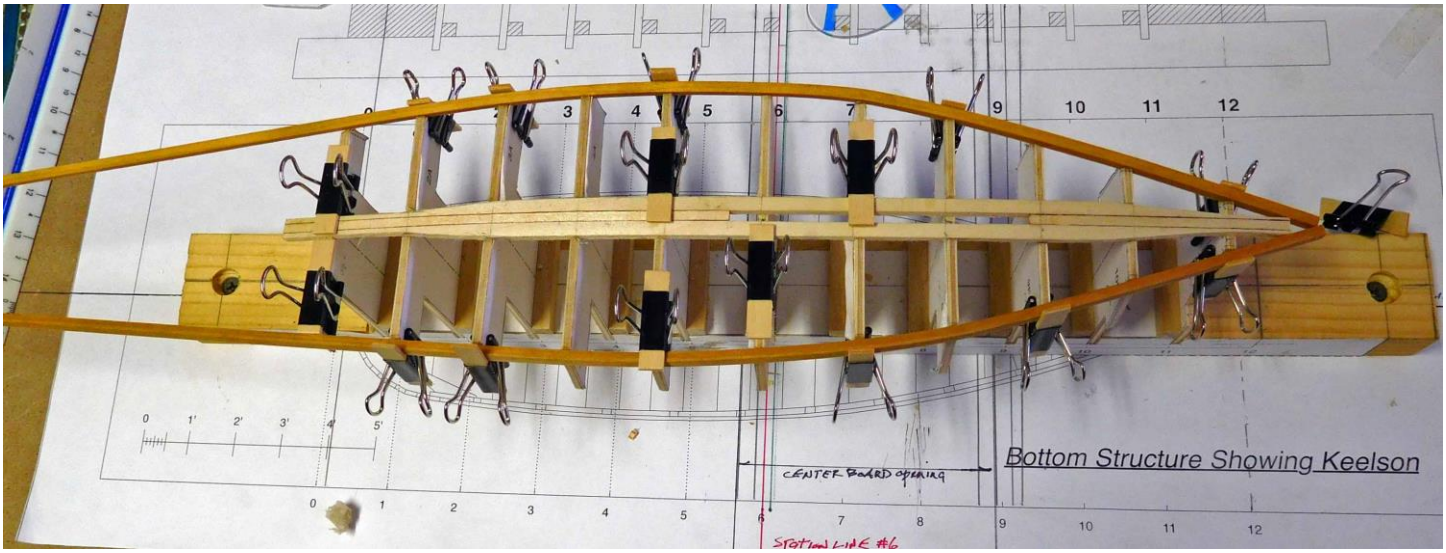


Illustration 29: This is my clamping system – and ACCO clip with 1/4" x 1-1/2" basswood plank fit snuggly into the clip but moveable back and forth. You can attach your battens in the same manner as above. More on this clamping later.

10) That's the best we can do in the dry fit phase. Now remove all the station templates and we will repeat the installation, this time securing it permanently.

11) I use Elmer's Carpenter's glue for most gluing situations. It's tacky almost instantly, it cleans up with water, yet there is a "little wiggle time" to a full set-up. I suggest, this time, to start your run of station templates going from one end too other. It doesn't matter in which direction. This will allow every station template to receive the support of the angle blocks. (See **illustration 27, page 17**) I do not set multiple stations templates at a time, checking again for all the things checked in the test run and adding one more test:

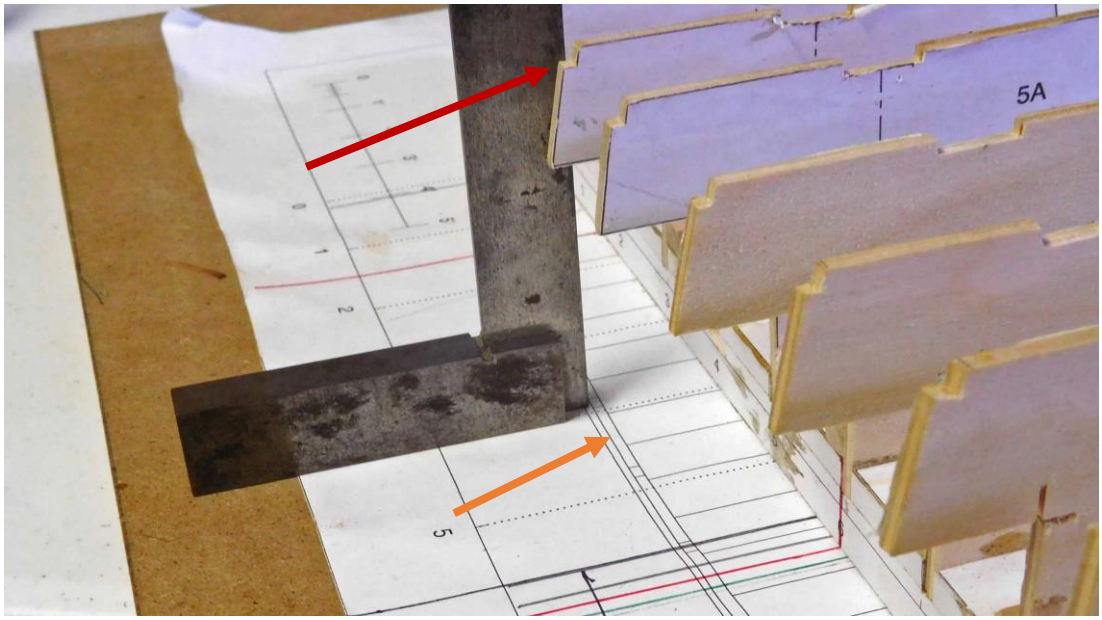


Illustration 30: The final test.

12) The **orange arrow** in the **Illustration 30** is pointing at the outside edge of the framing of the of the lower side plank lower edge. The exact location is at the bottom top of the chine. The **red arrow** shows that same location but on the plank bottom plan. With all the other testing, we've done, that could only mean that the seating of this station template is askew or off the centerline. Rule of thumb here is to check each installation immediately after insertion to take advantage of the glue's "wiggle room" in setting up. Finished? Then you are done with **BJ1**.

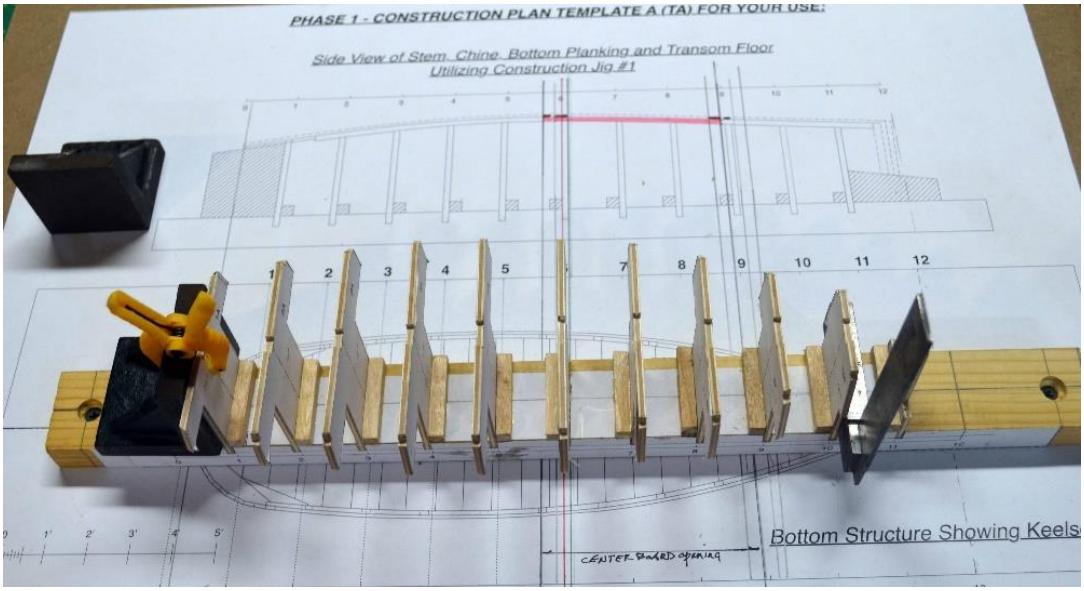


Illustration 31: Let the fun begin.

The **BJ1** is now ready for use, but your jig building is not done yet. I've mentioned "think ahead" and I have mentioned "some things will overlap," and so it is with this build. To make the keelson, the first element of phase I, we need to make the construction jig for Phase 2: the **BJ2**. So, let's set the **PBJ1** aside and get the second built.

PHASE 2

The Bottom Framing: or the “bottom’s up” phase of the build

In this Phase, we are going build a second construction jig upon which the rest of the hull framing will take place. Like the first jig, it will be fixed to a base board that will have a sheet template attached to its surface showing all the information you will need to complete this second phase. Below, is a list of a few more abbreviations.

Abbreviations: Phase 2

BB2 = The building board to which the Construction Plan B template drawing is attached, and secured to the **Jig 2** to continue with the build.

BJ2 (**Jig 2**) - The building jig on which the models remaining framing and planking will be formed.

TA2 = The construction template **B** as drawn on the plans for your use.

The Plans:

NOTE: For the second phase, the two sheets listed below should be studied carefully.

Sheet #4 Building Board Construction **Jig 2**

Sheet A2 of 3 – Building Board Construction Jig 2 (for your use).

The Sections write-ups for Phase 2, part I:

2.0 The building board (**BB2**)

2.1 The building jig 2 (**BJ2**)

2.2 Creating the individual beam pattern “block”

2.3 Dry fitting the **BJ2** assembly

2.4 Gluing things up

The Sections write-ups for Phase 2, part 2:

2.5 The keelson template and **BJ2** mounting

2.6 Building the **BJ2** to construct the keelson

2.7 Getting the keelson trim and proper

2.8 The chines (2) formation

2.9 The bottom planking

2.10 The keel, chine, and bottom planking relationship

An Outline:

Part 1: BB2 and BJ2 (Later referred to a Jig 1 and Jig 2)

1) We have arrived at point, (remember I said some phases overlap), where to continue, the build needs another building board and construction jig.

2) **Part 2: The real fun begins**

1) We will make a keelson, a set of chines, and begin the bottom planking.

2.0 The Building Board (BB2)

I refer you back to S**ection 1.0**, as I used the same sized MDF board for **BB2**: 18" x 24" x 3/4". I then spray glued the **Phase 2 – Construction Plan Template B** on the surface of the **BB2** in same manner as with **BB1.** You can set this aside for the moment as we construct the **BBJ2.**

NOTE: If you are asking yourself why you need a second building board, you can avoid a second building board by re-using the **BB1** if you so choose. Remove the first jig and turn the board over and use the other side. However, I found that it took a little bit more planning, as the build is in a transition phase going from one jig to the other, and it may find it necessary to re-establish the first jig. My advice, set-up and second building board. Save the BB1's backside for another model.

2.1 The Building Jig #2 Base (BJ2)

Materials List:

You have many options here as your choice of wood for this jig. I looked around my shop for odd lots of pine and found enough to supply needs. Pine is easy to work with. MDC board is also very workable and less expensive that plywood.

Full Beams (ST's 0-12)	3/4" x 2-1/4" x 17-1/2"	2 needed
Aft Half Beams (ST's 0-4)	3/4" x 2-1/4" x 5-1/2" 1/2" x 1-1/4" x 5-1/2"	1 2
Forward Half Beams ((ST's 5-12)	3/4" x 2-1/4" x 4-1/2" 1/2" x 1-1/4" x 4-1/2"	1 2
Base Plates	1/2" x 2" x 2-1/4"	2
Keelson Press	3/4" x 1-1/4" x 16"	1

Note: The above dimensions are "block" dimensions based upon the building templates on plan sheet no. 4. The plans provide you a full complement of patterns for each of the "beam" pieces needed. You can make each beam separately. However, you can make all five rows of beams by "blocking" or "sistering".

2.2 Creating the individual beam pattern "block":

1) Place the plan sheet 4 on a flat surface that you can work off and accommodate the 24" x 36" sheet. Also, if at the dining room table, make sure you have a cutting surface other that the table top. Mine is an Omni grid Cutting Mat bought at JoAnn's fabrics using a 40% coupon.

2) You will note that the beams themselves don't really need the use the full 2-1/2" pine. I chose the pine about an inch over the beam's highest elevation. Commercially, a "1 by 2" piece of pine is too small, but a "1 by 3" will do the trick.

3) I used my table saw to cut each beam to length, and, if necessary, height. Test fit laying each beam over its template.

4) Now, I used a straight edge and new #11 X-Acto blades and trimmed the templates from the sheet.

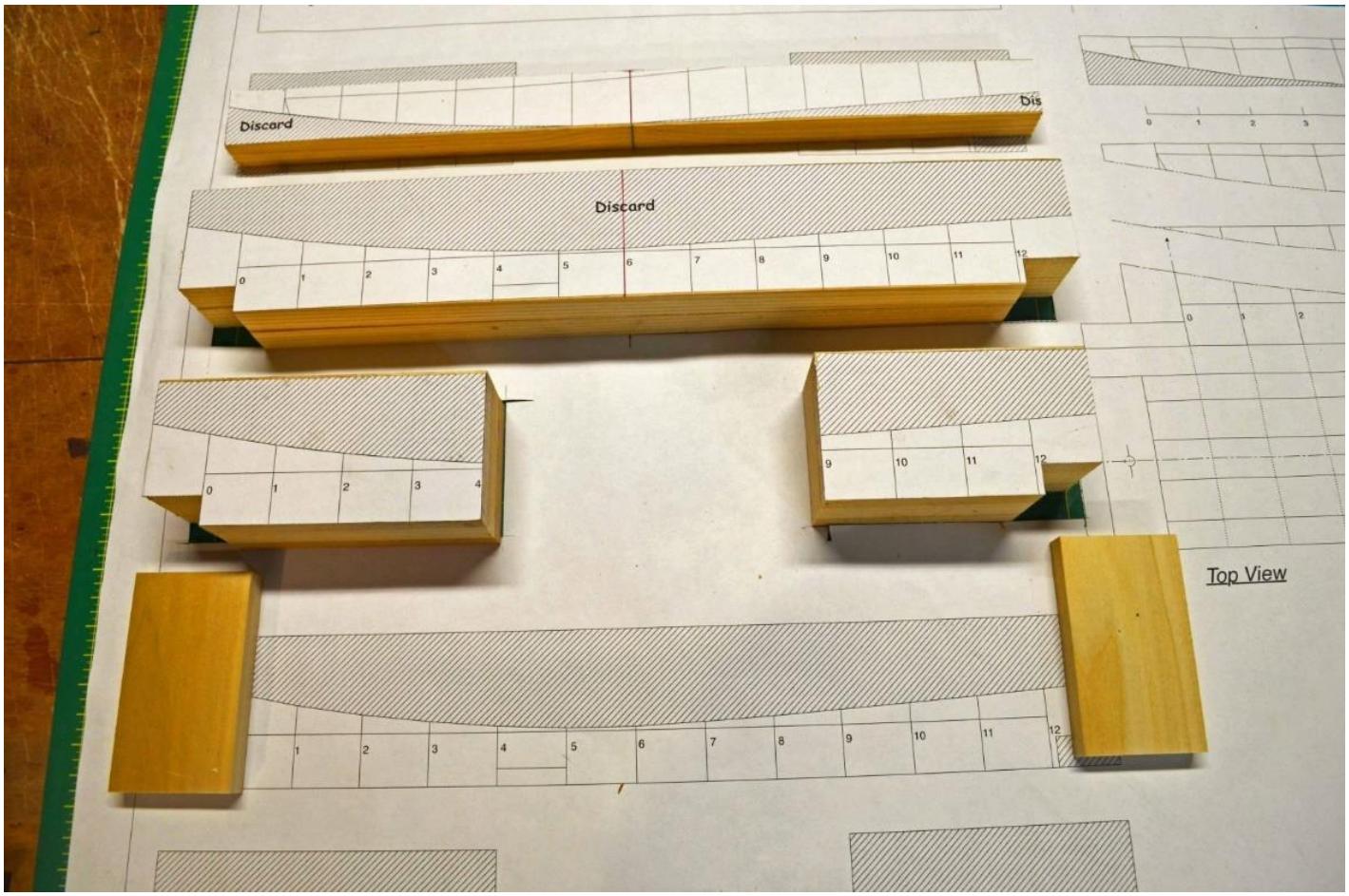


Illustration 32: Ready for “discard” removal. Note notches for base plates.

5) When I had all the beams and templates sized for 3/4” stock, I spray glued the template and carefully applied them to the beams surface. **ALERT:** You only need one full beam pattern to sprayed on each set of beams (see **Illustration 33**). You need only one aft beam pattern to be sprayed on and that is to the ½” stock, and you need only one-half beam forward pattern to be sprayed on and that too is to the ½” stock. The keelson press is a stand-alone and need its pattern. Make sure there are no wrinkles and the station information stays perpendicular to the beam bottom. I usually secure the pattern’s alignment by using a back board. In my case the back board is my table saw rip fence. I place the beam against the fence for a “stop” to keep the pattern in alignment with the bottom of beam.

6) Again. note that I made 2 full beams at once by spray gluing the two beam stock pieces for aft half beam in the center (3/4” stock) and the port and starboard half beams aft (1/2” stock), I spray glued all 3 together with the paper template applied only to the starboard half beam. I repeated the process with the half beams forward.

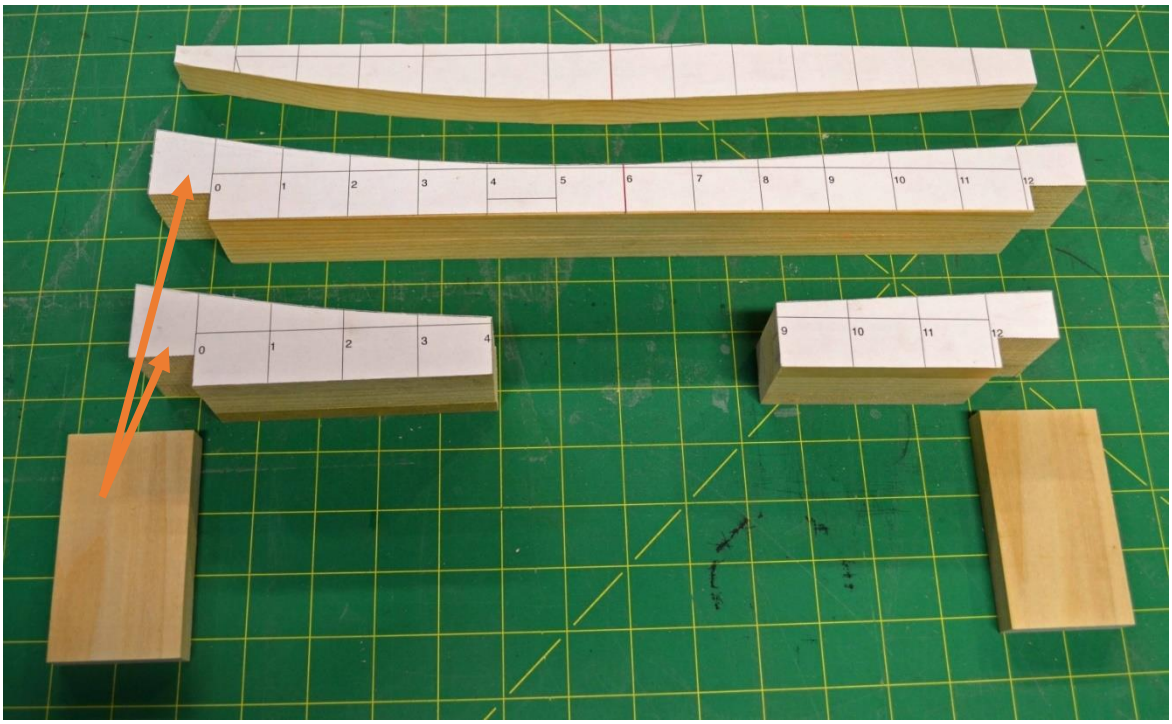


Illustration 33: Note the keelson press at the top.

7) Note the notches to allow the installation of the base plates (**See illustration 33**)). The half beams will create the area for the centerboard to drop into. The base plates are 1/2” stock and I use my table saw, blade set at ½” to form the notch. I make a dry test on scrap pine to assure a tight, accurate fit, and when satisfied, lock the setting in place. I make the first pass into the notch area at the back of the notch and work forward to the outer edge. I then do the same with the full beam taking off the extra 1/2” in the process.

8) I use my band saw to shape the top surface of the jig beams. The band saw takes the beam discard to about 1/32” short of the template line and switch over to my oscillating sander with a 3” drum. I then use the sander to carefully “shave” the bottom smooth, as this area will seat the bottom planking of the hull. Further finishing will come with the **BJ2** assembly.

9) When completed, separate each set of beams. Because they were spray glued, I use a single edge razor blade (very carefully) to break the bond when necessary.

2.3 Dry fitting the BJ2 Assembly

1) Once laid out, I dry fit the assembly. There are only 3 papered beams required. When positioned they become the “front face” of the **BJ2.**

2) When the dry fit is in place, on a flat surface (use your **BB2** or a piece of glass), clamp the assembly at the ends, and check the top surface. You want a smooth union of beams.

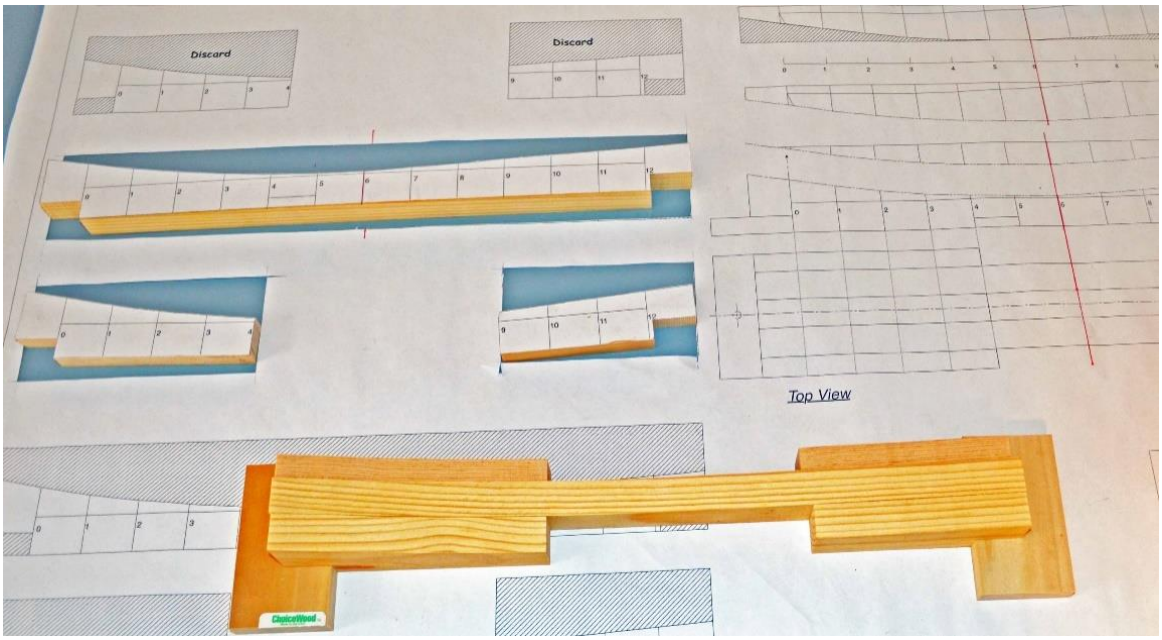


Illustration 34: Test fitting the un-papered beams

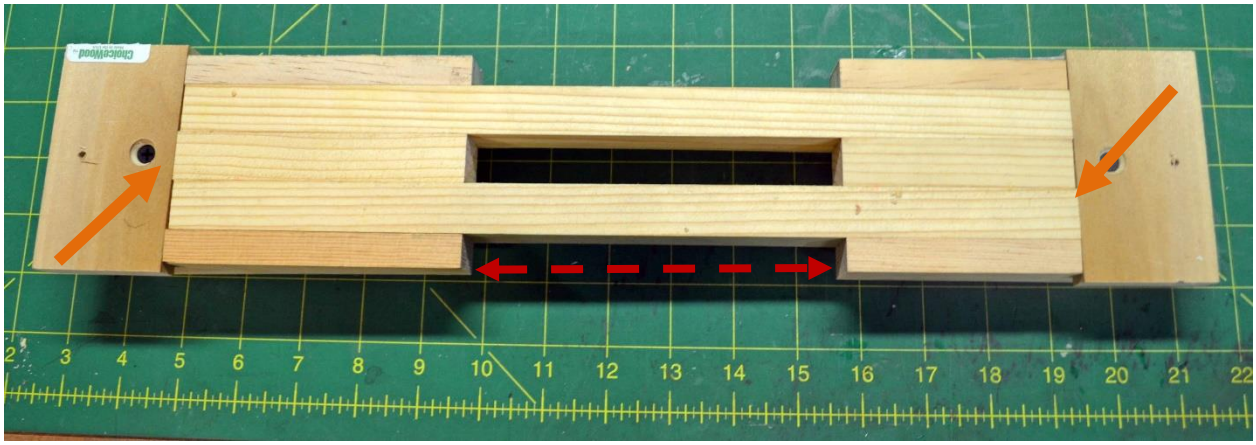


Illustration 35: Noting additional sanding areas for the top surface.

3) I pencil mark any beam where the surface needs to be adjusted to match the adjoining beams, remove it, and hand sand or even oscillating sand to correct. You are making a flat-bottomed hull, and the even jig surface is a good start.

4) In my case the beams came together the **orange arrows** have only a small rise differential easily sanded away. If your jig is similar you could sand it now, before gluing, or after gluing up, and smooth it out on the oscillating sander when done.

5) **Illustration 35:** Note that the base plates have been drilled and counter sunk. They will be turned around when glued and screwed to the base.

2.4 Gluing things up

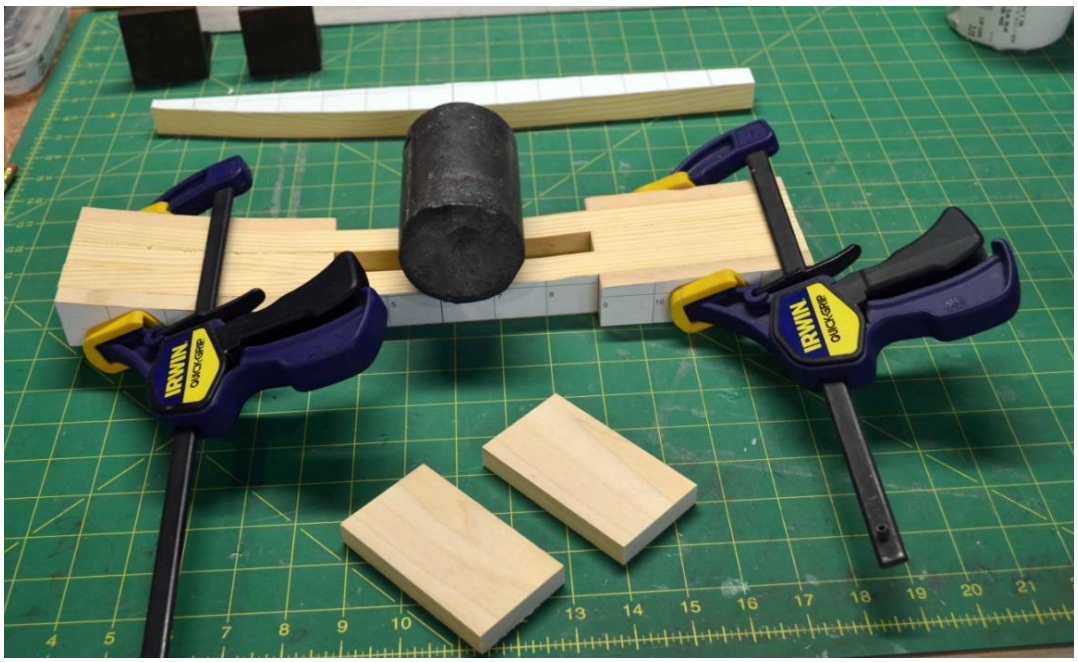


Illustration 36: My clamping system while gluing proceeds.

1) Take the unpapered full beam and lay the unpapered half fore and aft half beams in to position. And with a sharp pencil mark vertically the inner edges that locate the open center (**red dotted arrow** in **Illustration 35**).

2) I use Elmer's Carpenter glue, and spread a thin layer of glue into the seating area of both half frames, being careful not get any glue on the surface of the opening created. Then press both half beamd onto the full beam surface and clamp. Do this on a flat surface making sure that sure the bonding will sit the **BJ2** flat on the **BB2**'s surface.

3) Continue this process until all the beams have have been set in place.

4) When dry, I smoothed out the surface from previous findings on the oscillating sander or with 120 grit sandpaper (**Illustration 35**).

The base plates:

1) The base plate is pine 1/2” x 3-1/4” x 2”. On the upper surface you need three lines: a base plate **C/L** length wise (the **blue line**), a **C/L** width wise (the **green line**), and another line (the **orange line**) which divides the exposed half of the base plate, The intersection of **green** and **orange** is the center hole to affix the **BJ2** jig to the base board.

2) I used a 1/16” drill bit to open the hole at the center line intersection followed by a counter sink to complete the opening, ready for a 3/4” drywall screw.

3) When formed, with a bead of glue on the inner half of the plate, slide it into position. You need to be exact in matching the plate **C/L** to the jig **C/L.**

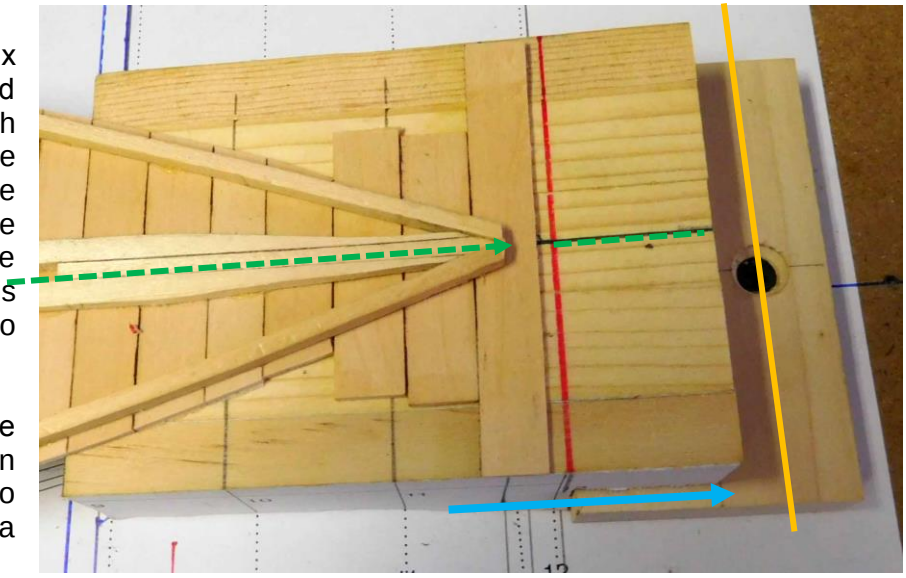


Illustration 37: The base plate with an early look at the using of the **BJ2**.

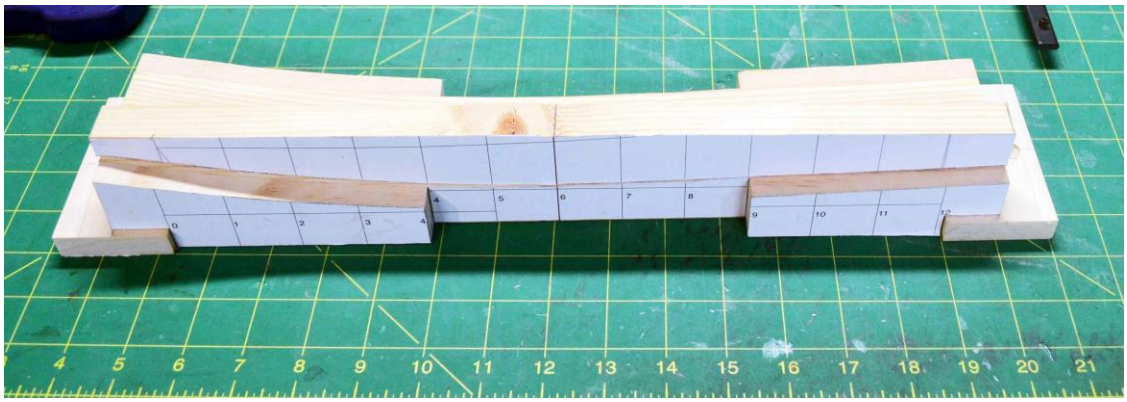


Illustration 37: The **BJ2** and press constructed.

NOTE:

Next up is **Section 2.5** where we will make the keelson. The **BJ2**, as it stands on cutting matt above, does not have to be mounted on a building board yet. It will serve a different function for now.

2.5 The Keelson Template and BJ2 Mounting

Research locator:

Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, p. **112**.

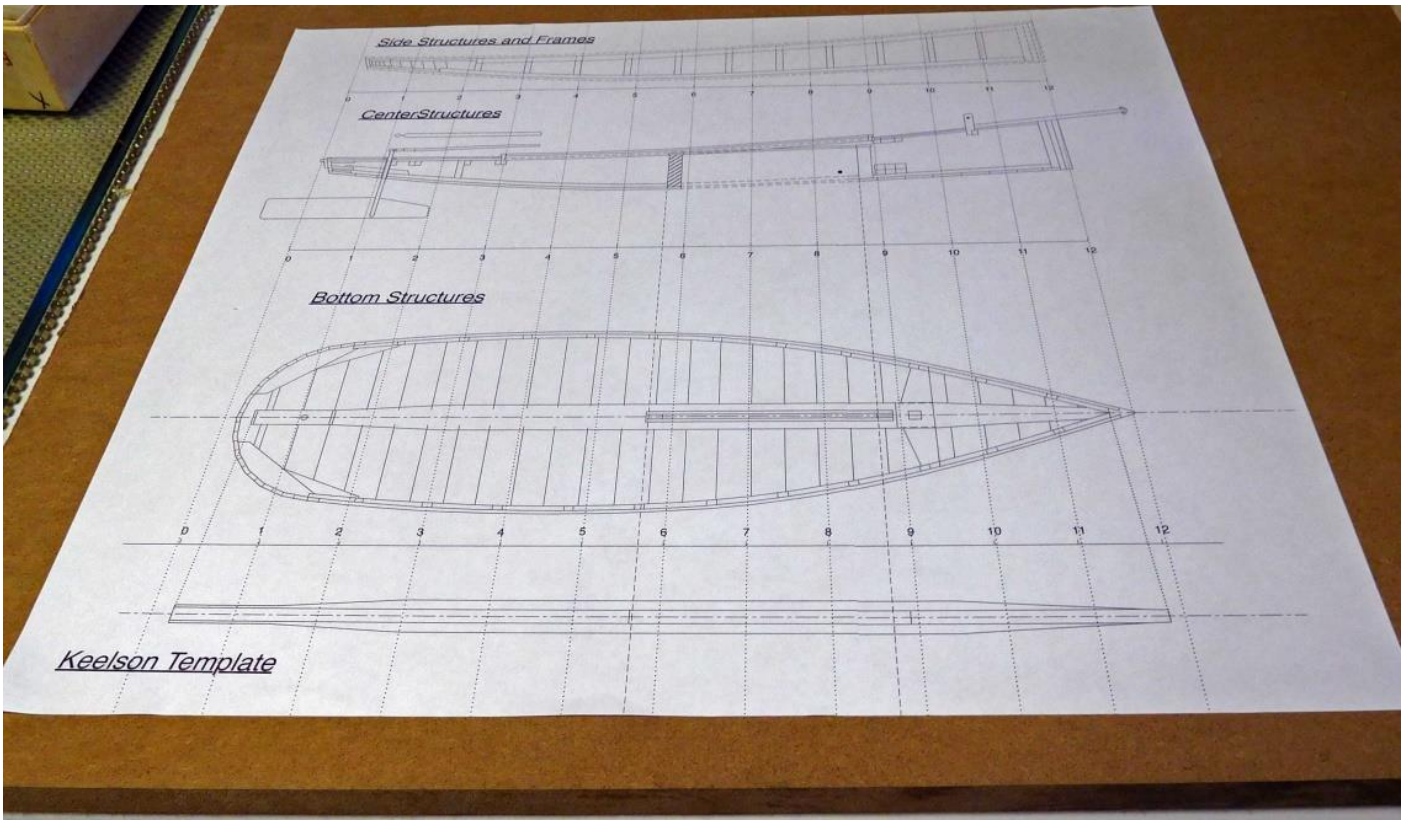


Illustration 38: The **BB2** for the **BJ2**

Added Abbreviation:

SL = The station lines of the plan drawings.

The Keelson Template set up:

Illustration 38 has all the **SL's** extended vertically through the "Keelson Template, Bottom Structure, and Center Structure" drawings. This gives you a visual reference from drawing to drawing, However, the "Bottom Structure" drawing is about to be covered up by the **BBJ2**. I then studied the plan and decided to step back and make a list of any other line(s), vertical or horizontal, which might help with the accuracy of positioning as you go forward. In doing so, those "aid" lines that will be covered up by the attachment of the **BBJ2**, might be a great deal of help if they were transferred to the top and sides of the **BBJ2**. So here is how I proceeded with the keelson line transfer:

Mounting the BJ2:

1) With a straight edge, I extended the "Bottom Structure" **C/L** out to ends of the **BB2**. This will enable me to center the **BJ2** onto the **BB2** accurately: (**green arrow**)

2) Two lines were drawn to be able to accurately mark the opening of the centerboard: (**blue arrow**)

3) Two stern lines were drawn to mark the end of the bottom planking and the end of the keelson: (**red arrow**)

4) The line was drawn to mark the end of the chines: (**orange arrow**)

5) Two lines were drawn to mark the forward position of the inner and outer stem pieces at the bottom structure: (**black arrows**)

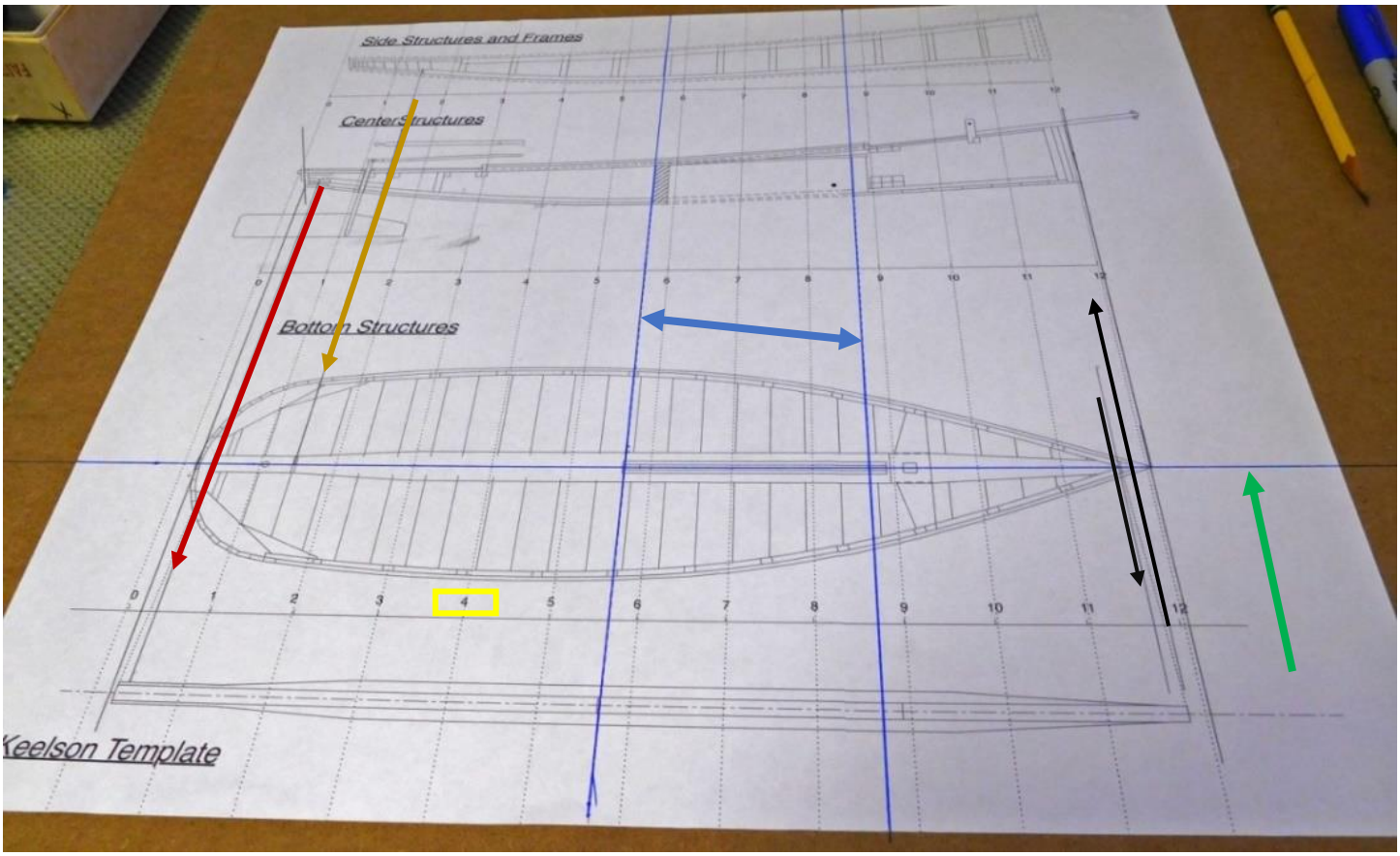


Illustration 39: The line additions to keelson Template

The **BBJ2** was positioned along the **C/L** and lined up with **station 4 (yellow box)**. I secured the position with two 1-1/8" drywall screws into pre-drilled and counter sunk holes. Note the **C/L** of **BJ2** is already penciled in **blue**. Now I will transfer the information I need to the top surface of the **BJ2.** Note the centerline is already penciled in (**Illustration 40**).

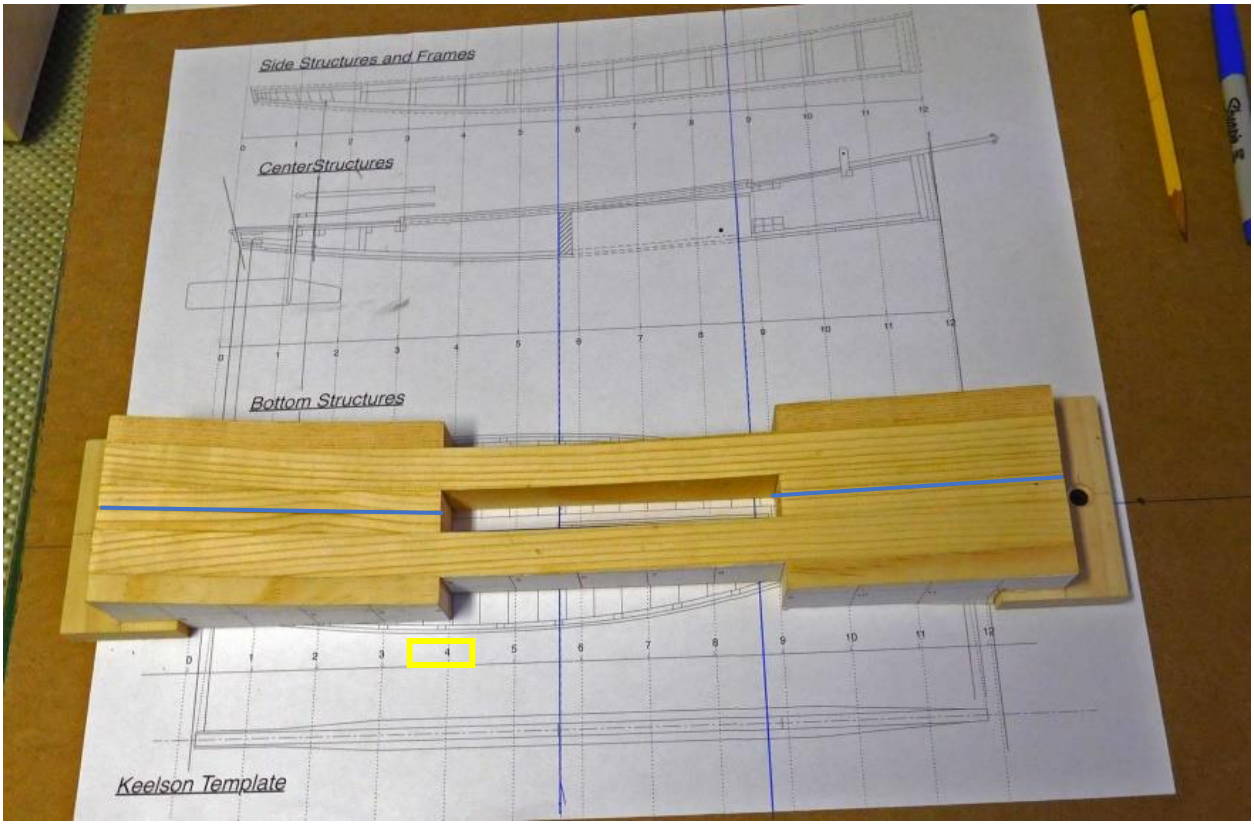


Illustration 40: BJ2 aligned & secured at **SL 4**

Transferring the Keelson "lines" to the BBJ2 surface:

1) To get my lines placed accurately on the **BB2** surface to the **BJ2's** surface, I use an angle block, not just my eyeballs. Run the block flush against the side of the **BJ2** and up to the line being transferred. I take a sharp pencil to the point of line and block intersection and scribe upward to the surface of the jig. I do this port and starboard. Using a square, I then connected the vertical lines across the surface which includes all station lines. **(Illustration 41)**

2) **Remember,** the **BJ2** is at 90-degrees to the **TA2**. That's why all the lines are carefully drawn and double checked as you screw the base to the board. You can use a straight edge along the back side the jig with a weight on the jig's surface to help maintain the placement.

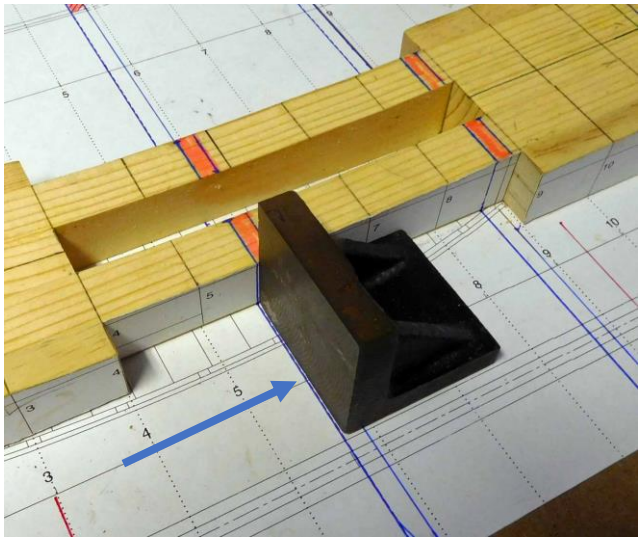


Illustration 41: angle block "checkup"

2.6 Using the BJ2 to construct the Keelson

Materials:

(2) Outer Keelson logs, Basswood: 3/16” w x 1/8” h x 24”

(1) Inner Keelson logs, Basswood: 1/8” w x 1/8” h x 24”

“Getting the Keelson into proper shape”

I have a piece of 1” PFVC pipe, about 30” long with a cap glued at the bottom and a threaded cap on top. Filling the pipe with water (just plain old tap water, all three basswood strips went for a swim. Holding their breath for about three hours was enough to make them pliable to be shaped on the **BBJ2**. I know that water from the tap works very well with wood, if you let it soak long enough.

1) I laid the three strips together, the 3/16” strips “sandwiching” the 1//8” strip. With blue tape strips, I wrapped the ends and mid sections together to hold their position in the jig.

2) Centering, the soon to be keelson, on the outer surface of the jig, I took the Keelson “press”, lined it up the station lines at the center board opening, and clamped the press onto the jig.

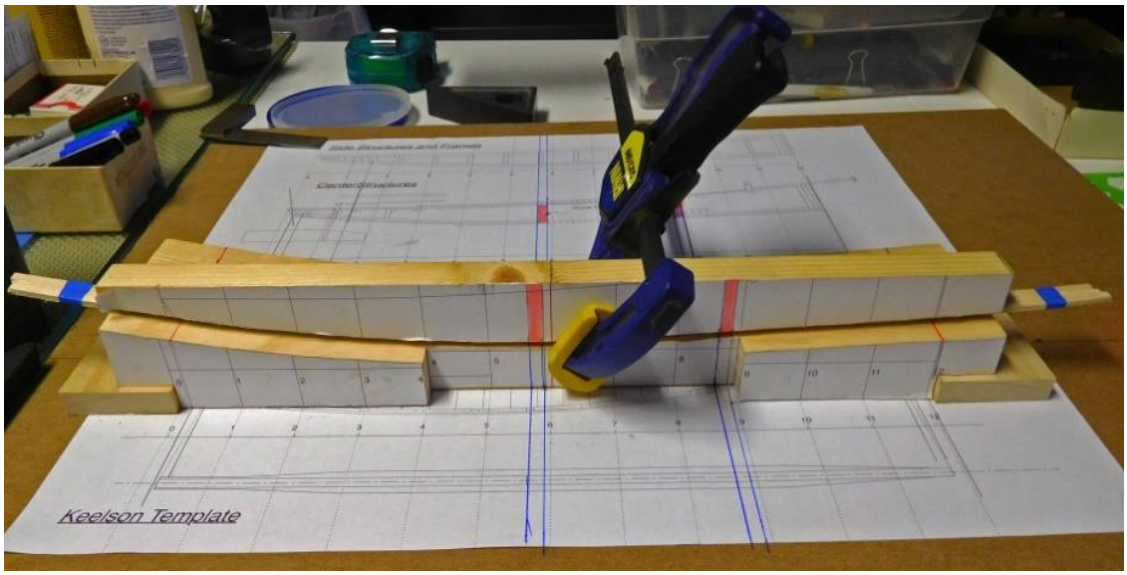


Illustration 42: Keeping the pressure applied to the keelson.

1) As you can see, I also carried the center opening position onto the face of jig press (**pink shading**).

2) I usually do this at overnight, especially with thicker pieces and harder woods. I like the planks to dry thoroughly in the press so, when removed they hold their new position.

3) 24” in length is probably overkill, but I have found, that using the center of the strip at the bend, rather than the actual length required, makes for better results. The overhang will be trimmed later.

4) When dry, I take the 3 pieces, still taped (remember, it's just a 3-strip blank at present), and place the assembly on the jig – centered (note the overhang on both ends). First to be marked on the keelson are the lines relative to the center board location. Note how the outer edge of the keelson is flush with the outer edge of the first full beam. This will guarantee the lines will be transferred at 90 degrees to the **C/L**. I used two angle blocks to hold the keelson in place.

5) I used a small square to mark the surface lines.

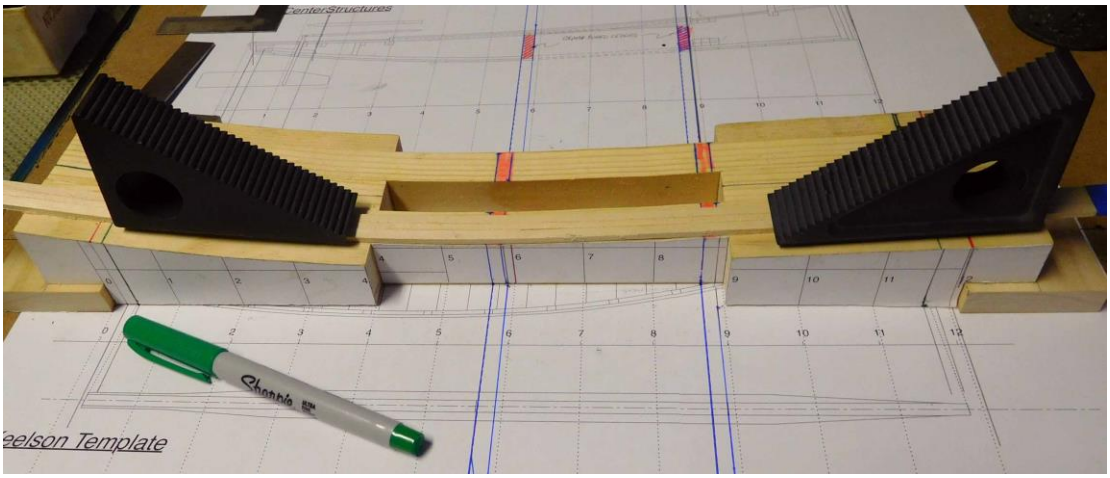


Illustration 43: The centerboard location.

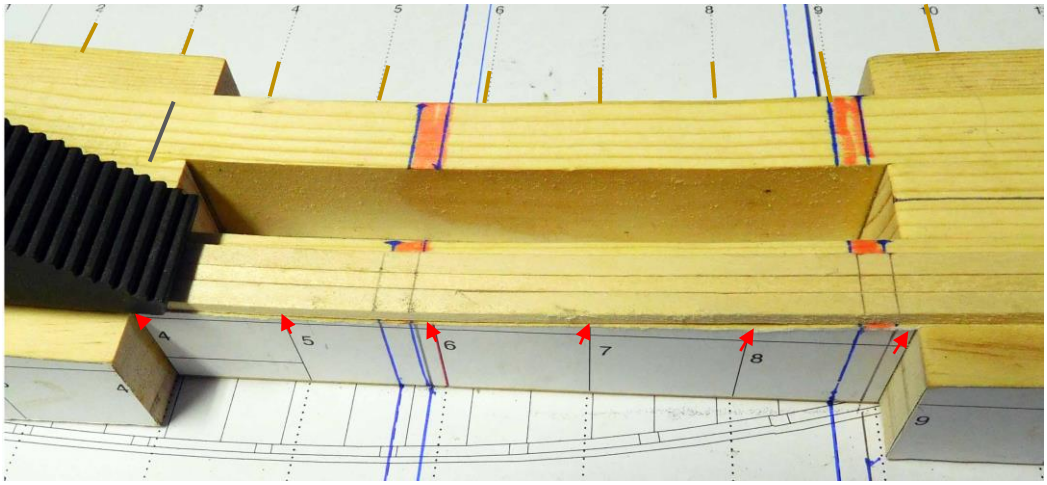


Illustration 44: Flush with outer edge and centerboard location marked to 'keelson" blank.

6) Looking ahead: While I have the keelson blank centered (**Illustration 44**), centerboard location defined marking the lines necessary on the upper face of the keelson (note that this surface will be visible in your model), I take a pencil and place locating "**tic**" mark on the facing edge of the keelson papered side, to identify each station line location. I do this now, because the **ST's** are right in front of me and I will need this information to later mark the lines on the under surface of the keelson. Marking them across the top surface now would require you to erase them later and if your pencil is too sharp, that may be a problem.

7) Transfer the remaining fore and aft location lines. I used the colored Sharpies to mark plans and jigs, but do not use color on the components of the build. Use a #2 pencil gently so that the removal of said lines later, can be by eraser, not sandpaper.

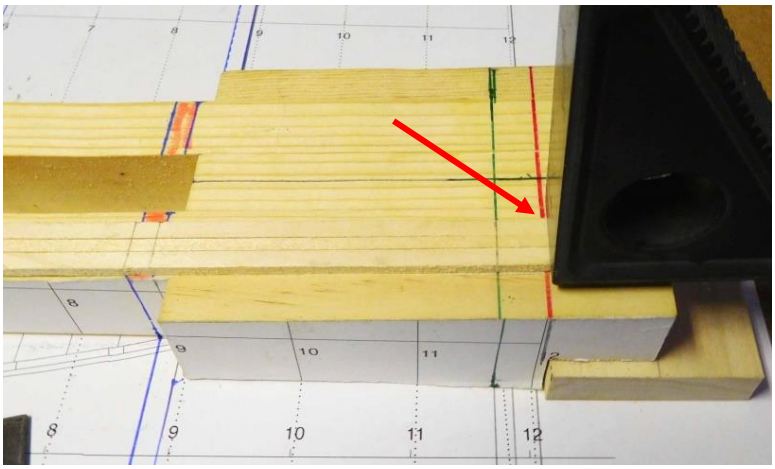


Illustration 45: At the stem.

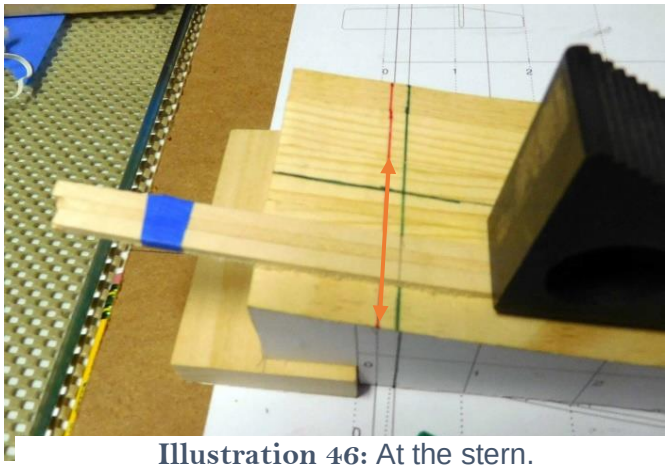


Illustration 46: At the stern.

8) Once marked, remove the tape. Using the 1/8" center "log," I trim the center board opening creating two strips, one fore, and one aft. I separate the fore and aft by using a single edged razor blade at the **red lines**, and use my sander to square the outside fore and aft **blue lines**. (See **Illustration 47:** below)

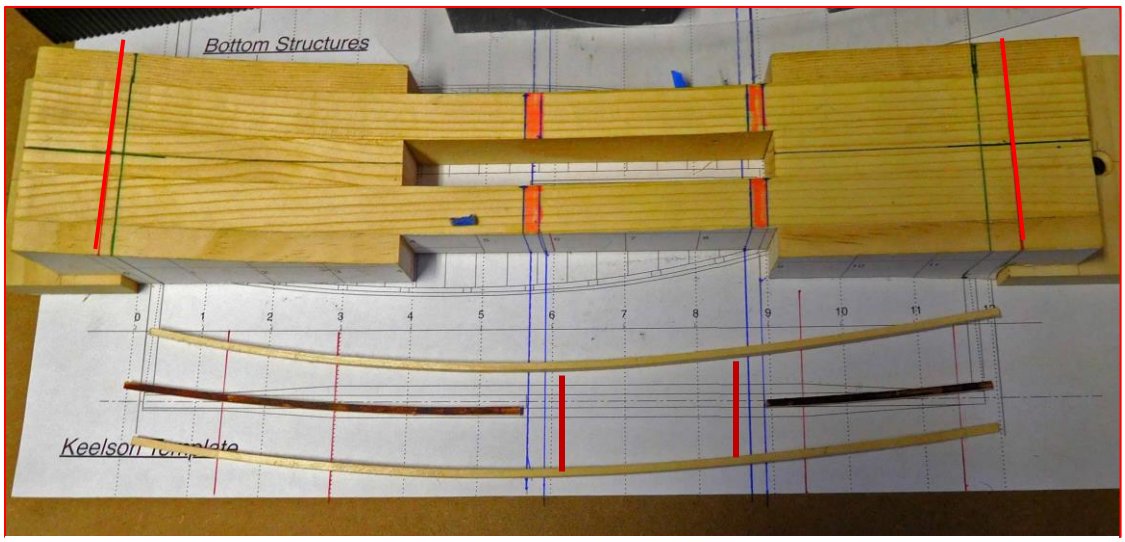


Illustration 47: The keelson logs.

9) At this point, the Elmer's carpenter comes out and, after "caulking' the joints with my brown sharpie (both sides of the two center pieces) I glue the assembly up, making sure the centerboard opening is correct. I do not trim fore and aft now.

10) Immediately after pressing together the whole assembly, making sure the centerboard opening is correctly located, I lay a sheet of wax paper over the jig's surface, leaving an overhang on one side. Placing the Keelson assembly onto the wax paper place it in position on the jig, I fold the overhang over the top of the assembly and weight the press to the jig and wait for the glue to dry thoroughly. This will "cement" the run of the keelson into memory. I try to position at the center of the first **BJ2** beam (**yellow arrow**), but wax paper is very slippery, so make sure there is even pressure on the entire assembly and that the "run" is in a straight line.

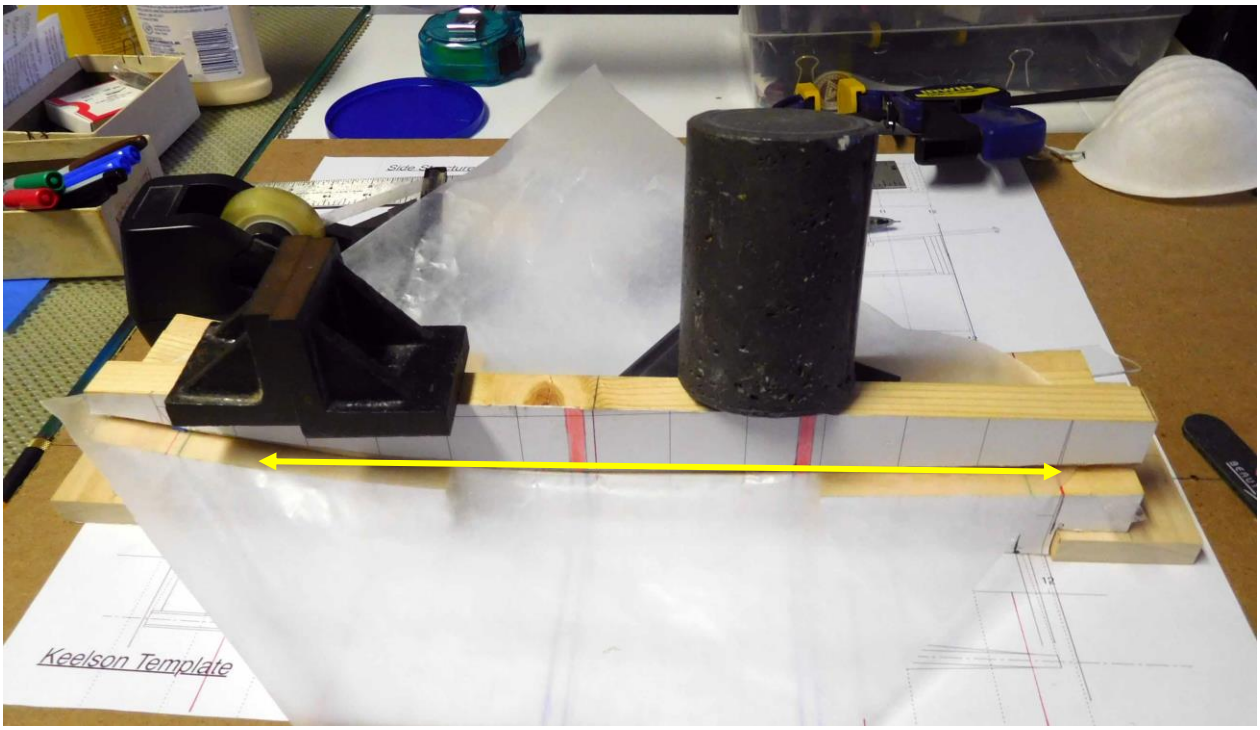


Illustration 48: The press accurately lined up with the jig.

11) When removed from the press and separated from the wax paper, I scrape the now formed keelson's surface with a single edged razor blade. Now I can shape to the keelson template. The tape can now be removed.

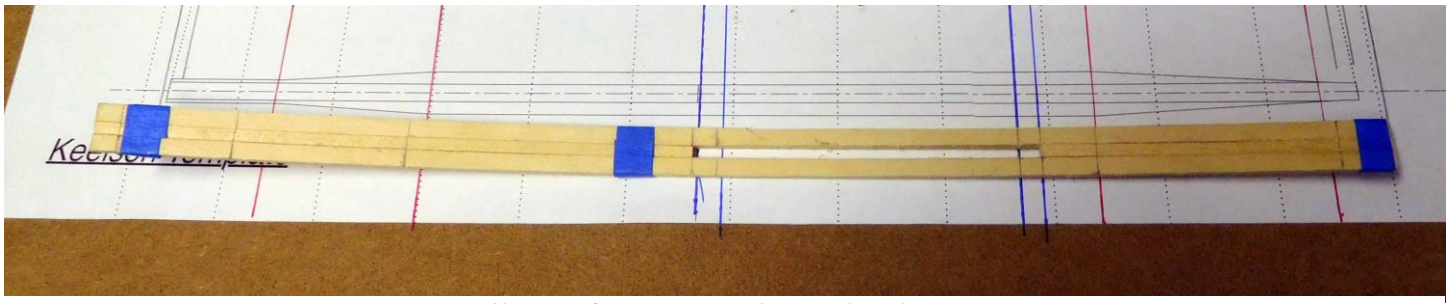


Illustration 49: Ready to take shape.

2.7 Getting the Keelson trim and proper

In Illustration 46, note the keelson template tapers at both the stem and the stern. Notice also that I have left the keelson blank a little longer than need be now (**Illustration 51**).

1) Placing the keelson onto the BBJ2, I locate (the **green lines**) where the tapers changes, fore and aft. Note that, aft, it stages down to a final "end run" at 1/4" in width (**orange rectangles**), while forward, the taper is brought down to 3/16". I pencil these locations lightly onto the keelson bottom's surface**.**

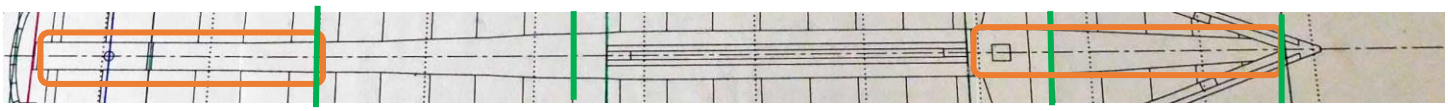


Illustration 50: The two areas of taper fore and aft.

2) Looking back to **Illustration 50,** see the location of the **orange rectangles**. These designate that part of the template that will be spray glued onto the keelson assembly. Carefully trim these two sections from the plan template, and attach using all the lines available to you. I use 3M Super 77 spray adhesive.

3) It's time now to trim (the **blue dotted line**) the assembly to actual length at the stem and stern. Trimming should be 90- degrees to the keelson's **C/L**.

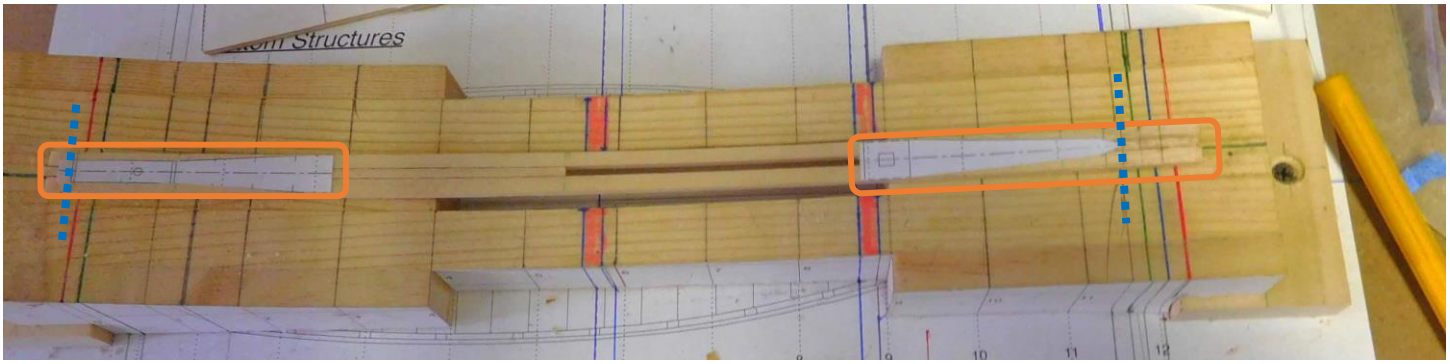


Illustration 51: The two templates affixed.

4) I use my oscillating sander and sanding sticks to gently (many light passes) take the keelson to final shape, laying it over the template numerous times to check for accuracy, the important thing here is that the ends be exactly 1/4" aft and 3/16" forward.

5) **Illustration 52** shows the stem, ready to be tapered. Note the slight angle change at the arrow tip. Forward, I took the keelson down to the template with the oscillating sander. The arrow's tip comes last and is sanded "to the line."

6) Aft, I assured the 1/4" width of the finish end of the keelson on my Preach saw. It was easy because the keelson blank was 1/4" wide. Setting the rip fence to run the blade along the "outer edge" of the keelson line I visibly cut about two-thirds of the run to the taper point, then turn the blank over duplicating the first run I separated the excess with a single edge razor blade.

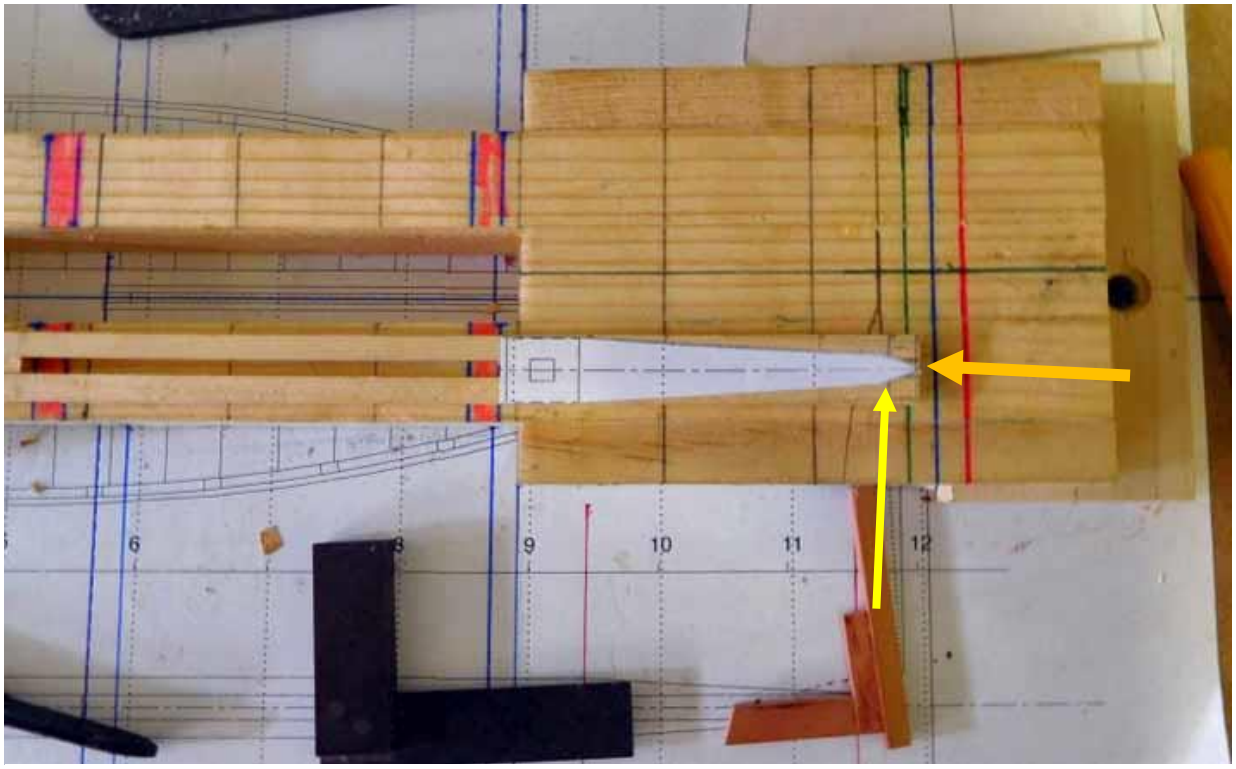


Illustration 52: A close-up look at this point at the stem before finishing.

7) I used the oscillating sander to set the aft taper "to the line," again, go about two-thirds of the taper from 1/2" to the 1/4" union. The union itself should be formed by hand. I used a sanding stick making sure I kept the keelson edge at 90-degrees.

8) The **yellow arrow** in **Illustration 52** shows the finished width of 3/16". The **orange arrow** shows the tip of the keelson on **C/L**.

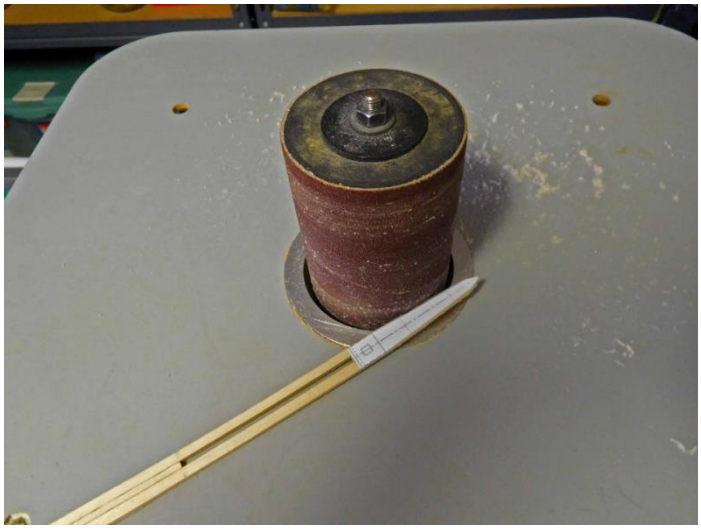


Illustration 53: The forward connection.

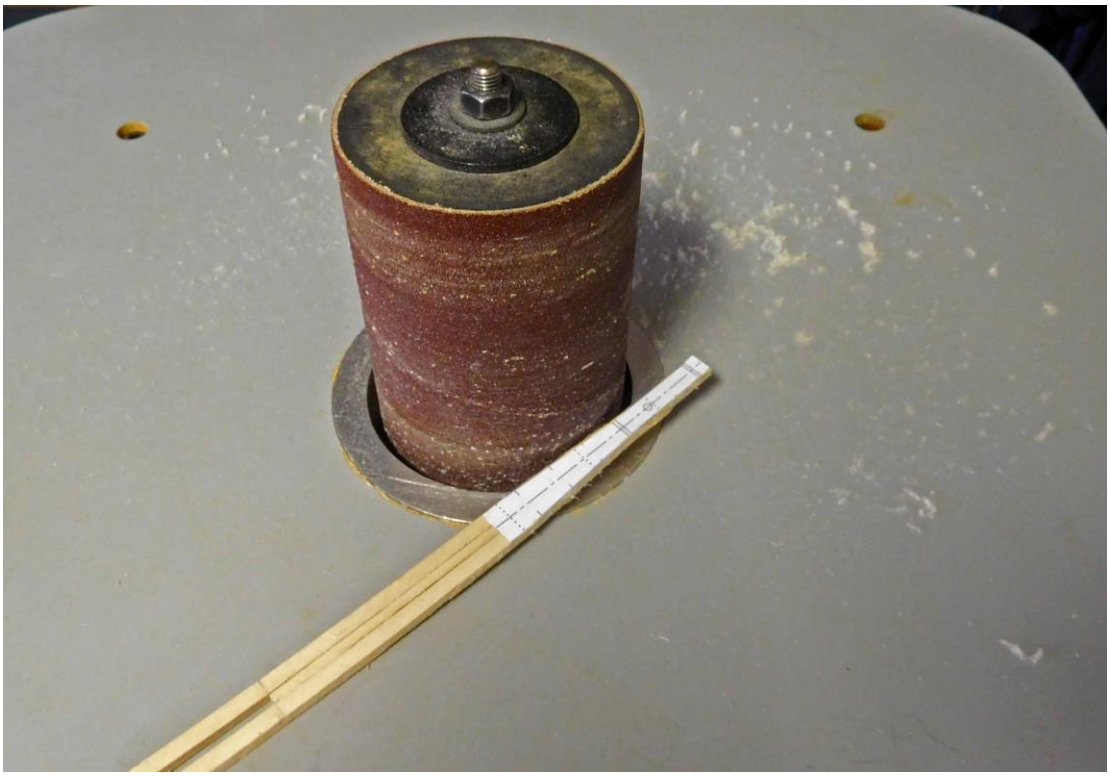


Illustration 54: The aft connection.

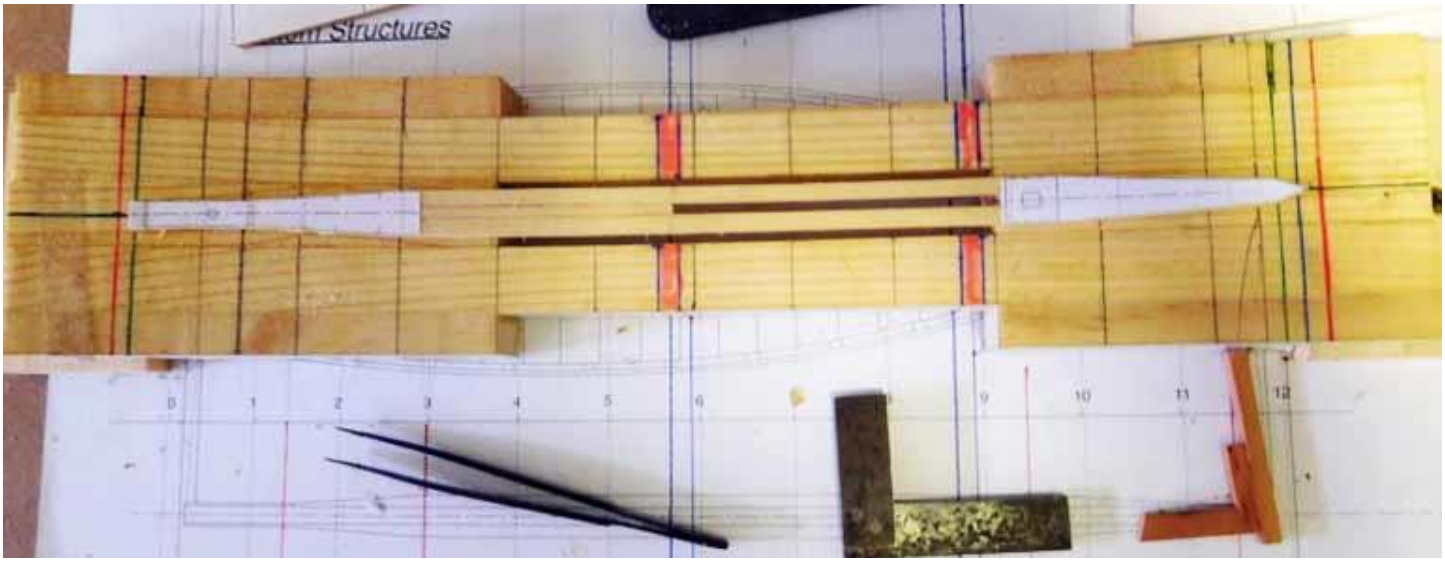


Illustration 55: Ready to go back to the **BJ1.**

9) Though it has slid a little out of position (poor photographer planning), I am now the proud owner of perfectly healthy sharpie keelson. You will notice I have added additional reference lines to the **BJ2** surface as the build progressed. Test for you: the line for the rudder hole, the lines for keelson width changes, all the station lines, and the line for the start of the stems "V" for the chines are all there. See if you can point them out without going back to the plans!

NOTE: Before you begin the keelson seating, make sure you have a good clear C/L at each notch floor. The paper face of each ST runs the center line up to notch, make sure it gets onto the notch at every location. The **orange arrow** shows the C/L at the centerboard opening.

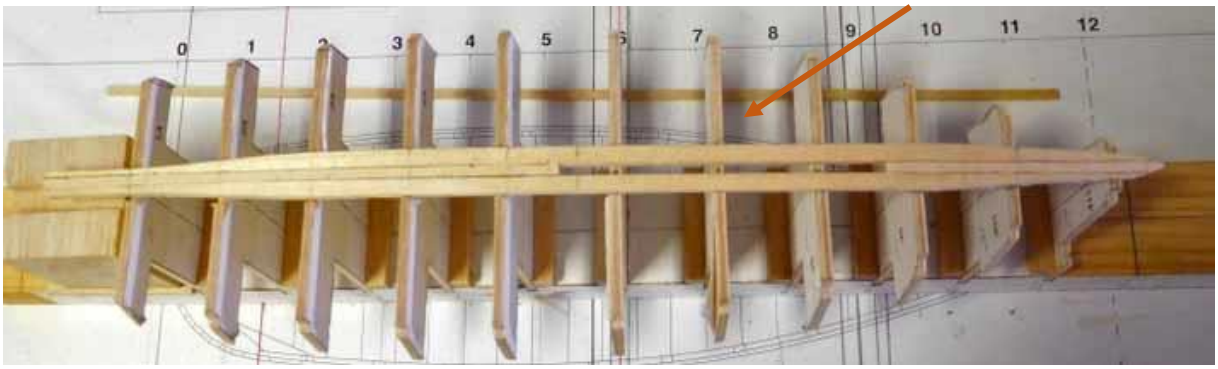


Illustration 56: The Keelson fitted to the **BJ1.** Note the keelson station lines.

10) When the keelson was right side up on the **BJ2,** I left the port side edge of the keelson with "tic" marks at each **ST** location. Installing the keelson to the jig accurately will require the **ST's** "tic" marks to be run across the bottom surface now (they are faint, but there). Don't be afraid to make them very visible and the bottom planking will cover them. Once, transferred erase the tic marks on the sides. These lines will allow you to easily set the keelson onto the jig in proper position to its **C/L**. Remember, these are station lines not framing locations - the station line is the edge of the frame that is glued to the support log.

11) The lines drawn to aid final shaping of the keelson bottom will allow you to easily set the keelson onto the jig and in its proper position. However, it may very well be that the keelson notches need a little tweaking to get the "right seat". If so, the objective is to make sure to keep the entire length of the keelson on the **C/L.** As shown, you can visually see it through the center board opening. You have three other points of reference: The face **C/L** of **ST1**, **ST11**, and by using a machinist square to line up the point of the keelson stem to the **C/L** of the **PBJ1**. I have a small dentists mirror to check the underside alignments.

12) I started at the "tallest" station template **ST6**.center station. and work alternately between fore and aft, one notch at a time:

    a) Set the keelson into the notch. At **ST6** the 1/2" wide keelson, should be received by ½" centered notch. It will either be a good fit, a notch not wide enough to fit, or a notch that is too wide.

    b) If the fit is fine, double check that it is on center. I use a proportional divider to see if the centerline from the paper template reading is centered. If it is, we are done with the first test. If the two sides are not equidistant from the **C/L**, use the divider set at 1/4" and re-mark the longer of the two sides. Now swing the divider to 1/4" from the **C/L** to find the point of widening necessary. You can either "tic" it with a sharp pencil, or use a single edged razor blade to scribe where the cut need to come. I use the latter and see-saw the blade to the bottom surface of the notch, then take a sharp #11 blade to finish.

    c) If the notch doesn't fit at all, use the divider method described above, on both sides.

d) If the notch is too wide, use the divider to as above to find the side that needs to be shimmed. Note that it could be both. Shimming doesn't have to be pretty. Card stock, or thin strips of railroad scale lumber scrap (my choice – I told you I save everything) will suffice.

13) In **Illustration 57:** Not only does the keelson need a proper width, it needs to seat on the bottom of the notch as well. With the keelson now being set to width, I clamp it into position. you are looking for the bottom surface of the keelson to rise just above the top surface of the station frames themselves. If too deep a notch, shim it up with a small piece of anything handy, card stock, thin strips of basswood, etc. See the **yellow arrow** noting a proper seat. You do this, so that the bottom planking won't stick to the frames when being glue up. Review the **ST-9F** saga if you have problems.

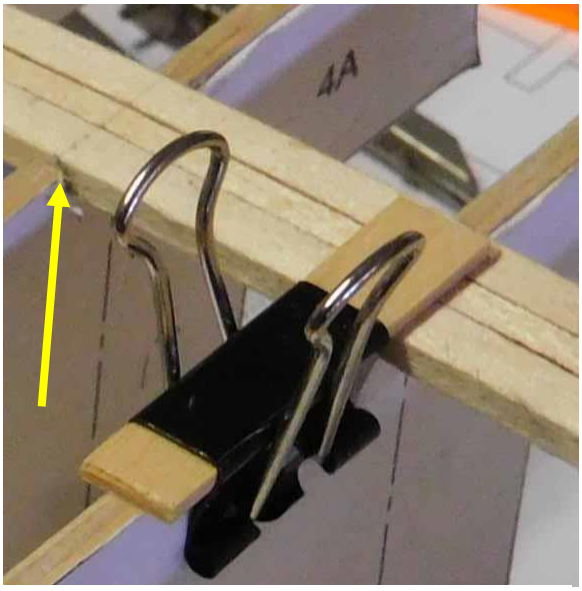


Illustration 57: ACCO clamp

14) A test: Take a batten and run it down the notches **C/L.** It should be a smooth gentle arc sitting up nicely on the notch bottoms. It should also let you know the problem at each station if there is one.

15) Additionally, remember that there are small notch bevels that may need "tweaking." A small file can easily add to the bevel.

16) In summary: The process of depth is simple: At each location, just use your index finger to press down the keelson. It will with either go as the **yellow arrow**, or you will need to lower the notch to get to the arrow.

Note: The homemade clamps are from Staples. A box of 12 small ACCO clips and some 1/16" basswood strips, trimmed for a tight fit, worked perfectly, and they are adjustable, just slide the basswood back and forth.

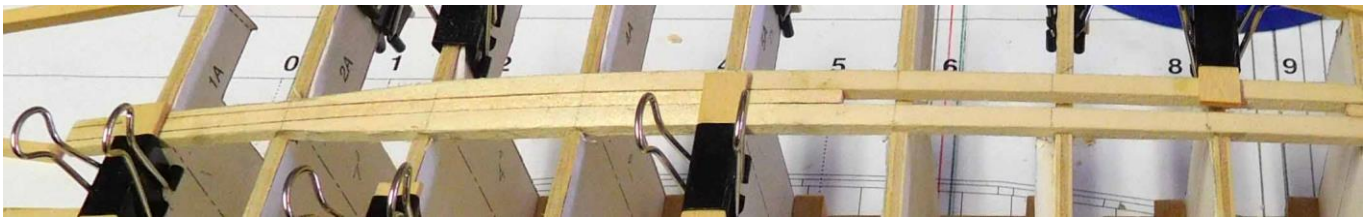


Illustration 58: Ready for the next step.

2.8 The Chines Formation

Research Locator:

Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, **pp**. **100, 112.**

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), **pp. 218-219**, **247-248**

Remember Chapelle's sharpie characteristic No. 5: **"**The chine line, in elevation, must appear as follows: the heel of the stem should be above the water line; the chine runs straight for about one-third the overall length of the hull abaft the stem, sloping downwards toward the midsection. The chine then curves gently to the point of greatest draft, and runs upward to the stern in a flat, gentle curve. A long run is important."[1]

Materials:

Chines – basswood/pear: Two pieces 3/32" x 1/8" x 24" (If you are doing this shaping by purchase or saw)

Chines – basswood/pear: Two pieces 1/8" x 1/8" x 24" (If you are doing this shaping by hand)

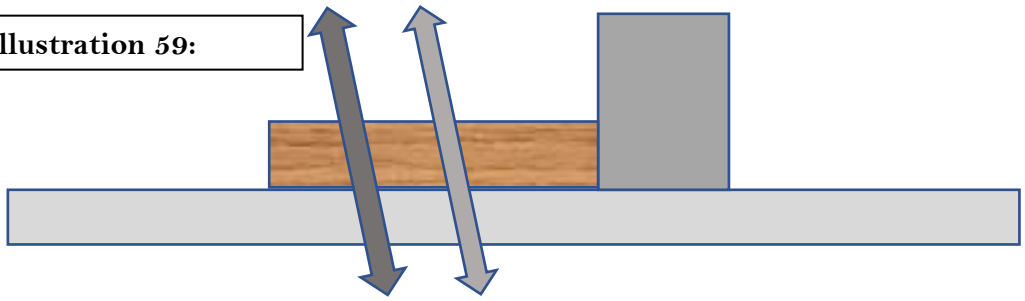
With the final shape of the keelson completed, and the keelson clamped into position, I used a ship's curve to adjust the chine seat notches if needed. The angle that is now you're your guiding light, is the small angle of "V" of the keelson at the stem.

Chine Construction:

1) The chines may take one of two shapes: angled top and bottom at 9-degrees, or angled only on the bottom at 9-degrees leaving the top at 90-degrees. What is the difference? If you go with the former, all frames (they seat on the chines) will require a matching 9-degree angle at their base to seat properly. The latter will have no such requirement. I have found drawings to support either way, but I keep it simple for this build.

2) I elected to go with the single 9-degree bevel. Since I have a MicroLux saw, I used it. With a 1/8" x 1" x 24" piece of basswood, set the blade to the 9-degree angle, and rip fence to 1/8", and sliced off two chines. They then went into my homemade PVC "soaker" for a few hours. If you have no saw, just soak the chines, at 1/8" square. The first cut (**gray**) is aimed at 1/8' at the saw table. To get both ends angled, move the rip fence to establish another 1/8" and rip again (lighter gray).

Illustration 59:



[1] Chapelle, Howard I., **American Sailing Craft**, Bonanza Books, New York, 1936, **p. 8**

3) Next, remove the chine pieces from the soaker and clamp them into position to dry. Make sure you check the bevel to determine port or starboard. You want the chine to hold the first side planking to the 9-degree angle. The clamps need to hold the chines tight against the template notch in both horizontal and vertical position in the jig. If you elected to defer the angle, it doesn't matter about proper positioning now, just clamp the planks and let dry. When dry, with the square stock clamped in place, the 9-degrees will be sanded into the top with the **ST** flat-surface as a guide. When sanded, lift the port chine off the jig, turn it over, and you have the starboard chine angle seated. Ditto the other way.

Some notes of interest on preparing the Keelson to seat the chines and help you understand what's going on at the stem.

1) What you see above is my first test keelson for the prototype. At the time, the drawings were in progress and I had moved ahead, when my first attempt with the keelson "blank" had square ends both fore and aft, and, the chine stock was 1/8" square. Note there was no pattern at the keelson stem.

Illustration 60: Chines coming out of the water and clamped to dry.

1) Note the **green arrow** and the "V" opening that results when the two chines are brought together and clamped to dry. This is the location of the of the outer stem post.

2) So, why are the chines running on the outside of outer stem post? Remember, the keelson receives the outer stem post at 3/16", so the width is correct. So, the answer is, the fore end of the keelson needs to be trimmed to receive the inner stem post, and then the chines themselves.

3) **NOTE**: The chines are basswood not an exotic species of wood. They are wet and still drying when this picture was taken.

4) **Illustration 61** shows the outer stem piece dry fitted in place at the end of the keelson. The width of the stem is 3/16". So is the inner surface of the stem piece. Now all I needed was the "V" at the end of the keelson.

5) To achieve the proper shape of the keelson at the stem, when without a template, I use the chines themselves. Mark the **C/L** of the keelson. Loosen the clamp, the chines will spread slightly. Draw a chine to the marked **C/L** and scribe a line onto the surface of the keelson. Repeat with the other chine. As the run of the chine is clamped to the notches, the point formed will allow the right "seat" of the chine and inner stem post.

Illustration 61: The outer stem post.

6) Now, release the keelson. Sand carefully to shape the "V". I used a sanding stick. Once shaped, I "pinch" the chines, one at time, into position against the keelsons surface. Holding the chine in place, I mark the end of the run at ninety degrees from the **C/L** across the top surface of the chine.

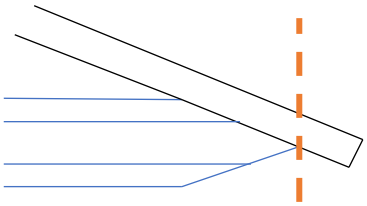


Illustration 62: scribing.

7) Since I did have a template to guide me on the second build, I used my disc sander to complete the "V". I also shaped the chine ends with the sander.

8) At this point, we are ready to fit the chines to **BJ1.**

Dealing with chine notches:

1) Reseat the keelson and clamp into position.

2) **Illustration 63:** Once re-positioned, set the battens aside. Here is where a ship's curve is a valuable tool in ship modeling. Go to the plan 2, the "Bottom Structure" drawing. Take your curve set and find the curve the lines up, from **ST7** to **ST12** at the inside edge of the chine. Mark the run of the chine accordingly. I used a narrow strip of blue tape. Now go to the jig and placing the forward end of the curve to the one position were sure of, clamp the curve.

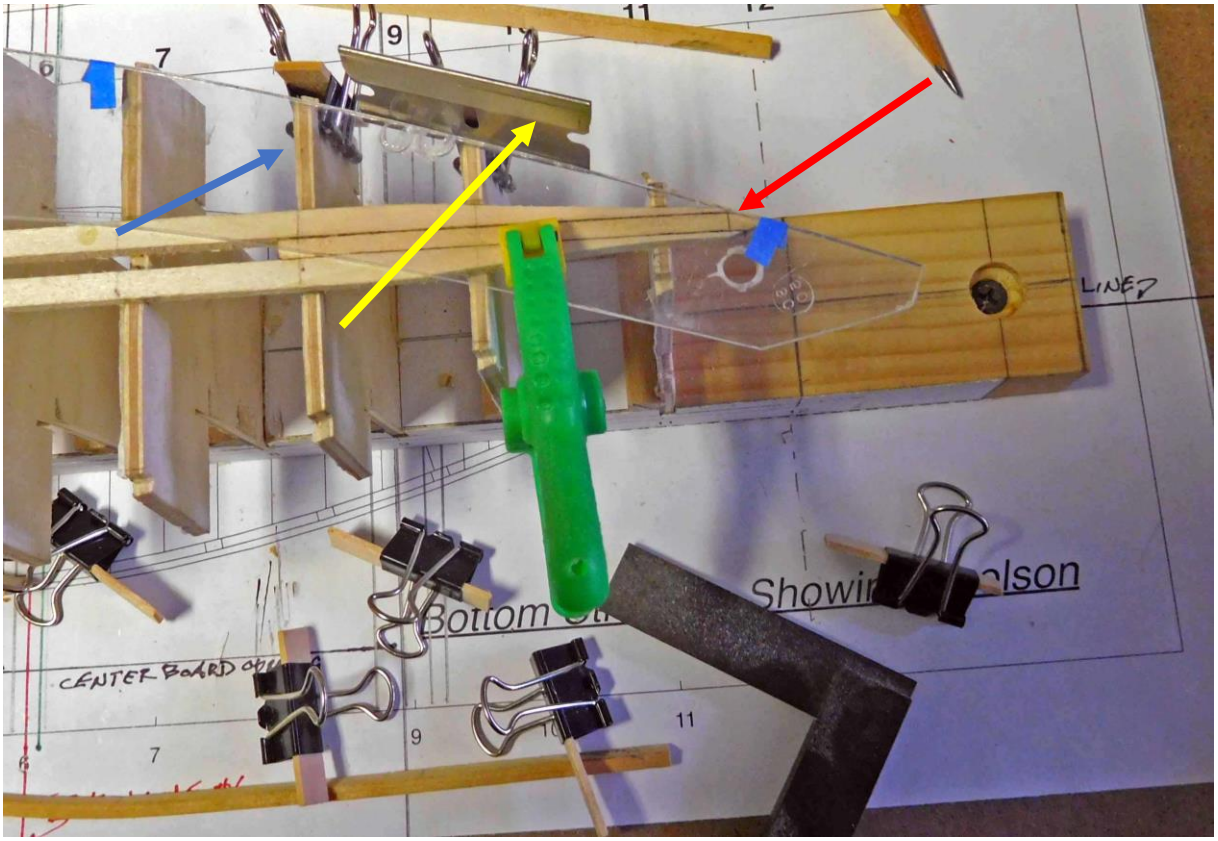


Illustration 63: NOTE: If you search the web to "ship curve set", a I just did (July 2017), Alvin (drafting supplies) has a 6-piece ship curve set (Model SC66A) in clear plastic (6-3/4" to 24") at Amazon.com for $16.71.

3) With the curve in place, I use a single edged (new) razor blade and gently "see saw" down to the bottom of the notch to open the width to edge of the curve. You use the same blade along the bottom edge "tidy-up".

4) If you look closely, station notches at **ST9**, **ST10**, and **ST11**, need adjustment. With the curve in place, I use a single edged (new) razor blade and gently "see saw" down to the bottom of the notch to open the width to edge of the curve. You use the same blade along the bottom edge "tidy-up".

5) Repeat this exercise on the other side and then recalculate the curve location from the plan to match the aft stations.

6) When done, re-clamp the chines. The "run" of the chines should be judged by visually comparing the model chine "outline" to the bottom plan.

8) The best way to check your work is go back to using a divider if something doesn't look right, the same way you check the keelson notches. Fix any needed adjustments in the same manner.

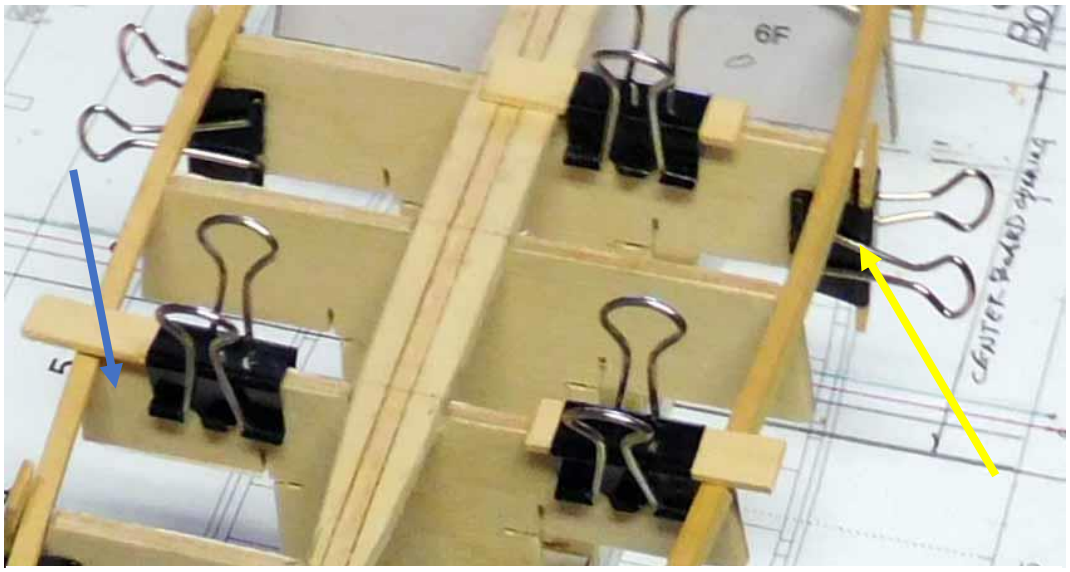


Illustration 64: ACCO clamping. By adjusting the basswood note the increased pressure **downward.** Note also that they need to check often to maintain the pressure. Vertically, they can **drift slightly**.

9) We have now established chine location of the flat-bottom framing. As we go forth on the installation of the chines, the next adjustment to be made is to the top surface of the chine. It will need to be matched with the top surface of the keelson (after all, it is a flat-bottom hull).

10) The simple diagram below, shows you the two options of the shape of the chine: the **blue dotted line** represents the 9-degree angle at the bottom while keeping the end at 90-degrees.

11) The **green dotted line** represents the 9-degree angle at both top and bottom. The distance between the red dotted lines is 3/16". The junction of the **red** and **green** is a3/32" wide and 1/8" from the top of the bottom planking. (This drawing is not to scale.)

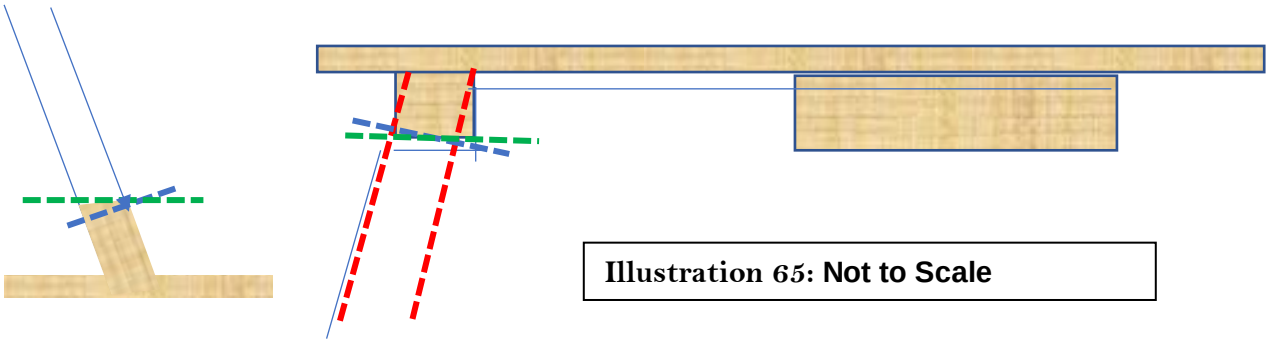
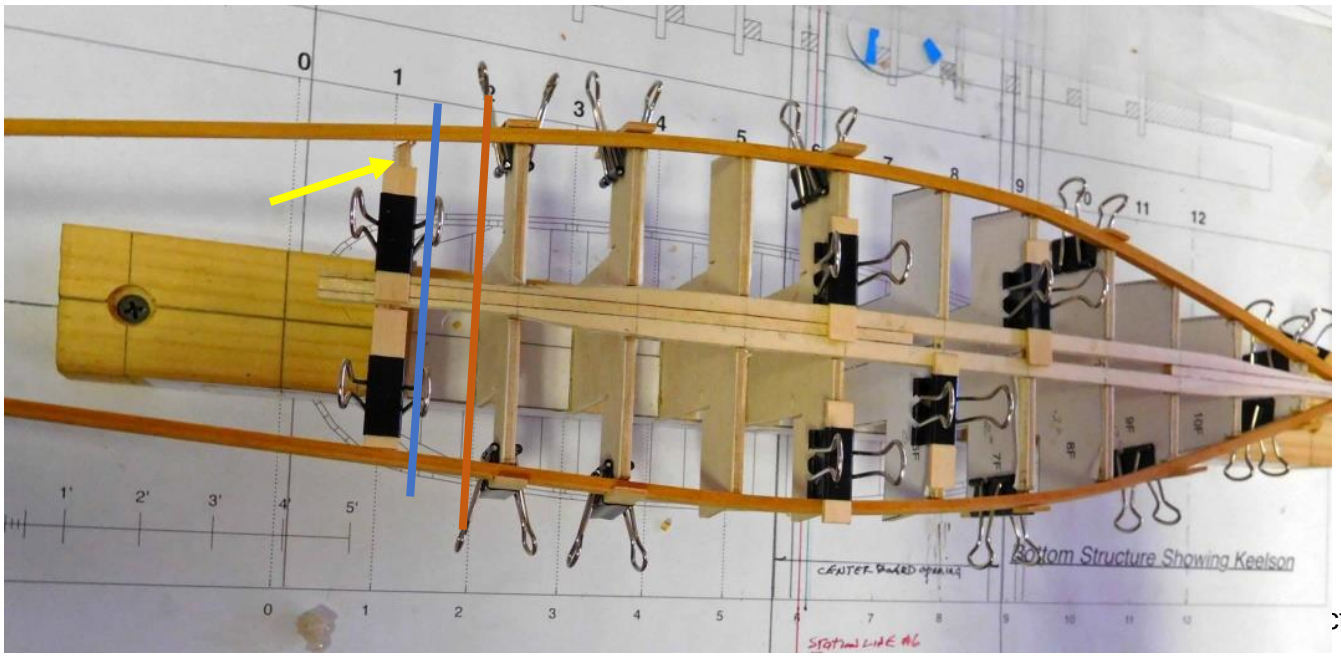


Illustration 65: Not to Scale

Another adjustment made to maintain a proper chines seat aft:

1) I am showing you another view for a mistake that I made in the process of seating the chines. Construction of the original prototype model had too long a chine log to begin with. **ST1** is the only template that has no notch for the chine (because the run of the chine ends before it reaches **ST1**). Note the **yellow arrow**: the chine is being "pushed" out to the side planking seat and thus making it hard to seat **ST2** and **ST3**. Just forward of the

ST1 is a **blue line.** Trim the chines at that location**.** The **orange line** is the approximate position of the actual chine ends.

2) 

ction

Illustration 66 The keelson is seated and so are the chines and no glue has been applied.

of the original prototype model had too long a chine log to begin with. **ST1** is the only template that has no notch for the chine (because the run of the chine ends before it reaches **ST1**). Note the yellow arrow: the chine is being "pushed" out to the side planking seat and thus making it hard to seat **ST2** and **ST3**. Just forward of the **ST1** is a **blue line.** Trim the chines at that location**.** The **orange line** is the approximate position of the actual chine ends.

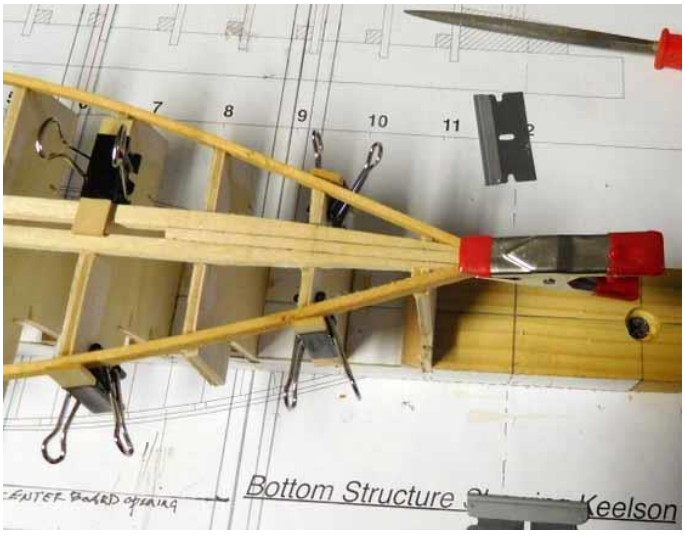


Illustration 67: clamp till dry

3) Lastly, reclamp the chines in to place. The chine ends at the stem post should be 90-degrees to the **C/L** of the keel, and the ending dimension should be 3/16". If you're a tad over, not to worry. You can sand it down at the insertion of the inner stem post.

4) Finally, it is time to glue the chines to the keelson at the stem. Release the clamp holding the newly formed chines and the keelson stem. They will separate enough for you apply some carpenter's glue to the chine surface and the keelson stem. I used a Q-tip as a applicator. Now press them tightly together and hold for a few minutes, then re-clamp the assembly. I then took a wet Q-tip (water) to clear away any oozing of the glue at clamping. If you prefer, wet a paper towel and when you pinch the chines to the keelson stem, wipe the area down before clamping, this area will not be visible in the finished model.

5) At the step post make sure there is enough pressure on the chine ends to hold in place until the glue has set up.

2.9The Bottom Planking

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), **p. 247-249**

The technical term for a sharpie's bottom planking is "cross-planking". It was permissible to use more than one size of plank. Our sharpie will have a round transom, the planking process begins amidships and proceeds fore and aft.

Materials:

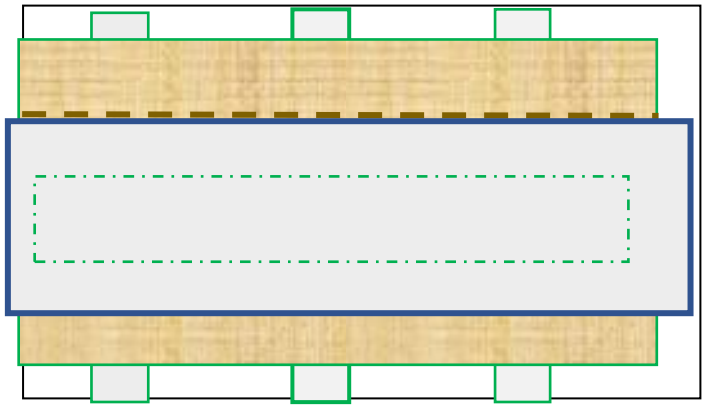
(2) Bottom Planking, basswood, or hardwood (i.e. maple): 1/16" x 3" x 24" sheets, if you are cutting your own, or you can use the Dimension Table below to purchase individual strips.

1) I used the Microlux saw to make a mixture of 6" to 8" bottom planks but you can also duplicate what the saw did by using a new #11 X-acto blade and a good straight edge and a steady hand. On a flat surface, I used my cutting mat because of the grid lined surface. Take a 5" piece of the basswood and secure it to the mat with **3** strips of double stick tape. Scribe the size of plank you desire from the dimension table onto the sheet. I then put some double stick tape on the underside of a straight edge and set it along the outside edge of the cut line. Keeping pressure on ruler, with the X-acto, make a series of light passes (do not force the issue) to achieve separation.

Dimension Table for Bottom Planking:

¾" Scale	4"	5"	6"	7"	8"
Inches	1/4"	5/16"	3/8"	7/16"	1/2"

Not to scale:



Precaution: Before you glue any of the bottom planks in place, you can easily test fit what combination of bottom plank dimensions will get you from stem to stern without having to fill the lasts location with something less than 4-inches. I went with the 8" plank initially on the first prototype. Now, fast forward to **Illustrations 73** and **74** and rest your eyes on the **orange arrows**. Poor planning on my part. Fixed it the second time around.

Solution: Cut a few planks at some of the other dimensions. After the initial plank has been laid (it's coming right up) run a strip of double stick tape along the C/L to the of the keelson. Now start tape sticking planks forward and aft. Treat it like a jig-saw puzzle. Until all fits well. Then number each plank and remove the planks in order on the building board. Remove the tape and glue up in the proper order knowing there will be no surprises.

2.10 The Keel, Chine, and Bottom Planking relationship

1) The first step is finding the location of the first plank, and as this is a round stern I chose the fore and aft ends of the center board opening. I highlighted these locations, with a square. I then marked a second location 1/4" forward of the aft location and another 1/4" aft of the forward location. This second location will be the leading edge of the first planks. This 1/4" of planking over the opening of the center board will seat the fore and aft center board support logs to the centerboard housing. Note the square runs to the chine. Make a tic mark at that location, then flip the square and mark the other chine. This will assure that the planking is lined up at 90 degrees to the center line.

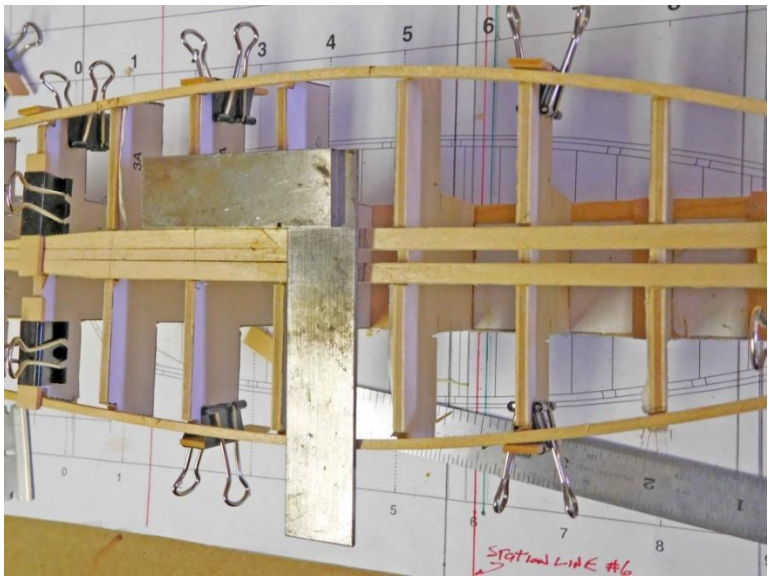


Illustration 68: securing proper alignment

2) Now, the individual planks need to be sized to 4" in length. I need 30 Planks to cover the hull's bottom. Obviously, not all the planks are at 4" in length, but chose to work with 4" and cut them down as needed. I do recommend that you scribe the **C/L** of each plank for alignment purposes (lightly but visible).

3) **This is important:** The keelsons bottom surface sits about 1/32": above the upper surface of the **ST's.** This is by design so that any planking won't inadvertently end up as permanent attachment to the **ST.** This also means that to maintain a "flat-bottom," the chines will have to end up at the surface level of the keelson. Remember, the chines are "chill 'in" unglued. So here is what you do: Make sure that the side clamps and surface clamps are holding the chine firmly in place.

4) Take a 4" plank and "caulk" on edge. I used a Sharpie brown marker, and my first planks were at the 8" scale. Now comes the fun part because the hull will start to take shape very quickly.

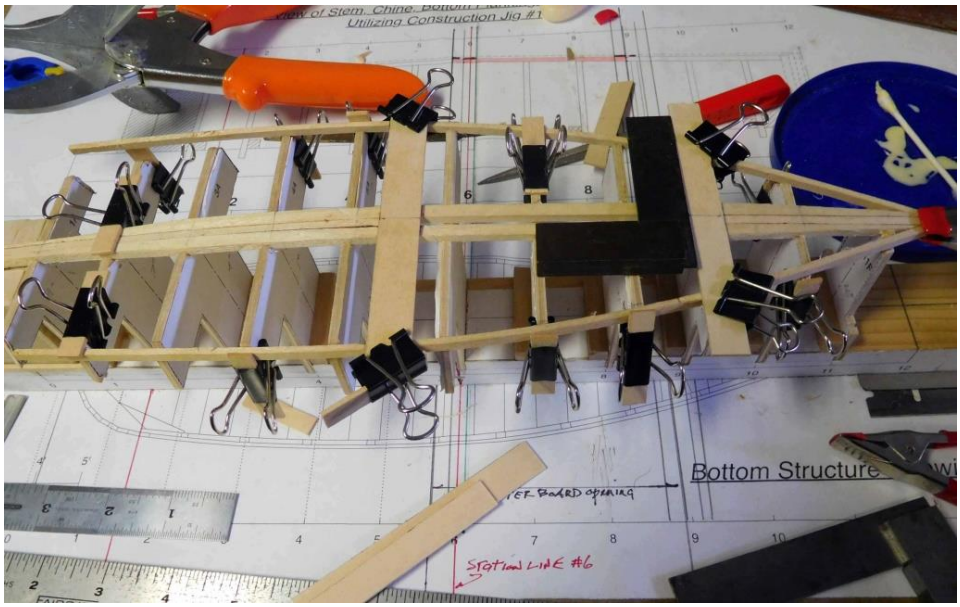


Illustration 69: The 1st two planks

5) I lay the plank onto the keelson with the square in place at the aft center board location 1/4" forward. I then scribe a line onto the other side of the plank, making at the keelson and the two chines. Now I remove the

plank and I have the actual gluing areas highlighted. I put a dab of Elmer's Carpenter glue onto a plastic cottage cheese lid, and take a Q-tip and apply the glue to the surfaces marked, not the underside of the plank. Note: if there is a surface clamp within an inch or so of the gluing location, loosen it. Secondly, as each plank is added to the hull's bottom, I use the Q-tip to run a small bead of glue along the un-caulked edge of the plank. The latter won't be necessary on the first two planks.

6) Press the plank into position. Don't slide it into position but place it accurately onto the gluing surface. Remember, the side that you can't see, is the exposed bottom of hull planking when upright. You don't want glue smudges on that surface. When satisfied with the alignment, clamp the two ends of the plank to the chines and place a weight onto the keelson area. This will bring bottom-plank at a level, flat, relationship across the beam of the hull.

7) Now go to the forward center board support log position and repeat the installation of that plank. In **illustration 70**, you will note that I have taken a scrap piece of **1/8" hobby plywood** and inserted into the centerboard opening. This is to ensure that while gluing up the bottom planking, the center board opening remains at a true 1/8".

8) **Illustration 70** shows the crossing of the center board opening with bottom planking.

9) As you proceed with the planking, both fore and aft, you will have to begin trimming your planking, not to the chine itself, but trimmed enough to allow the ACCO camps to reach the chine.

10) You must leave at least a 1/8" 'ledge" that extends beyond the chines which receive the side planking later. Then we will fair the bottom planking to the run of the side planking.

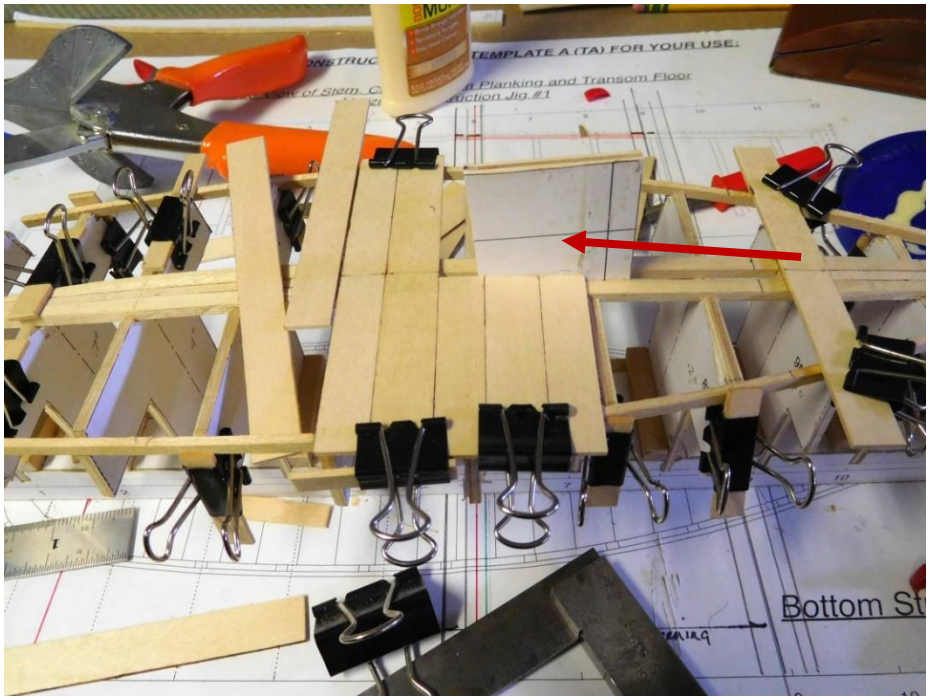


Illustration 70: At the center board opening.

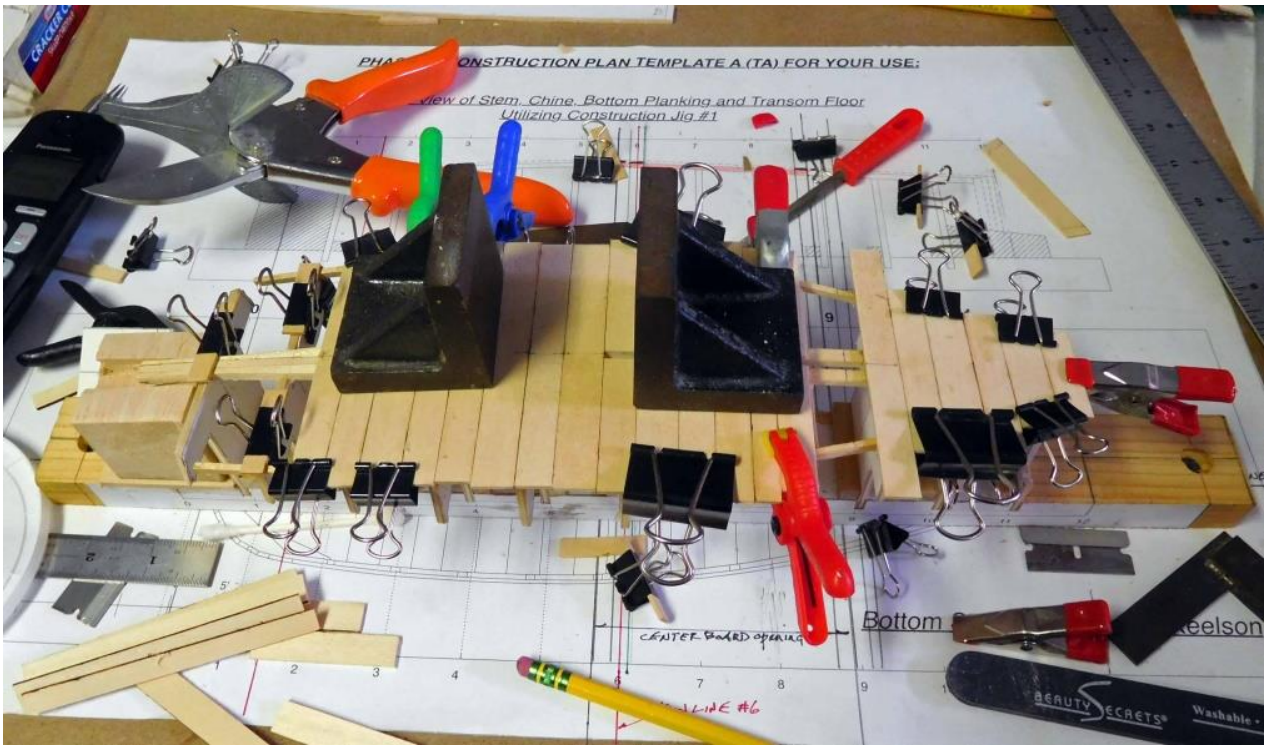


Illustration 71: Angle blocks make great weights for the C/L

12) **Illustration 72:** As the planking moves forward, the excess material needs to be trimmed to clamp to the chines. What I did was lay a strip of double stick tape along the keelson surface. Then, using the center line scribed on each plank, I press fit four planks into place. Now I take a ship's curve and scribe a line about 1/8" outward from the outside of the chine (creating that "ledge" for the side planking). Now I can remove the planks, remove the tape, trim the excess material, and then glue the planks in place. This will be where I stop, for now.

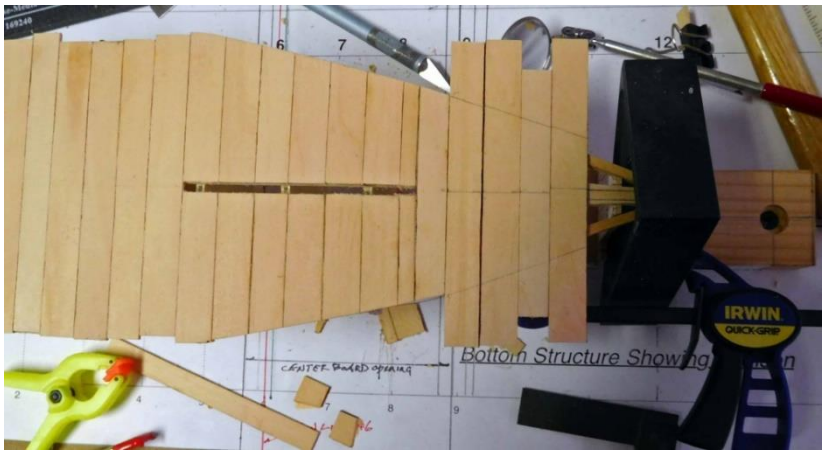


Illustration 72:

A note about the drawings: As the sharpie can have various widths of planks, you will find that bottom-plank drawing was laid out with one scale size of plank, at 8" (1/2"). As I said before, the bottom-planks on the prototype were a mixture of 6", 7", and 8" on the prototype model. After the two center board planks were set, I randomly dry fit, over the centerboard opening, enough planks to close the gap between them. Working my three sizes to cover, I only needed a scale 4" (1/4") plank to close the run. Note too, the planks butt up against the1/8" plywood shim/spacer, to keep a perfect alignment. **(See Illustration 70 and 71).**

13) **Illustration 73:** You may notice that I'm using a different clamp. This type of clamp gives a much firmer hold but with a softer wood like basswood, the added pressure may make an imprint in the hull planks. Hence, I take a scrap piece of basswood and use it as a buffer.

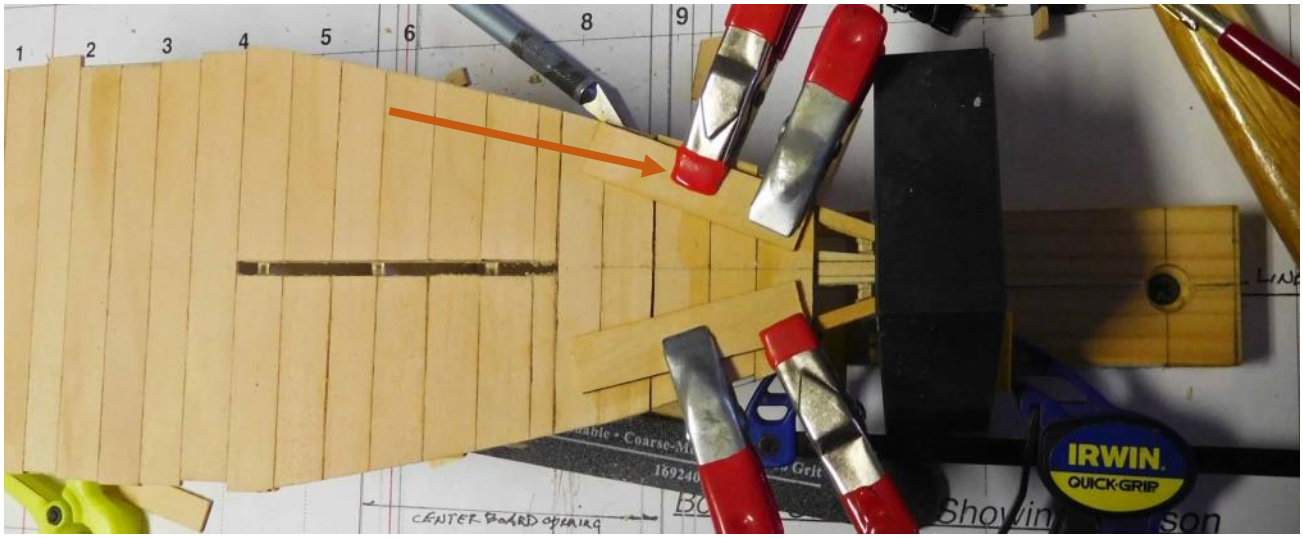


Illustration 73: clamping buffers

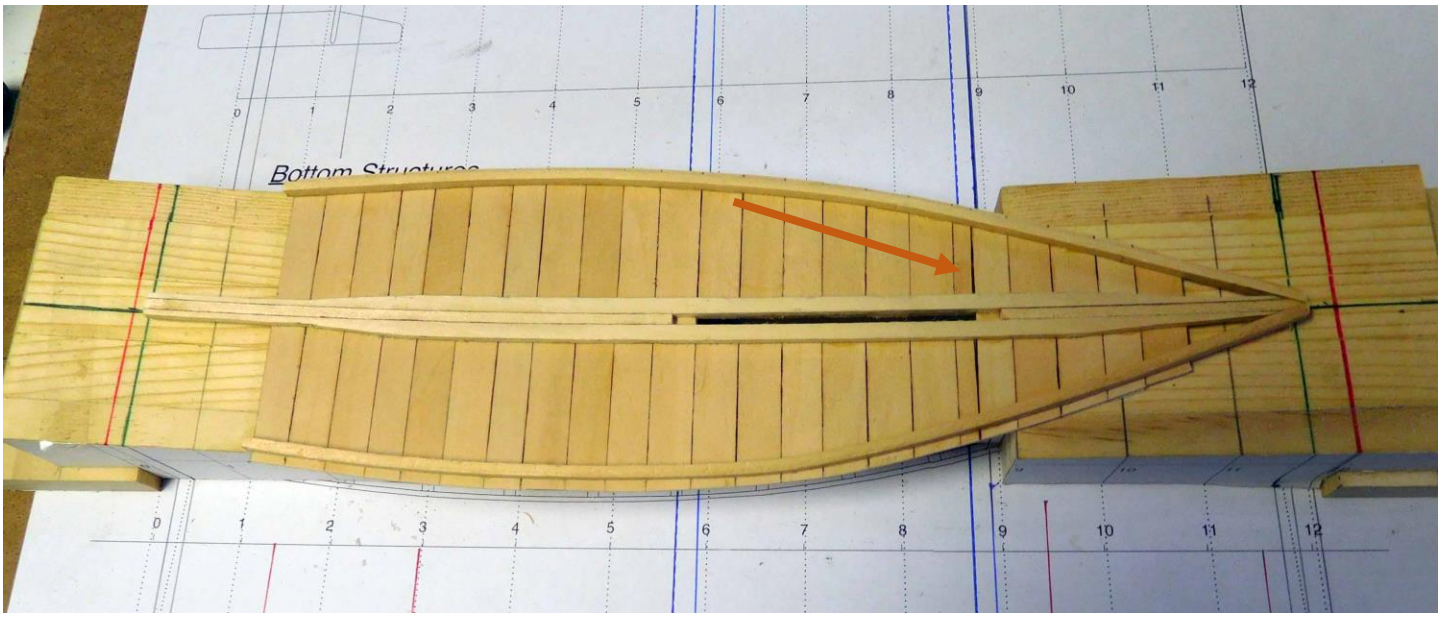


Illustration 74: note the sharpness of the center board opening

14) The last plank aft in place, unclamp and turn over – you're ready for **BJ2.** Note the "ledge" has been cleaned up. I did most of the finish work with my scroll saw and save the larger pieces of "trim" for later.

PHASE 3

“From stem to stern”

The section write-ups for Phase 3, part 1:

3.0-3.1 Forward bottom planking & stem assembly

3.2 Mast step block and mast logs

3.3 Stern bottom planks & flooring, rudder logs & iron pipe

3.4 Removeable flooring

3.5 Lower side sheer plank “A”

The section write-ups for Phase 3, part 1:

3.6 Centerboard trunk, cap, centerboards, thwarts and shoes

3.7 Sheer side planks B and C

3.8 Frames

3.9 Sheer clamps

3.10 Round vertical planked stern assembly

3.0-3.1 Forward bottom planking & stem assembly
Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **209-210.**

Chapelle indicates that the round transom, flat-bottom sharpies often constructed their stems logs with two logs. This was done to avoid the cutting of a rabbet into a one-piece stem log. We’re going to proceed in that manner in the 2-log approach, and you will have a choice of two methods of construction**.**

3.0 The bottom two planks:

Materials:

2 bottom planks from planking trim
The wood sizes to make and install the laminated stem:
2 - 1/4” x 3/16” x 2” (the inner stem)
1 - 3/16” x 1/4” x 1” (the horizontal stem support log)
1 - 3/16” x 1/4” x 1” (the vertical stem support log)
1-piece 3/16” x 1” x 2-1/4”
3/4” x 2” “block” of wood.
double sided scotch tape.

Note: I used pear wood on both the unpainted Sharpie and the painted Sharpie. As two sets of stem logs were needed, I just went ahead with using the same wood for both. However, if your painting you’re build, I would recommend the basswood.

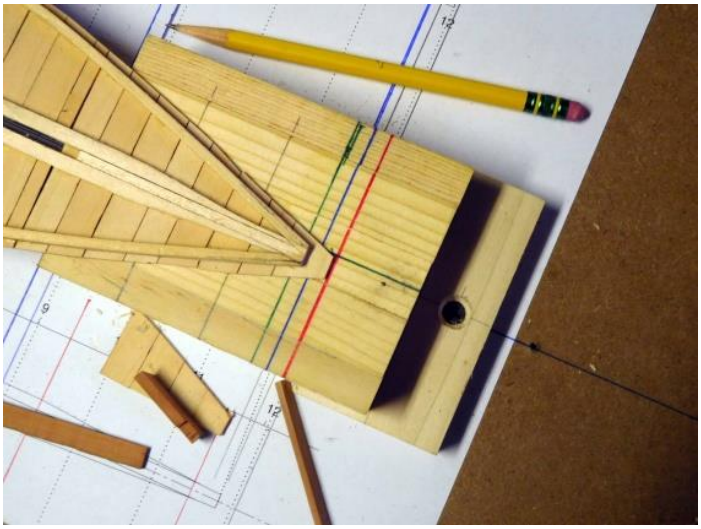


Illustration 75: The seat of the stem.

1) **Illustration 75:** I always save any excess wood. You never know when some of this “stash” could become useful. There was ample wood left from the initial trimming of the bottom planking. “ledge” to shape the remaining 2 bottom planks at the stem. **Note:** The last forward bottom-plank needs to extend past the tip of the keelson by 5/16.” It will receive the inner stem piece when attached to the vertical support log. It can then be trimmed off to the forward face of the inner stem, ready to receive the outer stem, which will seat on the bottom of jig 2**,** and not the bottom planking.

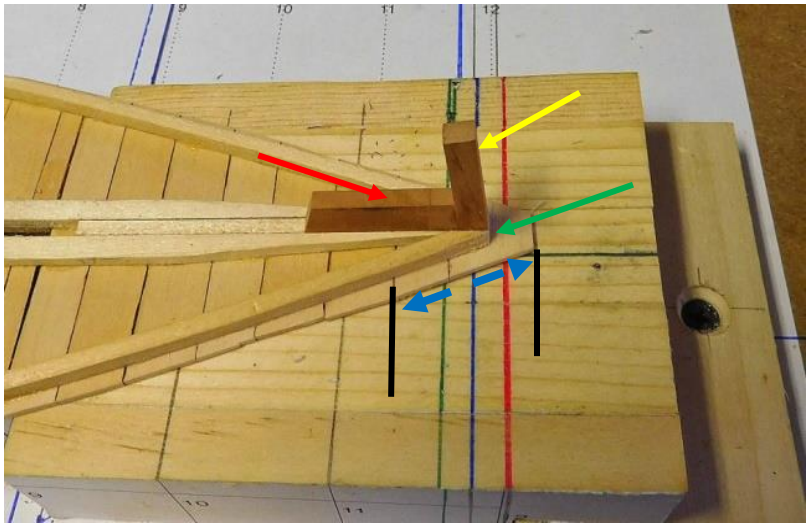
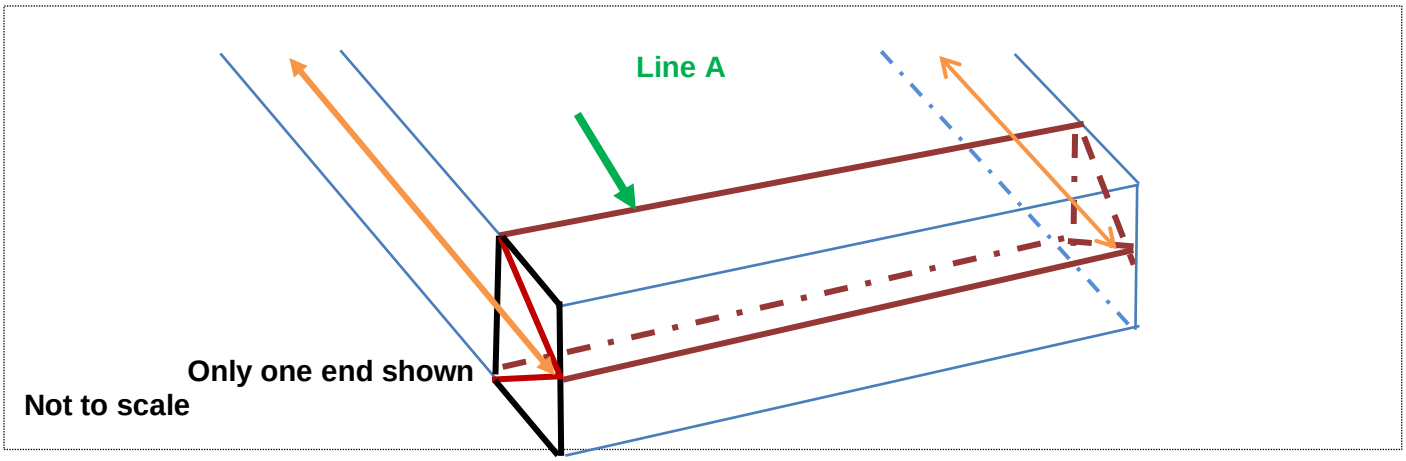


Illustration 76: Bottom planking at the stem.

2) The vertical stem support log (**yellow arrow**) rises from atop the keelson. This means that the forward face of the **horizontal support log** and the seat of the vertical support log will be finished to 3-degrees (aft) on my disk sander. The aft end of the horizontal support log will angle downward at 25-degrees.

3) Once these two logs are shaped, I glued them together using the surface of a piece of glass. the logs seat at the intersection of the chine log and the keelson (the **green arrow**). The log assembly straddles the keelson centerline

Illustration 77: 1-Pear or basswood block 3/16” x 1” x 2 ¼”



3.1 The Inner and Outer Stem Posts:

I've tried numerous ways of making triangular posts and getting two identically alike; it, can be difficult without special tooling: if you have the right miniature table saw that has the capability to adjust the angle of the cut, it's not much of a problem, but what if you don't? So, I found a way to fashion the stem pieces using my 5" disk sander.

1) The 3/16" represents the width of the stem pieces, the 2-1/4" is the overall length of stem, and from the 1" "blank" will come the two stems (inner and outer). The outline of the stem is shown in **red** above.

2) **Illustration 78:** Take the blank and a small square and scribe a line at ¼" on both sides of the 1" blank (**Line A**), then connect them across the width of the block. Now you have created one stem pattern. Scribe the other end of this block in the same manner to the second stem pattern. Go to each end of the 1" blank and you will see you have created a 3/16" x 1/4" "box." At the 3/16" width, scribe a center line through all four "boxes."

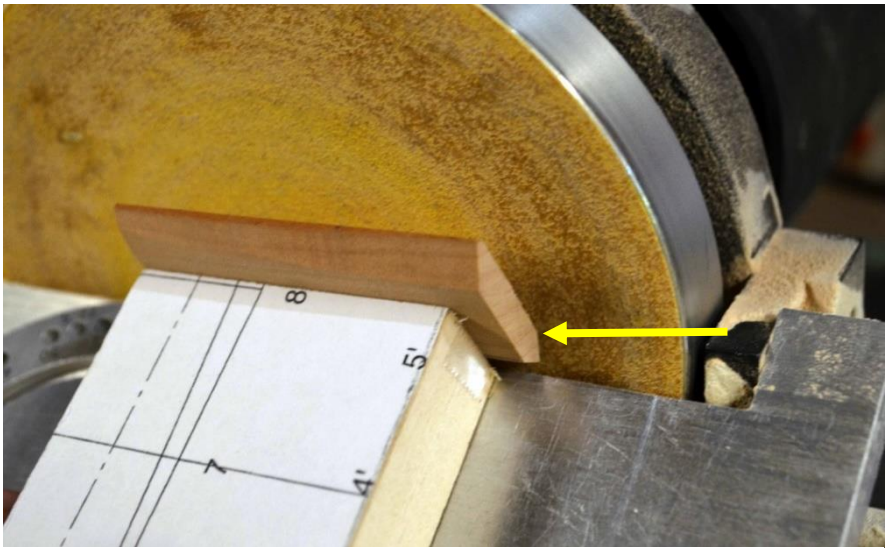


Illustration 78: Positioning the block on the sander.

3) Once the stem block has been marked, run a strip of double stick tape across the forward face of the pine block. Lay the pine block on a flat surface and position the stem block onto the tape. Make sure that the left side of both blocks are in perfect alignment.

4) The angle required is 22-1/2-degrees to create the "point" of the stem pieces and the 3/16" aft width. To achieve this, lower the disk sander surface plate to that setting. The miter gauge remains at 90-degrees.

5) Set the miter gauge at the center of the sander table. Lay the blocks flush against the miter gauge. Turn on the sander.

6) Your focus is on the lines you have drawn to guide the formation. Guide the blocks from left to right gently across the sander face, release, and go again. Keep the pressure firm so that equal amounts of wood are being shaved from the surface with each pass. Stop when you get to **line A** as identified in **Illustration 75.**

7) When you get one side done, remove the stem block, put fresh tape on the pine block, turn the stem block over, and repeat the procedure.

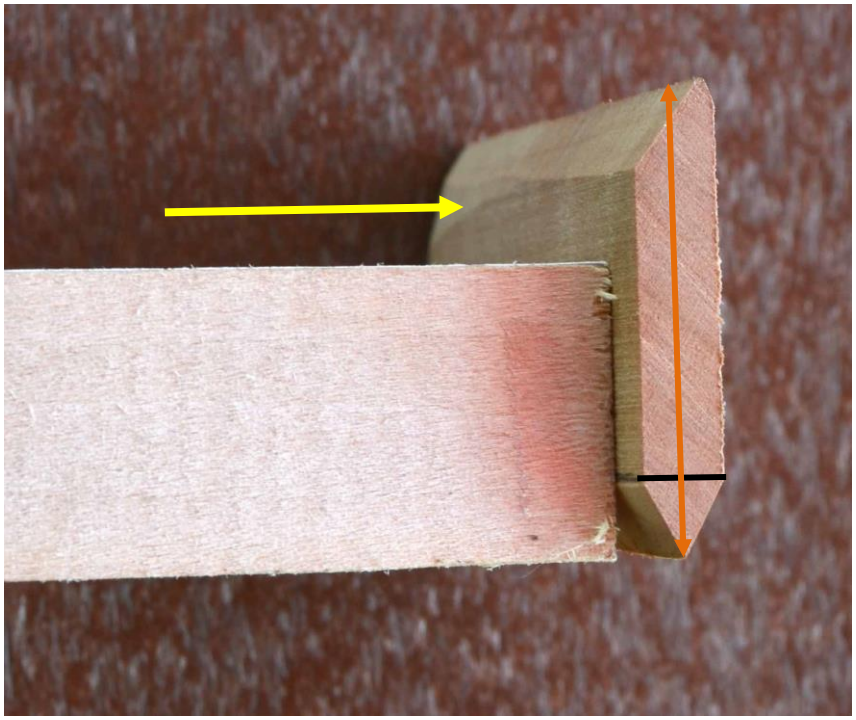


Illustration 79: Even pressure with contact to paper was lost.

8) **Illustration 79:** The **yellow arrow** denotes a "learning curve." You must maintain even pressure with each "shaving" pass, over and back. It is like the oscillating sander's "push and pull" technique. I'm right handed and I use my left-hand fingers to hold the miter gauge, with my thumb reaching across the block to apply the reverse pressure. My right-hand index finger is placed against the outer edge of the stem block, to put pressure back onto the miter gauge. This will act to keep the "tape connection" from breaking loose. **Note**: I position the miter/block/stem assembly on the table and in position to have the forward lower surface of the stem block just touching the disk surface. Then, holding on with the left hand, with no attempt to begin movement, use the right hand to turn on the sander. Put the index finger of the right hand back in place, and then proceed.

9) When both stems are formed separate at **Line A.** (I used a Preac saw.) If you have no tool that will get it "to the line". A razor saw or coping saw will also work, but make our cut slightly "off the line". Once free, place a sheet of sandpaper on a flat surface, and, with thumb and index finger slide the stem surface back and forth across the sand paper until you're at the line.

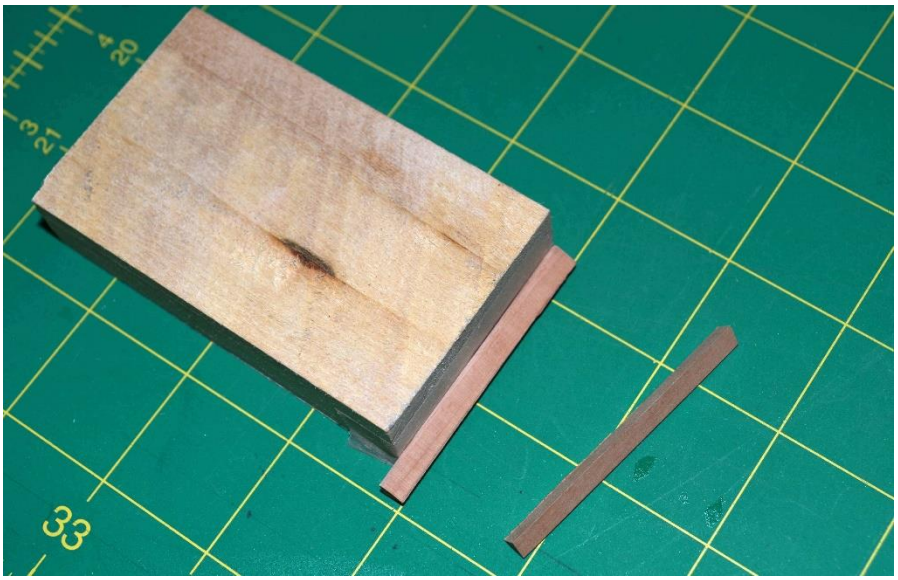


Illustration 80: Inner and Outer!

10) The last thing that needs to be done is to square off the forward face of the inner stem to receive the outer stem and create the planking rabbet.

11) With the two stems being identical (1/4" x 3/16"), and the rabbet being formed is receive the 1/16" planking, the face needs to be 1/16, and the best way to do that is to mount the inner stem back onto the support block (with fresh tape), mark the 1/16" width location, and carefully proceed as before. **Hint:** 3 words – GENTLY, GENTLY, GENTLY.

12) If you find you have created a rabbet of something less than 1/16", I recommend you not try and adjust the rabbet (or enlarge it, say with a file) to get to 1/16", but, rather, sand down some of the planking's outer surface flush with stem outer surface when the side planking is done.

13) When the outer stem is attached to the inner stem, it creates the rabbet for the side planking. It also marks the end of the bottom planking. In setting the inner stem into position take note:

    a. The inner stem rises at the same angle as the vertical support log and the forward edge of the last bottom plank.

    b. The vertical support log is centered to the inner stem post. Check and make sure that the chine intersection with the keelson, at the position of the support post, is flush and perfectly centered on the hull's centerline.

    c. Wipe any excess glue (i.e., Elmer' carpenter) from any joint "squeeze out".

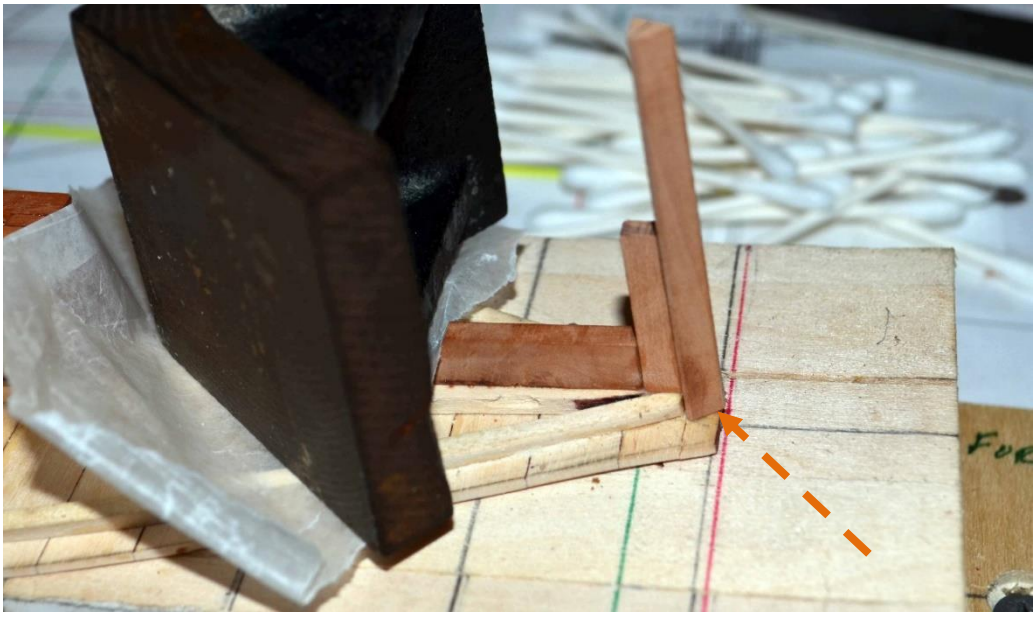


Illustration 81: The inner seat at the end of the bottom planking.

14) The angle block in **Illustration 81** was used to keep the bottom planking in contact with the edge and entered until the glue has dried. The wax paper is used to keep the glue from direct surface contact with the wood, and keeping the block from marring the wood surface below.

15) There are two options at the stem to receive the side planking: proceed without the outer stem in place, or proceed with the outer stem in place. You do not have to make that decision now. A full description of the two options is presented in **Section 3.5**. For now, seat only the inner stem post.

Seating the 3-piece inner stem assembly:

1) **It is imperative that the stem assembly rises at exactly 90-dergrees to the centerline of jig2.** You can see **(Illustration 81)** that the support logs and the inner stem have been glued in place and all looks good to this point, but from my experience, maybe not!

2) **Caution:** If all is to be OK, the surface of the **BJ2** must be flat and smooth, the bottom planking must be flat across the surface of the jig, a weight must be applied to the assembly to hold it perfectly on the **C/L** of the jig and the hull, and the stem assembly is "dead center" with the full length of the run of the keelson.

3) Failure of any one of these items can lead to a severe condition – the Leaning Tower Pisa anomaly! From experience, the symptoms were severe: In my first attempt, I realized my lack of attention early on. I was unaware of it until planking the upper deck and finding my bow bitt and bowsprit didn't **C/L** with my mast and centerboard by 1/16" to starboard. I failed to notice that the vertical rise had shifted off the 90-degree mark while the glue dried. The ability to correct was surgically impossible by that time.

4) On my second attempt, I decided to assemble the support logs and the inner stem post "off the boat". I took the center structures drawing, extend the pertinent lines, and transferred them to logs. The support logs were shaped, and by transfer all the lines of intersection from the drawings, I didn't have to measure each of the angles required.

5) **Illustration 82**: I taped the drawing to a sheet of glass and covered it with wax paper. Placing a straight edge along to the line extending the top of the keelson, I taped the 2 support logs in to position. I added the inner stem post in the same manner, but rather than cut them to size, I left the overhang. Applying glue to the front surface of the vertical support log, I glued up the inner stem. I set the 3-piece assembly aside for now, knowing that I won't have to worry about the stem assembly at installation.

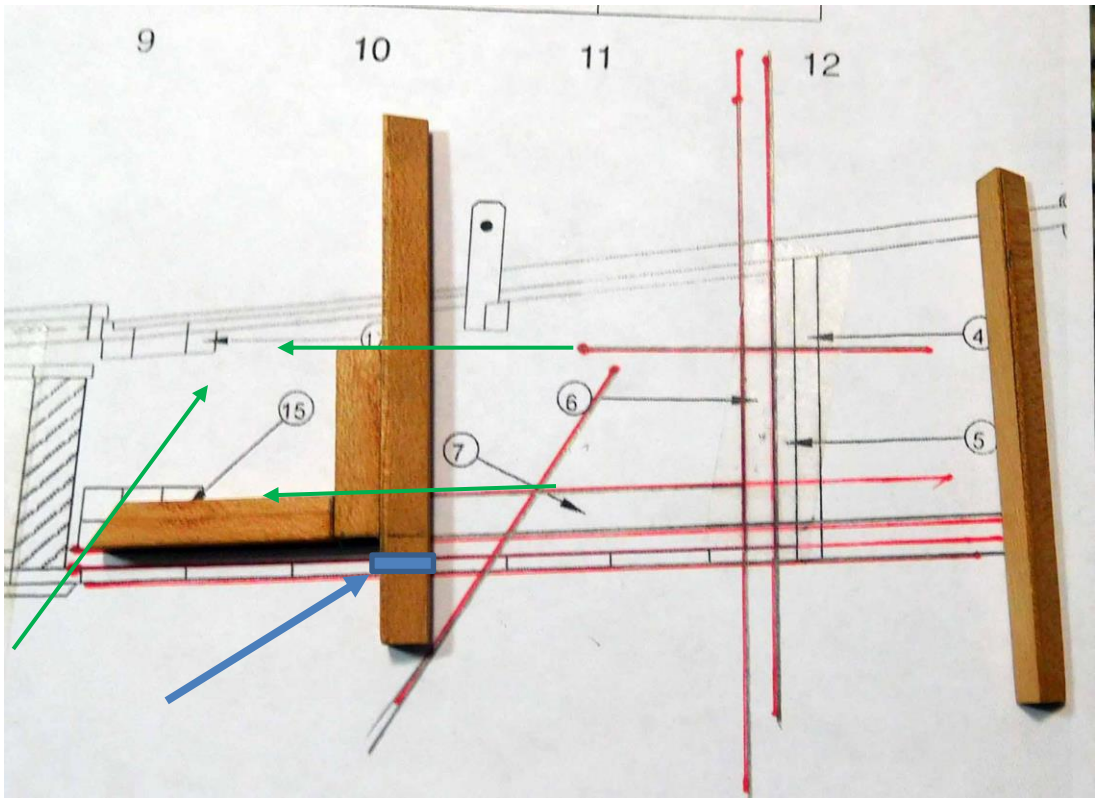


Illustration 82: Seating the inner stem to the **bottom planking**.

6) Moral of the story: Always do a 360-degree "look see" before the glue sets up!

3.2 The mast box logs and mast step locks:

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), p. **406-407**

Chapelle's advice: make the tenon longer than needed on the mast. It makes adjusting the setting of the rake of the mast, easier.

1 piece of pine/basswood 1/16" x 1/2" x 4"
4 pieces' basswood 3/16" x 3/16" x 1/2"
2 pieces' basswood 1/8" x 1/8" x 1/2"

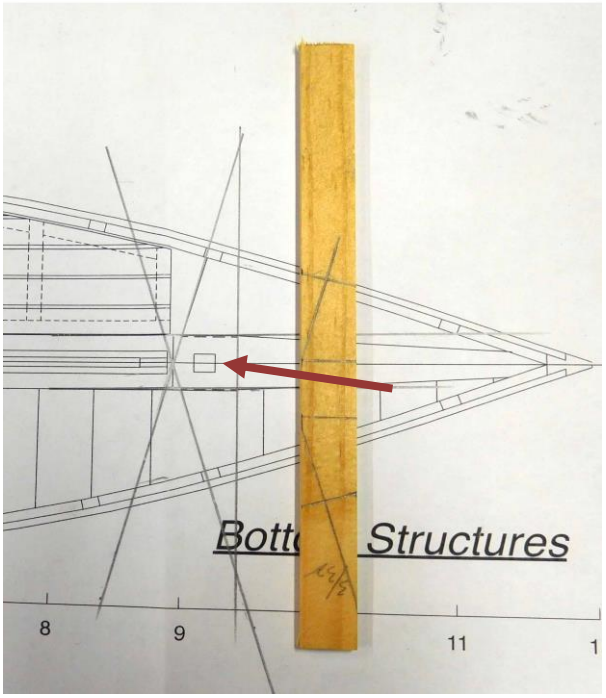


Illustration 83: The plan location of the mast box logs.

The mast logs:

1) **Illustration 83:** The **red arrow** points to the mast box logs. They seat atop the bottom planking and run from the keelson to the chine logs.

2) To get a pattern transferred onto the pine strip, I extended the log's perimeter outlines onto the plan.

3) Securing the piece of pine over the mast box/logs position with a small piece of double stick tape and use the visual line extensions to transfer the patterns to the wood.

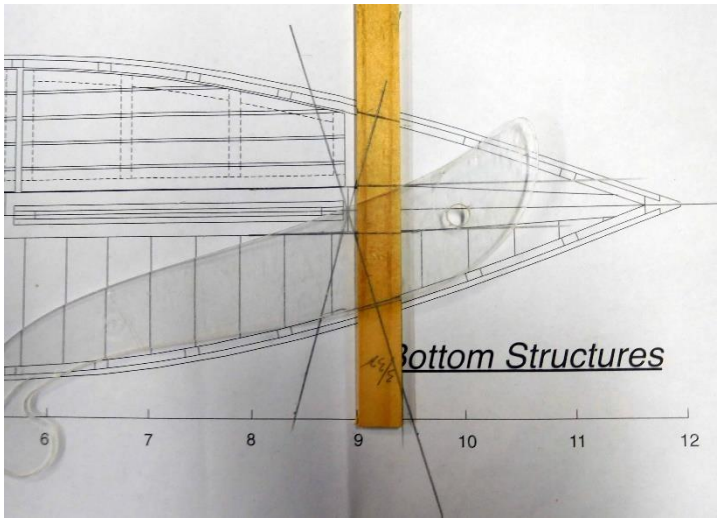


Illustration 84: Using a ship's curve.

4) **Illustration 84:** Note the ship's curve to correctly mark the log/chine intersection. The chine's 9-degree angle comes into play here when seating the log in place.

5) To finish the logs, I first used my scroll saw leaving a "surround" of about 1/32". At my disk sander, I sanded "to the line" but leaving the log-chine connection alone.

6) The disk sander table was then set to 9-dgrees. To complete the chine edge of the mast step logs, test fit your original location of the finished edge. each log to verify your sand edge is correct Erase and remark**,** if necessary**,** and sand "to the line." If you are still a little long, hand sand from here to seat.

7) **Illustration 85**: The two mast **box** logs are located about 1/32" forward of the center board housing. Though this picture shows the center board, you can go back to **Illustration 83** for the exact position and spacing (of the mast step blocks as well).

Illustration 85: In position.

The Mast Step Box:

1) The mast box receives the tenoned heal of the mast. The bottom tier of the box construction rises from the keelson and consist of 3 timbers, being 1/8" x 3/16" x 1/2".

2) When you have small pieces like this, sometimes it's easier to think "big" once, instead of having to be so precise 3 times. You need 3 pieces of wood that are identical in length. Rather than cut each piece individually, I took 3 pieces laying around the work table that were a little longer than needed and glued the three pieces together. At the disk sander I put a "clean" edge on one end, and marked off 1/2" to the other end, then squared the finished first tier floor logs.

3) I then taped a mini square to my glass surface with double stick tape and set tier 1 in place.

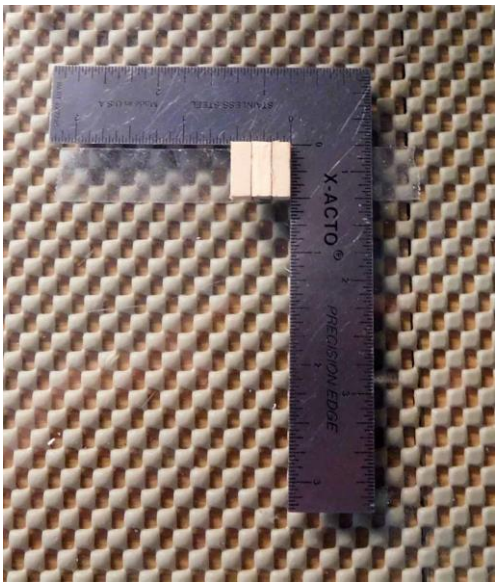


Illustration 86: Tier 1 in place.

4) The second tier goes back to the "exact cut" method to form the fore and aft logs. I used a small angle block to keep my edges true to the 1st tier. From the remaining 1/8" stock, create two 3/16" pieces. When glue in place, the 1/8" seat of the mast tenon has been created. Close the box with the last piece of 3/16" wood.

5) When the mast step box is seated to the keelson, the upward "rise" of the bottom planking must be recognized. I calculated that rise to be 4-degrees.

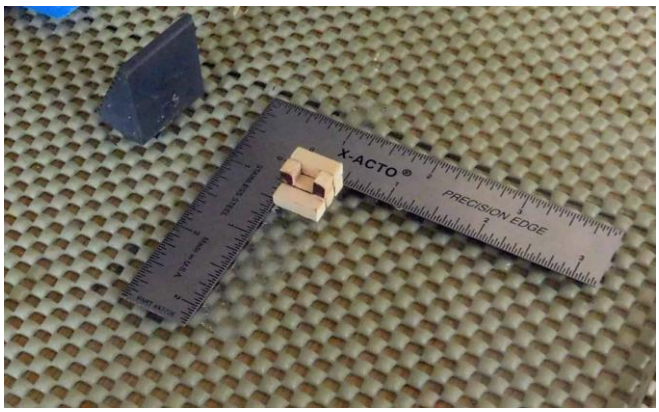


Illustration 87:

6) I used the same method in making the stem posts, to angle the bottom of mast step block. Set the disk sander table at 4-degrees, tape the completed mast step block onto a pine block, then use the miter gauge to guide the assembly, very lightly, up against the sandpaper face. Just a touch will probably be enough to achieve the small angle. **Note:** You should tape the mast block to the pine block, on a flat surface, so that both rest against the miter gauge. It will help keep the mast block in position. **CAUTION:** Make sure the mast block is taped contact is to the face of the tenon top of the block with the logs running at 90-degrees to the keelson **C/L**.

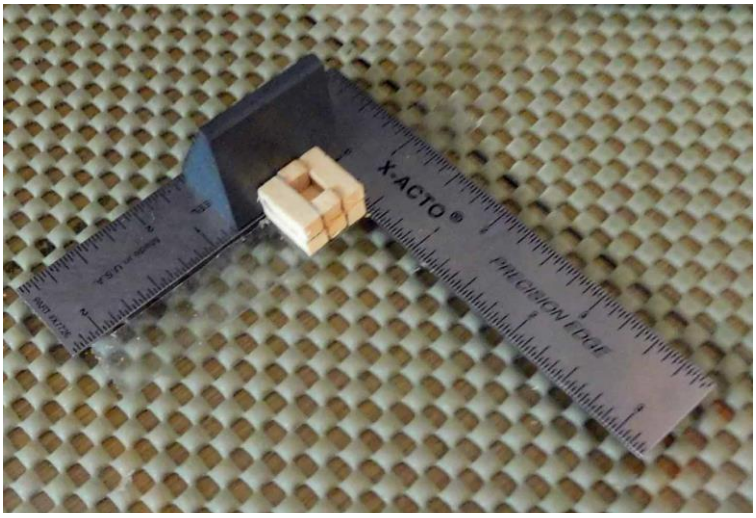
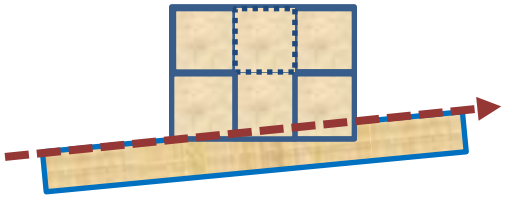


Illustration 88:

6) I used a scrap piece of 1/32" basswood to maintain the proper distance from the center board housing while the glue set. At this point in your build, if you have not started the centerboard assembly, I suggest you take a scrap piece of the 1/8" plywood used in the bottom planking installation and set it into the centerboard opening in the bottom planking as a "stop" to "rest" the basswood spacer into position. **Pull it out before the squeeze glue sets.**



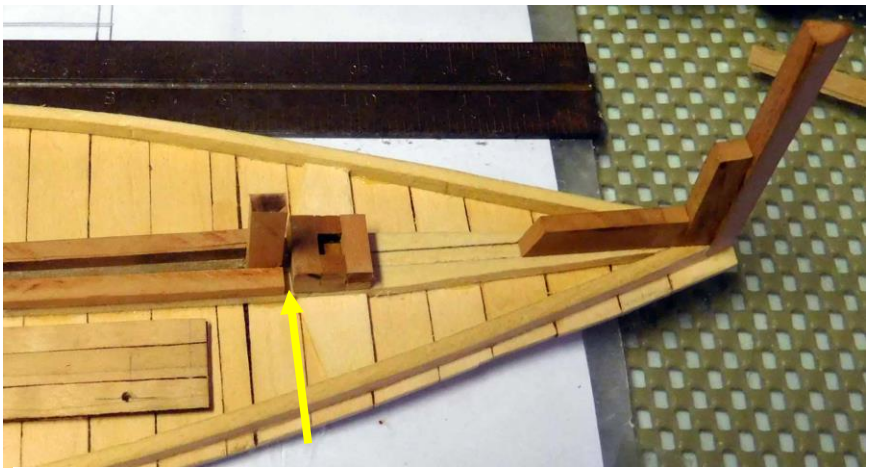


Illustration 89: The 1/32" spacer plank goes here.

3.3 The completion of the stern bottom planking & transom flooring and the rudder logs

Research: Review the research at Phase I, **Section 2.9**

Materials: See the "Dimensions Table for Bottom Planking' at the bottom of p. **47**.

The flat bottom planking:

Illustration 90: Here is why we transferred lines to the **BJ2** surface! (the unpainted sharpie)

1) **Illustration 90:** Time to complete the bottom planking aft., Look to the **red dotted arrow**: the starboard chine didn't reach the **BJ2** position (as noted by the **yellow arrow)**. You can easily trim back a chine too long, but this chine (the **green arrow**) falls short. How to fix this dilemma coming up, but for now, don't worry about it. **NOTE:** When placing your hull on the jig, always weight it down to maintain the sheer required. Note my two lead weights. I always try to keep the weights from sitting directly on the wood surface. In this case, a **strip of wood** that spans chine to chine, distributing downward pressure across the entire hull.

2) **Illustration 91**: The **green line** indicates where the bottom planking left off (see page **51**). Remember, the chines extended slightly farther than the last plank laid. Now it's time to finish the job and set in place the bottom transom flooring option you choose.

3) To prepare **BJ2**, I laid 2 strips of double stick tape at station line **1** and **3**, and then covered the area with a piece of wax paper. Placing the hull into position, I made sure of alignment, fore and aft, and along the **C/L**. I used a weight to secure the jig's position, while laying the remaining planks.

4) From the plans, I counted a need for **six** 1/16" x 1/2" x 4" planks. It just so happened that I had unused planks left over from the initial cutting of the bottom planking. All I had to do was mark the **C/L** on the top surface and apply the brown caulking to one edge of each plank.

Illustration 92: I got it right the second time. (the painted sharpie)

1) **NOTE:** This is trial dry fit. Place four planks into position by sliding them under the keelson, keeping the **C/L** true to the keelson and the planks already in place. You might have to loosen or remove the weight in this process. The key here is to make sure the plank edges will have a tight fit with those planks already in place. If you eased off on the weight to position, make sure when reapplied, the hull is in the same position.

5) Once satisfied, remove the planks, keeping them in order, and place them on a flat surface (mine was plate glass). To make things easier you can lay a couple of strips of double stick tape on the wax paper, to hold the planks in place as they are glued together. (That's glass – tape – wax paper – tape – plank.) Let dry.

Illustration 93: To the end of the keelson.

6) **Illustration 93:** When dry, I removed the assembly from the tape and scraped the excess glue (single edged razor blade). Lifting the hull of the jig, I placed some glue on the remaining exposed underside of the chines to grab hold of the first new plank. A bead of glue was then run down the outer edge of the first of the four-plank assembly which was then slid into place along the waxed surface while repositioning the hull. I held it there for a few minutes and re-placed the weight onto the hull's surface. I also used Acco clips "where old meets the new". The **4** planks brought me to the keelson's end. **NOTE:** The weight holds the hull in position but also keeps the bottom planking tight with the sheer floor of the Jig.

The round transom bottom and floor plank templates:

1) **Illustration 94:** At this point, take the stern floor template and cut it out, leaving a "shoulder" of 1/8". Using a small straight edge and a #11 X-Acto blade, trim out the center outline of the keelson. Where the keelson expands, trim the center of the template so you can easily slide the template forward into position. (the **blue arrow.)**

2) Trim the chine ends from the template as shown by the **red arrows**, and push the template tight against the end of the keelson. Remember, the keelson was constructed with a plan template so when the template seats at the end of keelson, it is in the correct position and establishes the end of the bottom planking and the location of the round transom. How did you do?

3) With the template now seated at the end of the keelson, check out the chines (remember **Illustration 91**). OK: If your chine falls short, take a piece of "chine stock" (perhaps a piece of chine trimmed off at installation. Shop Tip: I save everything until the build is completed. Trim it to the size required and glue it in place. If your painting you model, no one will see the "splice", If you're leaving the model "natural," this area will lie under the deck planking and will not be missing, and if you lightly sand the spliced area, you might not even be able to see it, either.

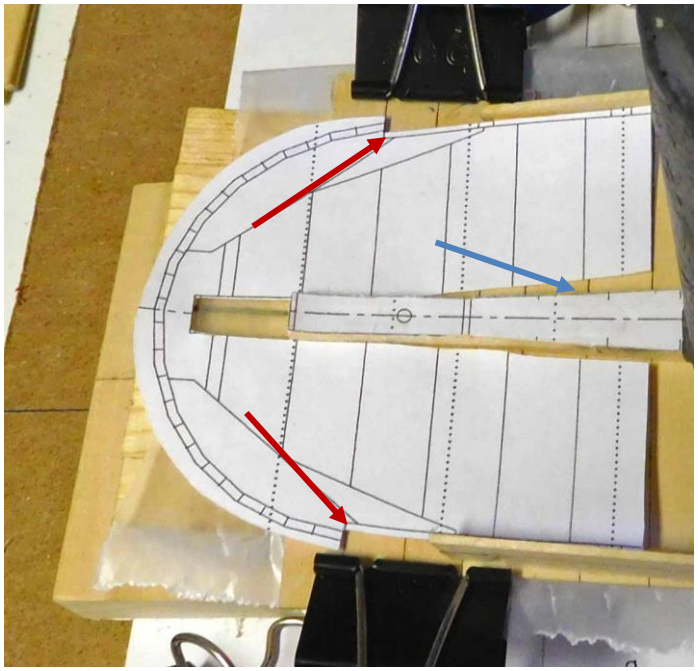


Illustration 94: The Option one template.

4) If the opposite is true, with a single edged razor blade you can remove the excess by carefully cutting down through the chine, then sliding the razor blade along and under the bottom planking, to release the old and create a surface for the new. Sand both chine ends to 90-degrees at the union and at the end of the extension log. Use your template to assure your accuracy all through this process.

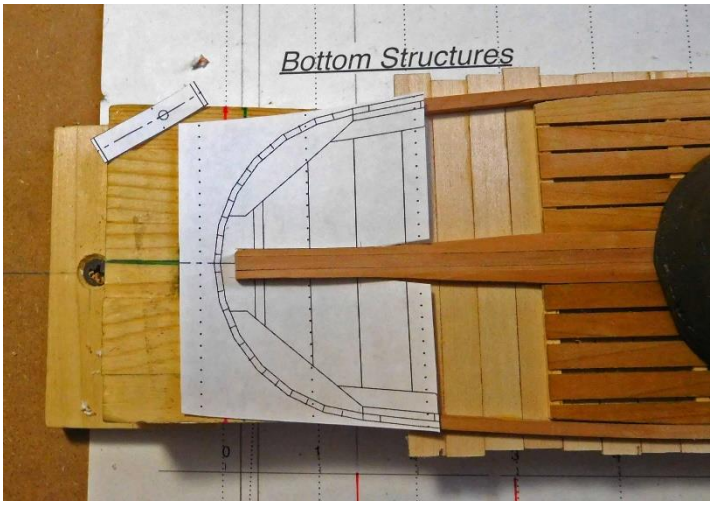


Illustration: 95: The option two template "all clear".

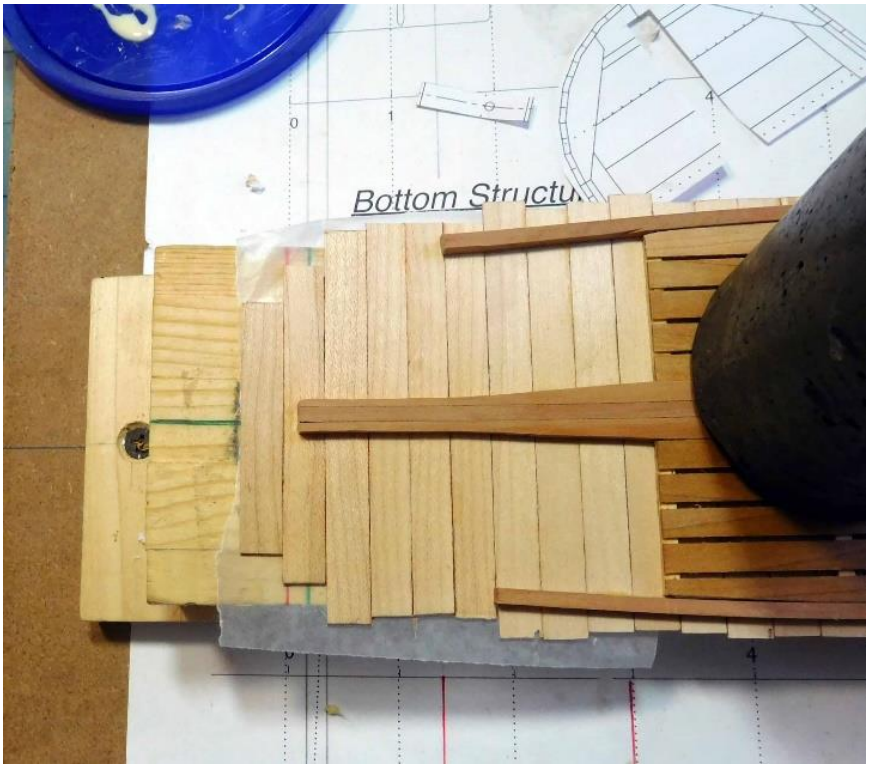


Illustration 96: The remaining planks **5** and **6**.

5) The final two bottom planks can now be installed. They can be seen in **Illustration 96**, and it is quite clear that they can be something less than 4". Use you template to figure the "ledge distance" around the transom that will be required to seat the vertical planking. Don't cut yourself short. Repeat the process of installation of the first **4** planks.

6) With the chine situation corrected (if necessary), choose one of the "exploded patterns", on sheet **A3**. The difference between them is geographical. **Option 1** was patterned after a North Carolina sharpie. **Illustration 96** shows the start of **option 2,** a New Haven sharpie. My gut tells me that there were probably as many designs to the transom flooring as there were sharpies. Most oyster sharpies seem to have been made by the oystermen themselves, and expense was a key factor. I'm sure made due with what was at hand any time they could.

7) To be on the safe side the apron or ledge should be no smaller than 3/32". (see **Illustration 97}**), the **green curve**.

Note: You are going to have two options of transom flooring patterns: **Option 1** and **Option 2**. So, you are not confused, the **Illustrations** will seem like a "flip flopping" politician. This is because I chose the best picture I had on file to show you how to complete the task. Both options have **7** logs. The **2** larger logs that meet the chine, have a different seating pattern: one is notched (#**1**) the other (#**2**) is not. The **2** logs that close out the flooring also have a different seating pattern: one is triangular (#**1**) the other (#**2**) is not. The process of shaping and installation is virtually the same. Option 2 is a little easier, but note they will not be seen, without a reveal, when the upper deck flooring and deck planking are completed.

The bottom transom flooring option #1 and option #2:

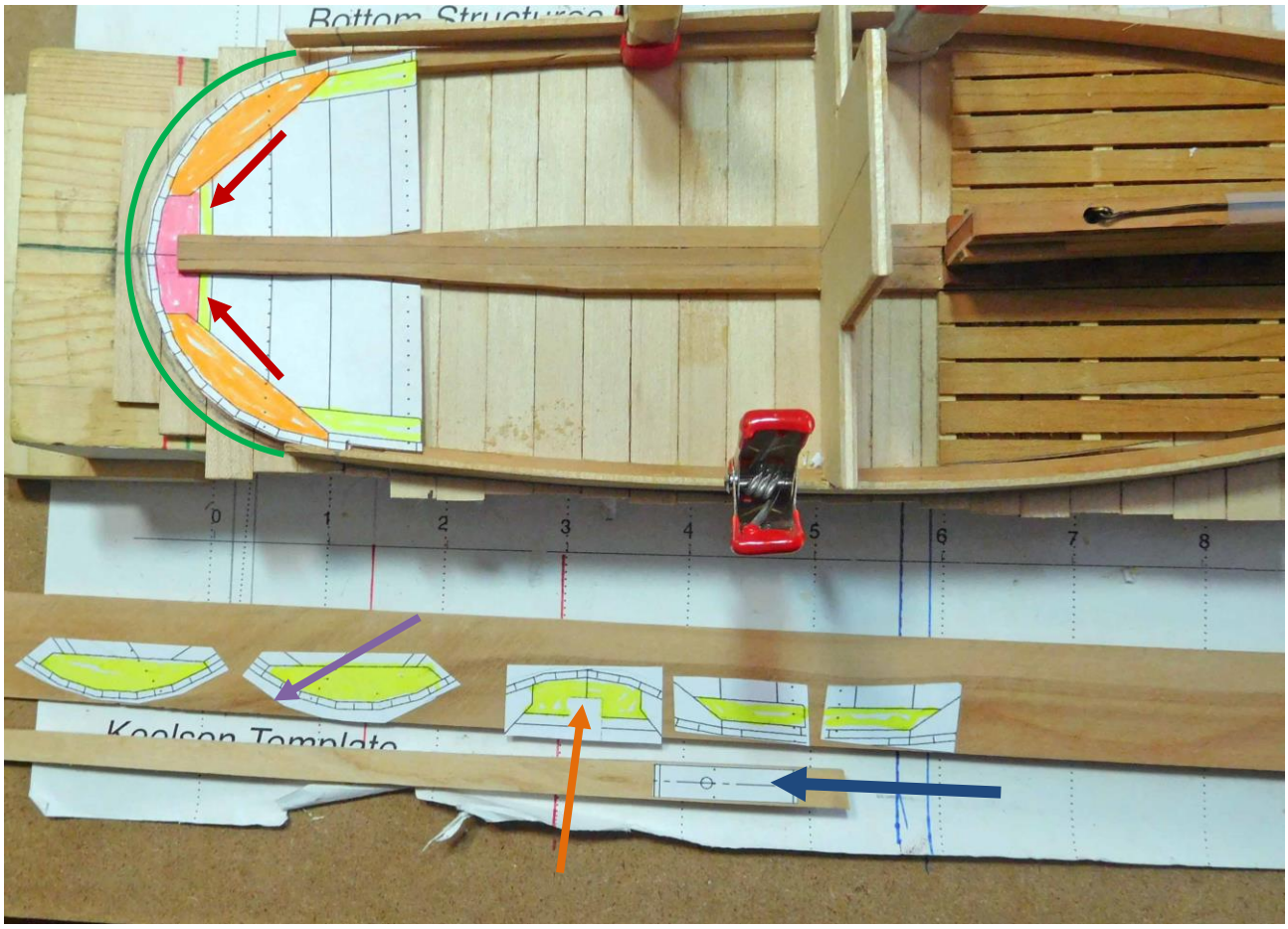


Illustration: 97: Option **2** – The **5 of 7** transom flooring logs and rudder log 3 (**blue arrow**).

1) Material needed is 1/16" stock. I used basswood for the painted sharpie and pear for the unpainted sharpie. **Option 2** has two smaller logs (the **red arrows**) for added reinforcement of the flooring. The stock used was 1/16" x 3/32".

2) Spray glue or rubber cement the individual floor plank templates to your choice of wood. I used a small piece of basswood (and the pear) taken from a 1/16" x 3" x 24" plank of each species. I then cut each pattern on my scroll saw, leaving an "apron" of about 1/32". I then clamped a small piece of 1/4" MDC board to the table of my 5" disk sander. This will keep small parts from being pulled down into the abyss below. Any part with a sharp angle I "notched out" with a single edged razor blade. I also sized the cut-out necessary to receive the end of the keelson in the center floor plank (**Illustration 97:** the **orange arrow**). The **purple arrow** points to a log connection with no notching.

3) Note the rudder log template in place to form the upper rudder log when needed later.

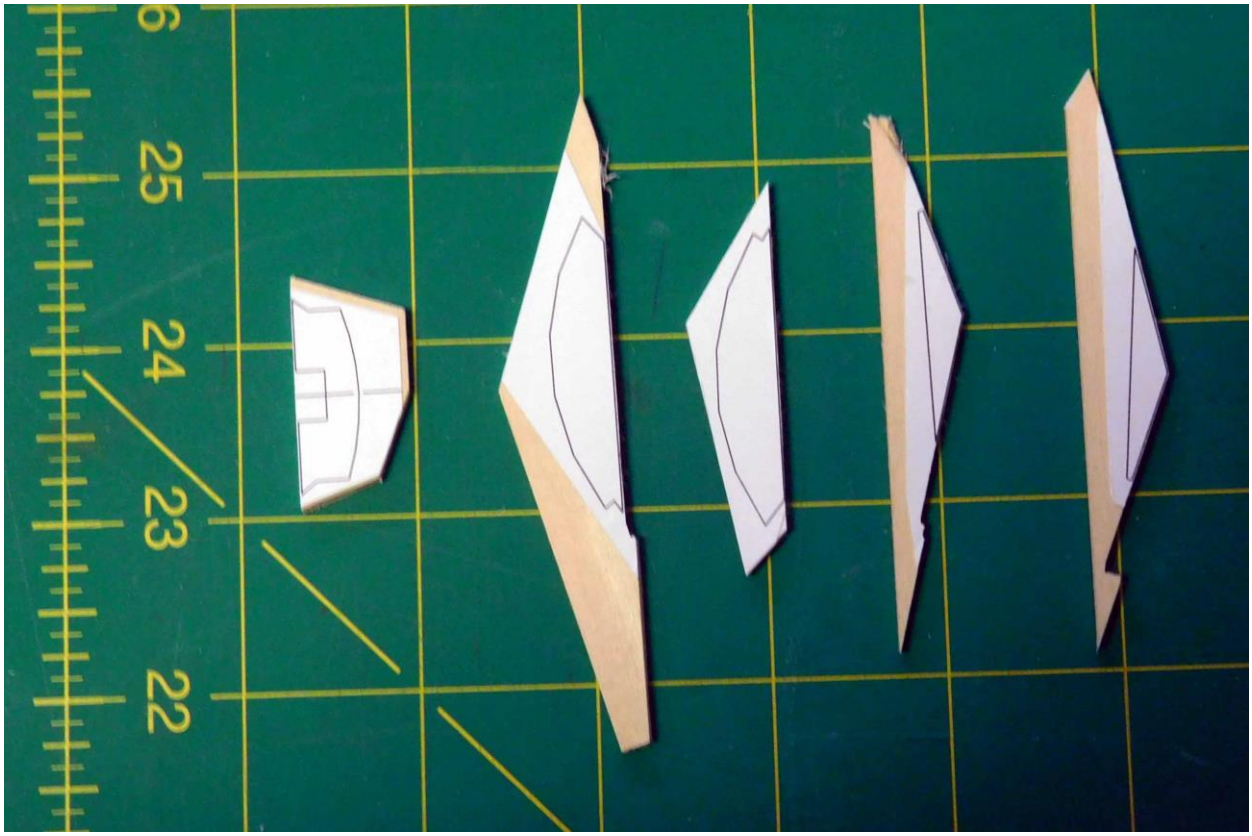


Illustration: 98: **Option 1** - The **5 of 7** transom flooring logs. (painted sharpie)

4) **Illustration 90** shows the three floor logs that circumnavigate the round transom and receive the vertical planking of the stern. When, fitted, very carefully place a small bevel on the outer edges. that will approximate the angle of rise from the apron. I used the disk sander and set the table angle at 12.5 degrees (1/2 of 17-degrees and 9-degrees). The circumnavigation is “fan like.” More on that later.

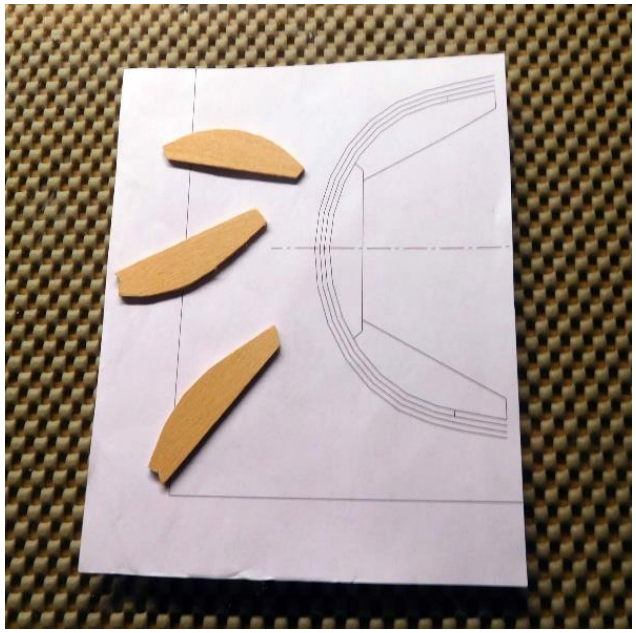
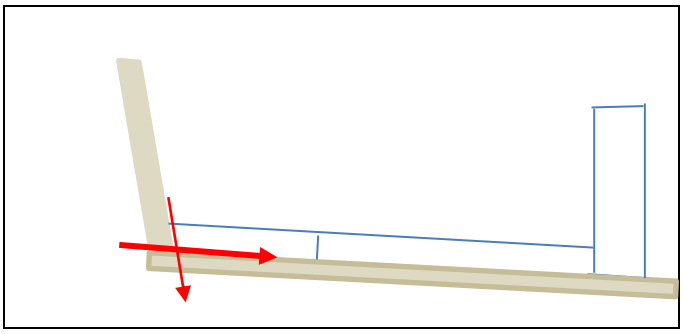


Illustration 99: Notch and friends!



1) Final shaping was done at the disk sander, a light touch guiding the planks "to the lines," letting the sander do all the work. I then test fit the floor planks onto the template, and then to the bottom planking of the hull. **CAUTION:** If you had an adjustment to make in Step 4, before you do all your final shaping, shape the keelson floor first.

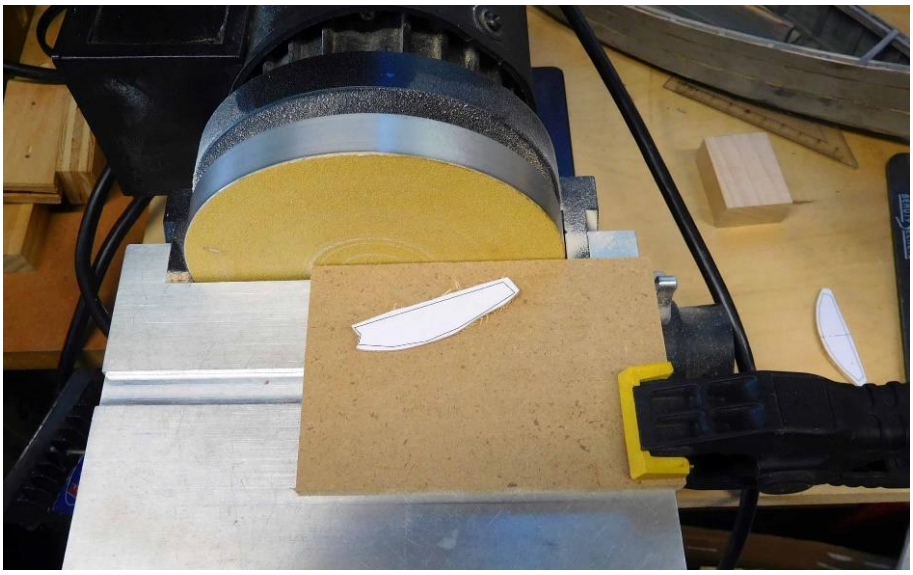


Illustration 100: Shaving Option #1

2) Once the flooring is glued in place, scribe the "apron" (1/8") onto the bottom planking that needs to be trimmed away. This is important, for you are leaving a "seat" for the vertical stern planks.

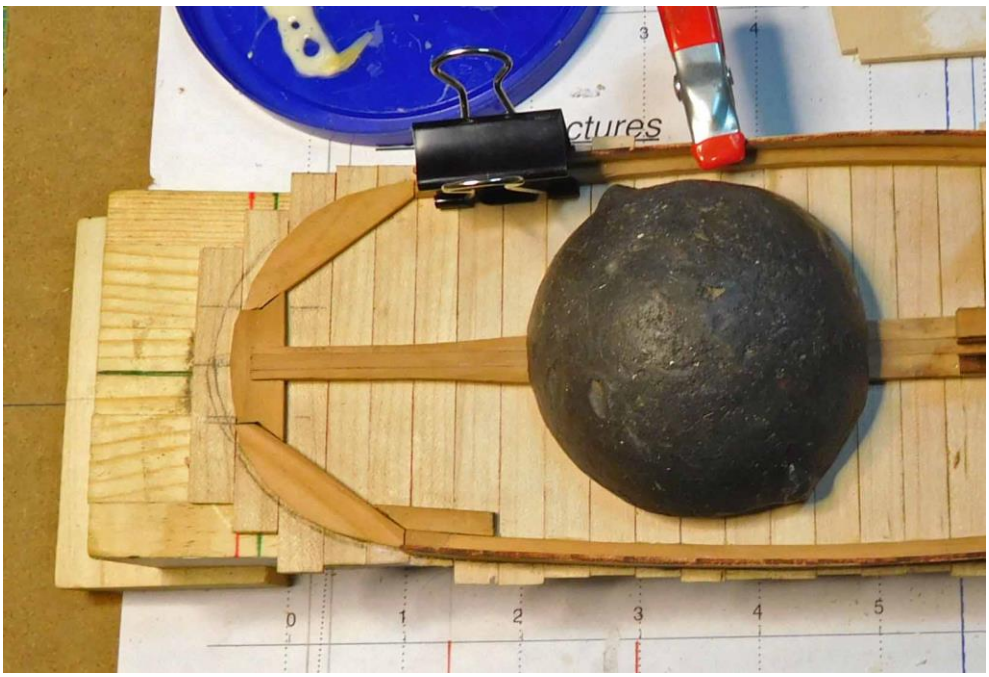


Illustration 101: Note Option **2** flooring pattern without the 3/32" logs.

3) In **Illustration 103**, you can see that the excess planking has been trimmed away. I used my scroll saw, but you can, with basswood and a steady hand, trim to size with a new X-Acto blade. You must go slowly, making 4 or 5 firm passes, because some areas are “against the grain”.

Illustration 102: The installation of Option 1 in progress

An alternative to the seating to receive the vertical transom planking:

1) On my first prototype, I did not leave enough of a “seating.” Here is how I fixed the situation: I carefully sanded the bottom planks to down to the flooring.

2) Using a 1/16” x 1/16” basswood strip, which had soaked overnight, I carefully wrapped the strip around the bottom flooring. (see **Illustration 103**). I ran the strip past the chine ends, holding it in place with Acco clips, and let the basswood dry.

3) Once, dry I trimmed the strip to fit and glued it in place.

4) As this will be the painted sharpie, and will be sanded to contour with the installation of the vertical transom planking, it won’t be noticeable.

5) If your build is natural and this happens, you can use a strip in the same species of wood as the bottom planking, and on the port and starboard ends of the bottom planking, scribe a “slit” to delineate the individual planks.

6) This should not be a problem if are at this point in the build, but just in case you find your apron is less the 1/16”, know that it can be fixed. I know because I had to use this repair on the prototype weathered sharpie. I would have read ahead, but nothing was written at that point.

The origin the weathered sharpie:

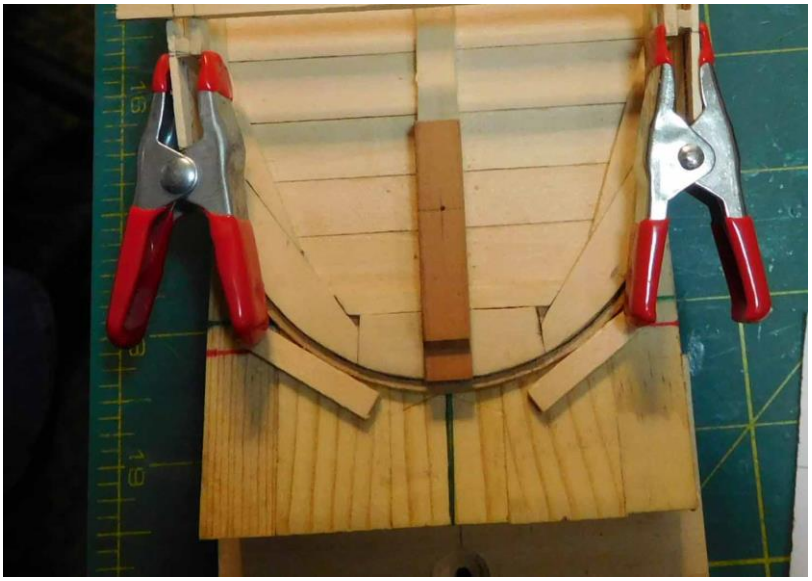


Illustration: 103: An “apron” add on from above.

Illustration: 104: An “apron” added on from below.

The rudder logs:

Materials: Rudder log - 3 basswood or hardwood strips**:** 1/4” x 1/16” and 1/4” 1/32” (2 pc.), 1/4” x 3/32” (1 pc.)

Rudder log 2 basswood or hardwood strip**:** 1/4” x 1/16”
Rudder log 3 basswood or hardwood strip**:** 1/4” x 1/16” (sanded to if necessary)
1/8 “piece of brass tubing

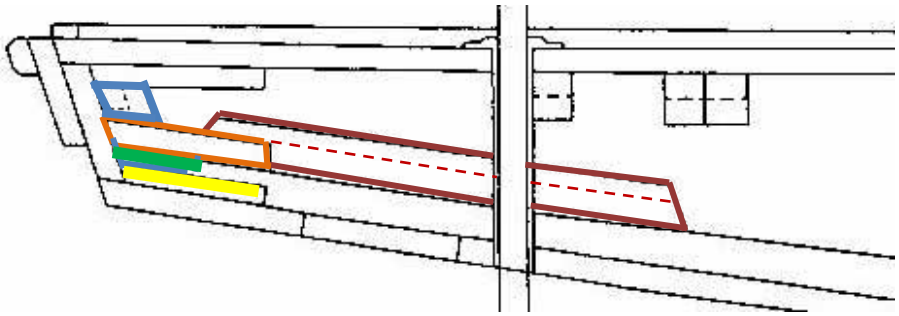


Illustration 105: The **blue** outline is the transom support log.

1) The center profile of the rudder logs is to scale. The **yellow** represents the transom floor log. The **green** is rudder log 1. Right above is rudder log 2, outlined in **orange,** and on top, outlined in **red**, is rudder log 3. Note: rudder log 3 can be laminated to 3/32”. The advantage is the easy creation of a “notch” for the seating on log 2**.** Mine was a single log with the notch cut with my Preac saw.

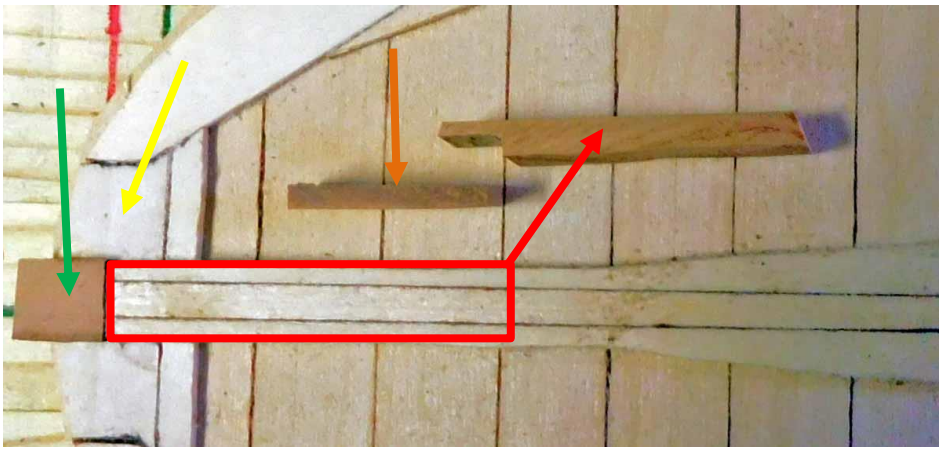


Illustration 106: Log 1.

2) Lay the log onto the floor surface. It should be flush with top of the keelson. If too high, place a [piece of sandpaper on a flat surface and with your index finger, run the log across the surface. I count the passes over the surface of the paper (1-2-3-4-5 stop and test fit) until the seat is flush. When Log 1 is flush, place a small piece of double stick tape on the transom log surface, and set the Log to the tape.

3) Log 2 should also extend out over the bottom planking. Mark the 1/4” length of the Log 3 notch onto the surface of the keelson. Cut log 2 to the length required.

4) **Illustration 97** (p. **65**) shows Log 3 ready to be shaped (the **blue arrow**). Take the keelson template of Log 3 and set it on to the 1/4" stock. Whether one piece or two, form the notch. If you are doing 1 piece, leave an overhang. See **Illustration 107** (**red dashed** square). Over cut your notch from the 1/4" line (the green arrow) going aft to the end. When done, sand back to template dimension.

5) Now sand the taper (**yellow line**) to the end.

6) Using the keelson plan, scribe the forward location of entire assembly onto the keelson surface, if not already done.

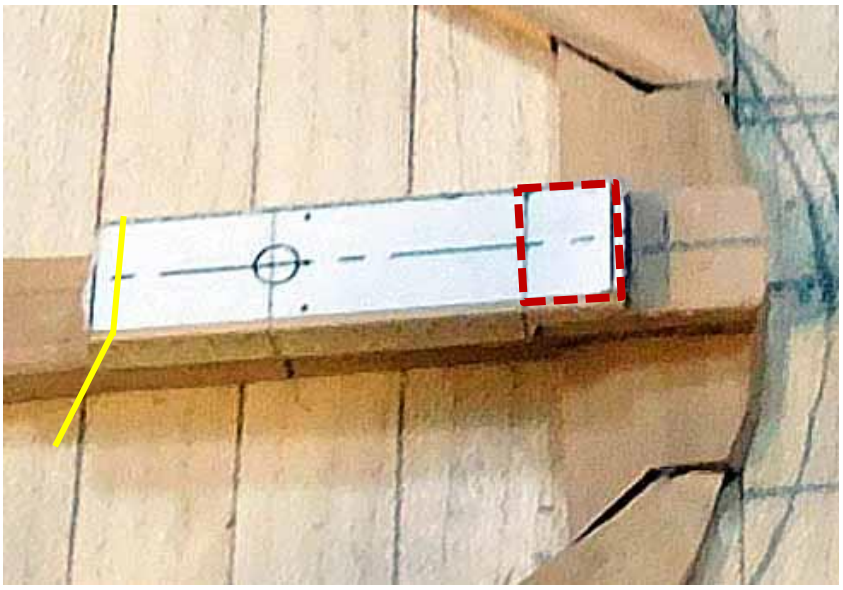


Illustration 107: Log 3.

7) Glue the Log 2 into the notch of Log 3 and let the assembly dry.

8) **Illustration 108:** Before removing the template, I used an awl to locate the center position of iron rudder tube hole (**blue arrow**).

9) Back to log 1 being held with the sticky tape. Take and place a dab of glue to the top surface of the log (you don't want a "squeeze" out) and set the 2-3 assembly in place. When dry, remove the completed 1-2-3 assembly from the tape.

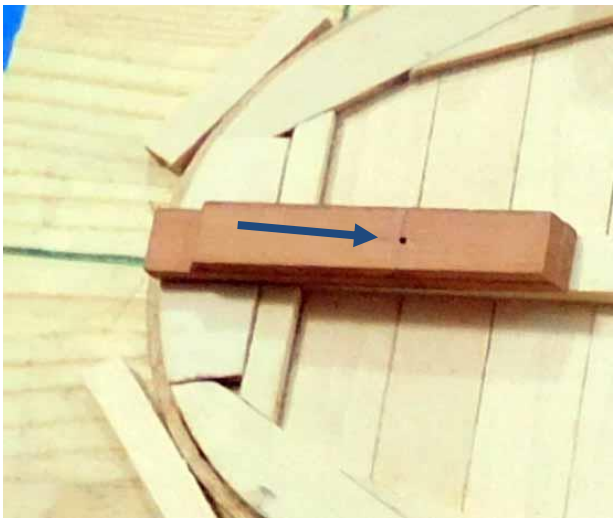


Illustration 108: Note prep for the rudder hole drilling.

11) All that remains now is setting the aft end of the assembly to properly seat the vertical transom angle of rise and drill the iron hole.

13) Re-position the assembly and scribe the 17-degree angle (as shown the **yellow arrow** in **Illustration 107**) onto one side, then across the top surface (the **orange curve**). Note the curvature is slight.

14) I the set the disk sander table to 17-degrees and finished shaping the assembly and glued it in place.

Illustration 109: Rudder tube.

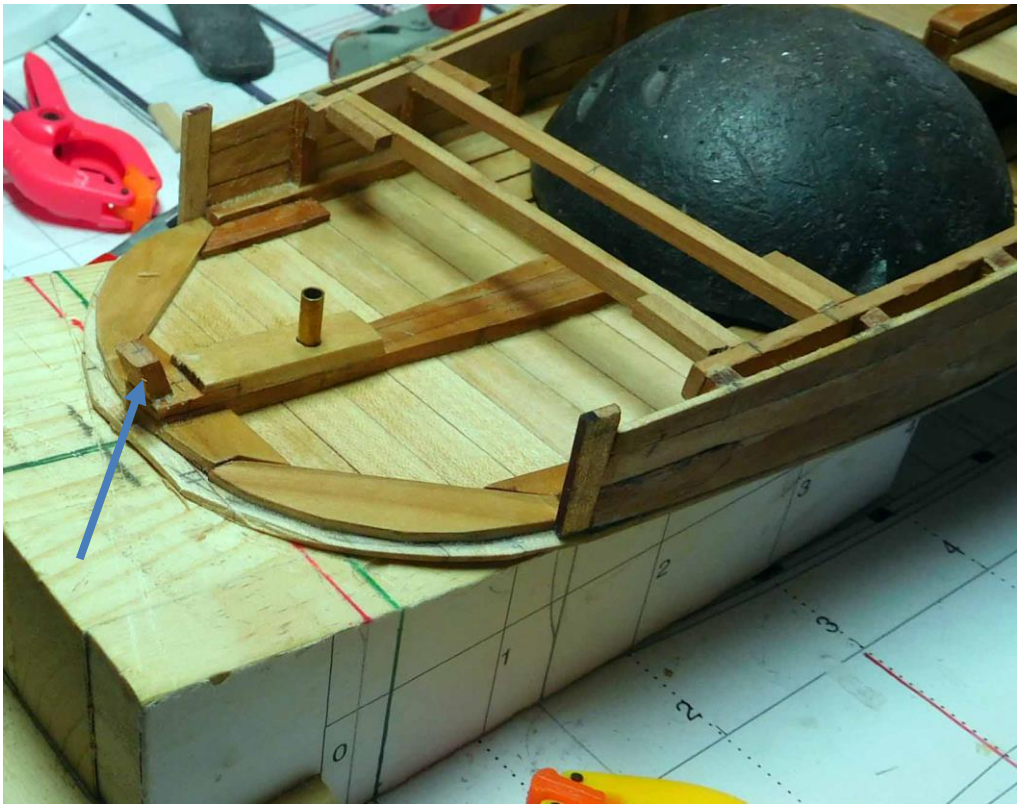


Illustration 110:

The rudder hole:

1) Now, you might want to position the hull onto the **BJ2**. I unfastened the jig and took it to my drill press. Using some double stick tape and my large lead weight to hold the hull in place to existing **ST's**, with a 1/8" brad point drill bit, guided my previous awl punch, and after alignment, especially the **C/L,** I drilled down through the log assembly, the bottom planking about 1/2" into the **BJ2.**

2) Now cut a piece of 1/8" brass tubing to a length of 2" and place it in the hole created in the jig. Why into the jig? Now, you have a locater to hold **C/L** and **ST** positioning every time you place your hull onto the jig. Also, by drilling the hole while the hull sits at the right angle guarantees 90-degree vertical entry to base line.

3) The **blue arrow** is the stern's vertical support log. It is made from 1/4" stock and follows the 17-degree angle and the 22-degree angle of the rise of the bottom planking. The top angle is at 90-dregrees to BB2. It will be where the vertical planking begins, at the **C/L**. **NOTE**: see Illustration 99 for positioning.

4) **Note**, also, how the brass "rudder tube" combined with a weight can hold the stern in place, flush against the jig.

A Look ahead: This all happens in **section 3.10.**

Illustration 110A:

3.4 Removeable Flooring

Research Locator: Mystic Seaport, Marine Historical Association, Mystic, CT, Item 51.4206: Plan Sheet 1 of 1, *"**16' 0" New Haven Sharpie**"*, clearly shows 1/2" x 8" (Scale 1" = 1'0") floor boards, in removeable sections.

Materials:

Planks: I used maple on one sharpie and basswood on the other using 1/32" x 5/16", 1/2" x 5", and 1/32" x 3/8" for the flooring planks.
Removeable Palette support logs, basswood 1/16" x 3/32"

NOTE: As I moved through Phase 2 construction of the initial prototype (in basswood), I decided that "something new" needed "something old" to show not only the beauty of the sharpie but to show the character of the sharpie. The "something old" could only be a model that was painted and weathered to show its age. "The something new" could only come by leaving the wood natural. Hence, a second prototype.

Using **illustrations** of both sharpie builds at work on the same task may confuse you. An example: You might see a mast box, newly installed, in a hull that is already framed. Then you look down at your hull, and all you see is bottom planking and stem assembly. No, you didn't miss anything. The purpose of having a test build is to find the reason the chicken (me) would decide to cross the road at rush hour? There must be a better time. Installing a mast box with everything framed out and in place, leaves little room for big fingers. Installing the centerboard housing, permanently, makes the installation of the thwarts impossible. You will continue to see illustrations where items are present (or not present) on the builds which you haven't yet tackled. That's because of my presenting the order of build best suited for your first build. Stated another way, I tried to clean up the trial and error process of a prototype into a coherent, logical, path of construction. The illustrations chosen in every section of this write-up, was based on the best picture I had on the subject at hand.

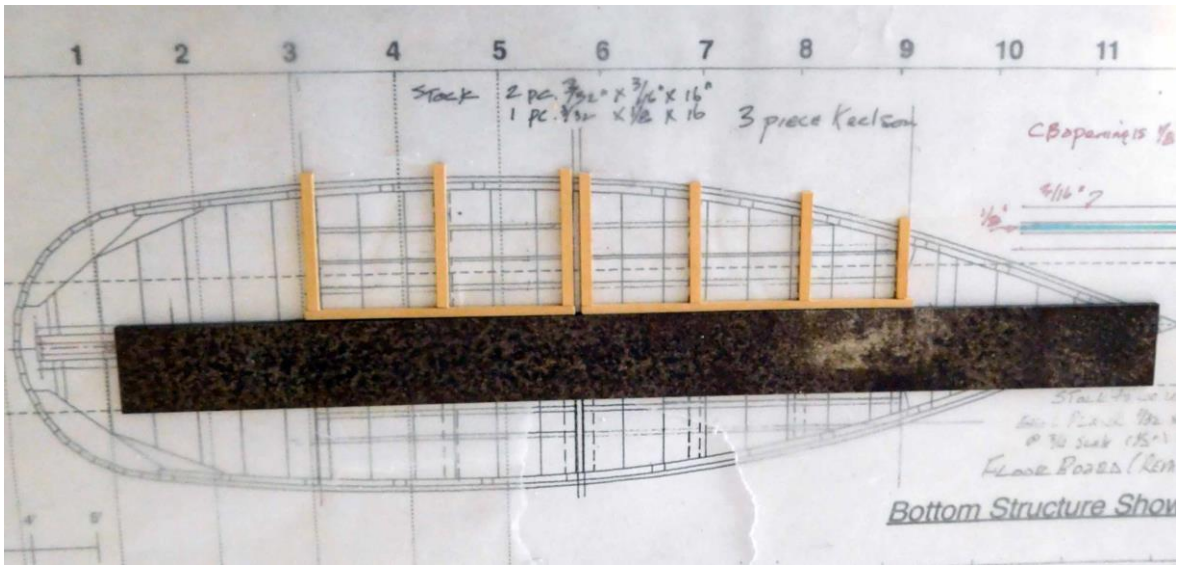


Illustration 111: The palate support logs.

1) **Illustration 111:** Cut out the removeable flooring building template provided in the plans. Tape the template to a flat surface (mine was 1/4" plate glass) with double stick tape, the tape extending past the needs of the template itself. This tape exposed tape extension will hold in place the wax paper. I then took a straight edge with double stick tape on the under surface, placed it along the outer edge of the keelson.

2) I trimmed the palette logs that run against the keelson, to size. I then laid two strips of double stick tape on to the wax paper (the **red arrow**) to secure the palette logs without gluing them down. Note that logs running to the chines are extended over the chine.

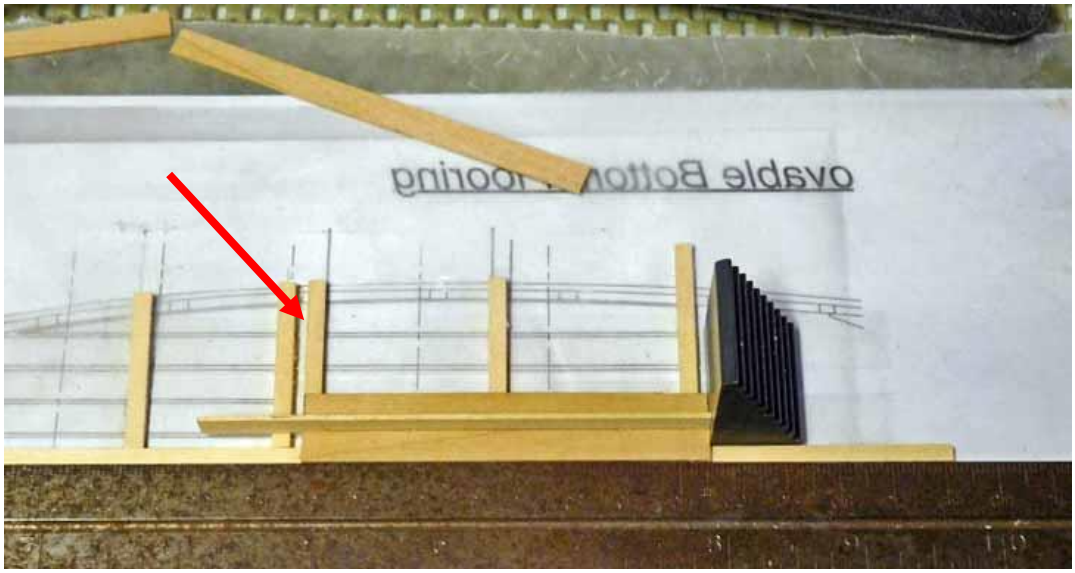


Illustration 112:

3) I cut **4** floor planks, **to plan size requirement,** from the 1/32" x 5/16" strips. I positioned an angle block as a "stop". I carefully ran a bead of glue onto the inner underside surface of the first plank, and laid in position. **NOTE:** My straight edge is from an old carpenter's square and is thick enough to hold the plank edge in position. You can see that I am using an unglued plank to act as a spacer when moving from plank to plank. The **red arrow** indicates the forward edge of the aft palette assembly. At four planks, I stop.

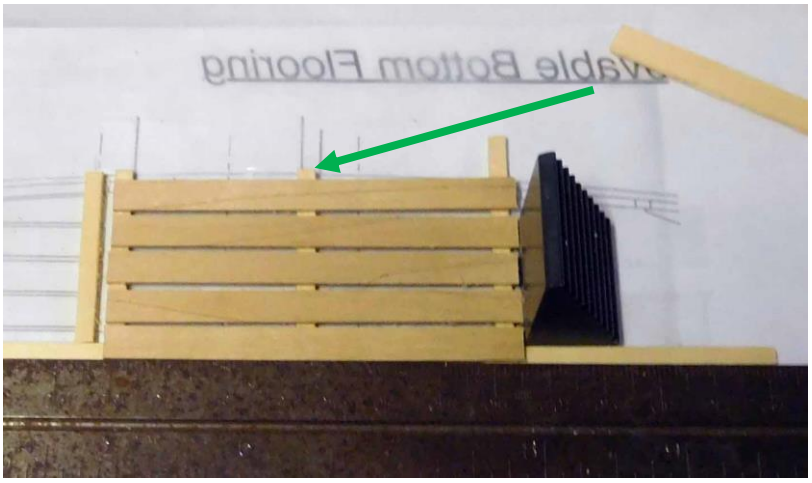


Illustration 113:

4) At **4** planks, you will plainly see if an adjustment needs to be made in the width of the **5th** plank required to meet the chine. In this case, a standard plank was enough. You want to go slightly over the plan's length to allow you tolerance in the final seating to your model. **Illustration 113**: the **green arrow**.

5) Make the forward palette in the same manner.

6) As you can see, the forward palette required a 3/8" plank **5** to extend to the chine. Now the chines inner edge location needs to be transferred to the surface of each palette.

Illustration 114: Ready for finishing.

7) With a ship's curve, go to the plan sheet and find the path of the outer edge of the chine run and mark the beginning and end of the run with blue tape. Take the curve back to the palettes, align it, and scribe it to the top surface.

Illustration 115: Again, a valuable tool – the ship's curve.

1) If, by chance, you do not have a set of ship's curves, you can transfer by making a paper template. To aid in stability, spray glue the paper to a piece of card stock and trim with scissors of X-Acto to shape.

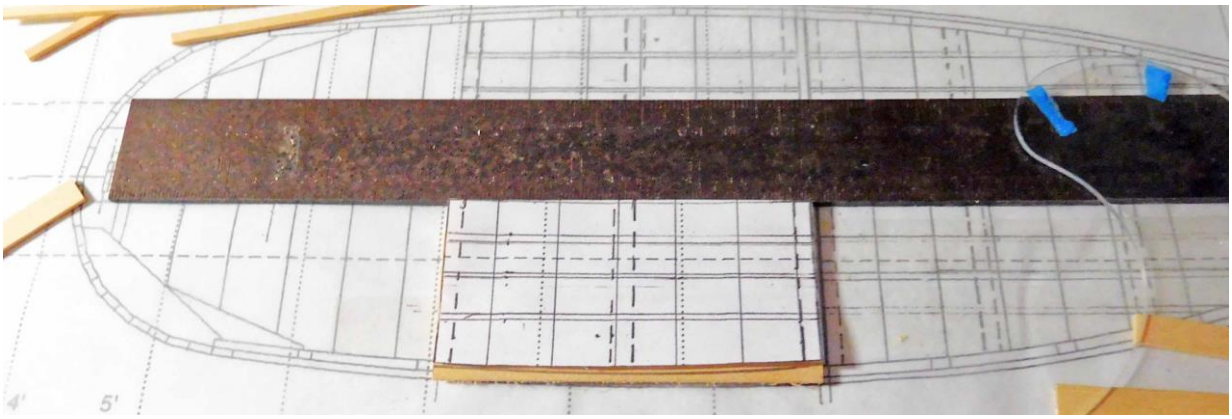


Illustration 116: But this will work too.

8) Now carefully remove the two flooring assemblies from the wax paper. The easiest way to do this is to remove the straight edge and lift the entire sheet of wax paper off the plan. Turn the paper down on the flat surface and start to peel it back slowly breaking the taping bond with a single edge razor blade when needed.

9) Now complete the other side's removeable flooring in the same manner.

Getting the removeable flooring installed:

1) **Illustration 117:** Having marked the outer edges of the four palettes, take each one and position in place, laying them against the keelson. Check the scribed chine location against the actual chine location. If needed, erase the plan location and remark to the chine location.

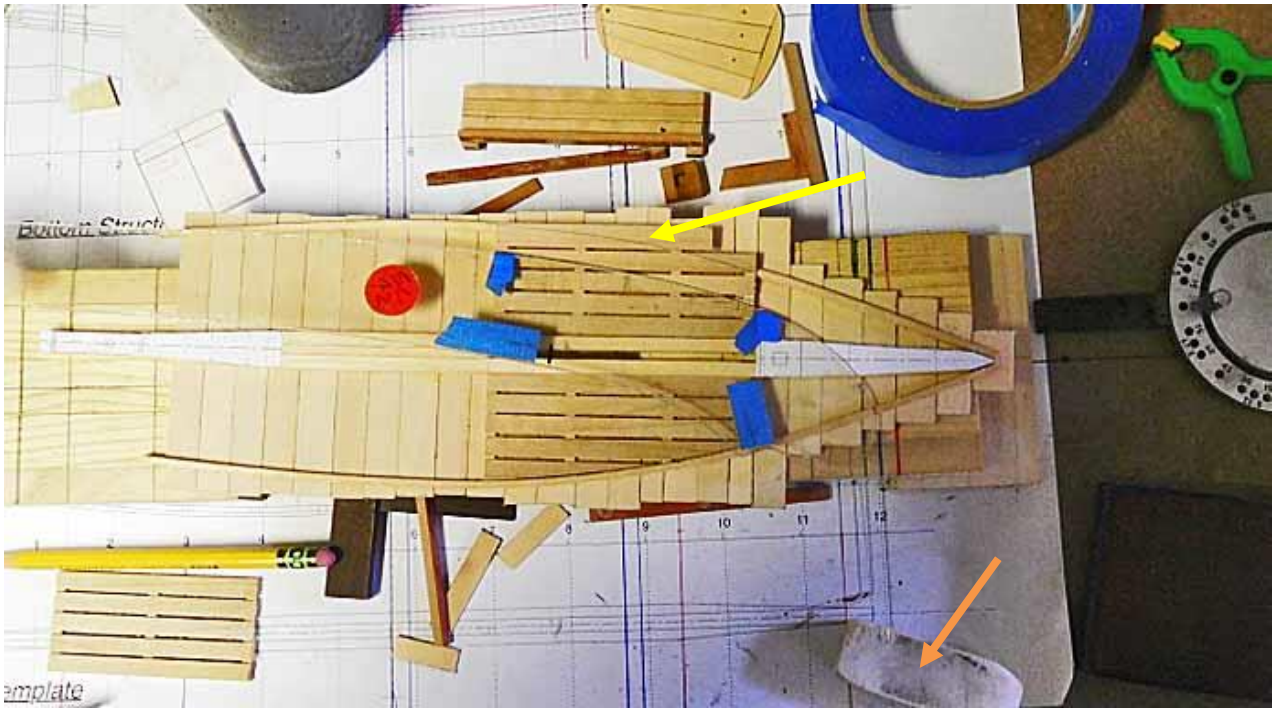


Illustration 117: I scribe lightly with pencil (the **yellow arrow**). Note the drafting eraser in the right-hand corner.

2) To trim off the excess material, I used my 5" disk sander. Because the palette is "fragile," I made "shaving" passes, keeping my fingertips pressed over the palette logs. I stopped just short of the scribed line.

3) The chine edge is at 9-degrees and so the outer edge of the palettes will need to reflect that angle. I set the disk sander table to 9-degrees and finished to the line. Test fit and adjust if necessary.

4) Finish all four palettes and lay them in place. Do not glue them in place. For much of the construction that follows, they will just get in the way and truly do need to be removeable.

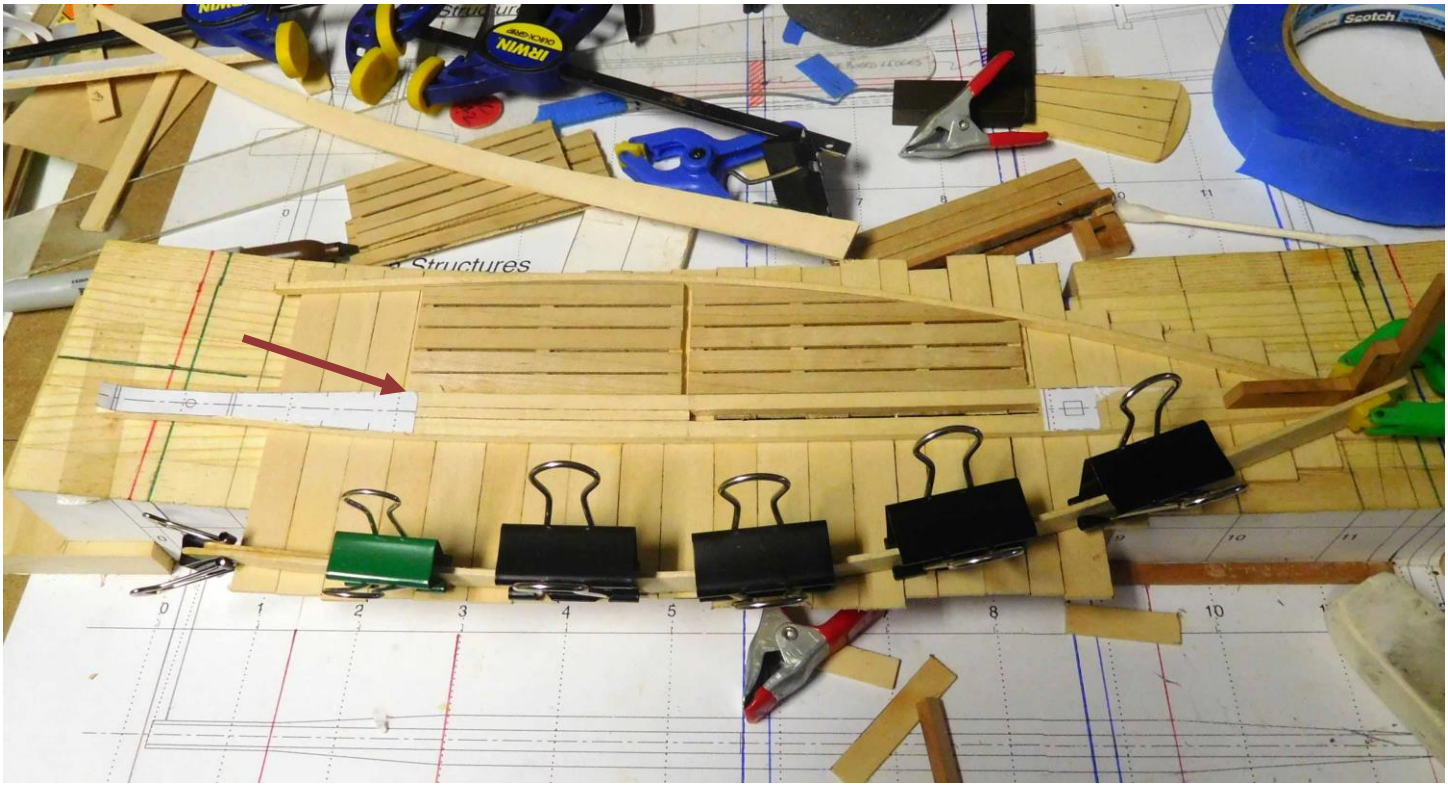


Illustration 118: Set into position.

5) **Illustration 119:** You will see a gap at the **red arrow.** This is because design of the first keelson was two pieces of keelson log and started the taper to the transom sooner. With the decision to use a removeable flooring, and other research noted previously, the keelson was redrawn to a 3-piece unit which extended the 1/2" run of the keelson before tapering. The end of the removeable flooring contined flush with the keeson for the entire length of the assembly.

Illustration 119: The gap created by the narrowing of the keelson in that area.

3.5 The Lower Side Shear Planks

The construction component in this section is **Plank A**, port and starboard. I have broken up the side planking into two segments, **A** goes before **B** and **C**. It should not present any problems but it is the precursor of a vertical planked round stern, and there are two options for that task. Which option you choose, will determine which set of planking templates you use. So, you have a decision to make: you can take the Robert Frost route, a definitive "road less travelled," or the Yogi Berra route and wait until lightning strikes to show you the way. The fork in the road is at the intersection of east-west Avenues A, B, and C, where they run into Stern Street the area of the vertical transom planking, not yet paved and unable to make up its mind to run due north to south or run northwest to southeast. Sorry, got carried away. Simply said, the aft side planking can rise at an angle or rise vertical. I'm telling you this because
there are options, but for our build, we'll keep it vertical.

Option #1	Option #2

Transom vertical plank "blank"

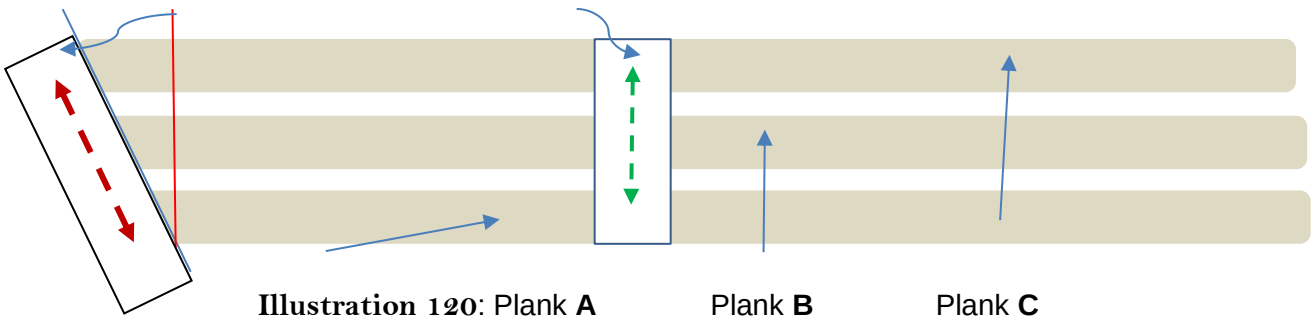


Illustration 120: Plank **A**

Option 1: The angle of rise from the bottom planking is, give or take, 12.5-degrees
Option 2: The angle of rise from the bottom planking is 90-degrees

NOTE: Section 3.5 will describe only Option #2 for this build. the low road at 90-degrees. I started prototype #1 with option #1 and it became clear to me that the transom planking was hard enough and could do without another angle to consider.

Caution: The development of the final set of plans and instructions was the outcome of trial and error, re-thinking, and constantly being open to a better alternative way of achieving success, even if it meant starting over, which I did, several times. The sequential pictures presented in this manual may reflect these efforts. A case in point, is **illustration 114** in **Section 3.5**: You will see the A plank being glued in place with centerboard assembly already in place. Later, I found great difficulty in the installation of the thwarts. Way too early to install the centerboard assembly. Too many decisions had yet to be made. The low road will make it a much easier walk through to end the journey.

If you want to consider Option #1, there are side planking templates for doing so in the plans. Later, if you change your mind and want to finalize with Option #2, your Option #1 side planking can be easily trimmed back to re-establish the vertical union of Option #2. This is because the transom planking installation begins at the transom **C/L**.

I suggest that you jump ahead to **Section 3.10** and read "the rest of the story" for a clearer understanding of the round stern vertical planking construction and then make your choice.

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **231-241**.

In the 1880's, planking a flat-bottom sharpie, especially one of this size (18 feet), would be in single strakes. The number of planks required would be dependent on the length and width required, and that usually could be accomplished with two or three planks. Chapelle says the process of planking "is usually a simple matter." We'll see!

"Assuming the hull is not lap-strake in the sides, the first step is to select a plank for the sheer strake, if the whole side cannot be made with a single strake. This must usually be a rather wide plank, due to the combination of sheer and flare. The sheer strake is sprung on the molds and shifted up and down until it appears that its position permits the greatest depth at the point of least freeboard, or at the bow or stern. The bottom plank should be smooth and straight. The bottom of the plank should be smooth and straight." [1]

Materials:

I used **6**, 1/16" x 1" x 24" basswood (Sharpie **#**1), and **6** maple strips (Sharpie #2).

Illustration 121: The side planks tempates applied.

1) There are two sets of side planking templates on plan sheet **A3**. Templates for both port and starboard are labeled **A**, **B**, and **C**, one set for the each of the round vertical stern options. In this section, we form and set in place plank **A,** the bottom plank. It is fastened to the outside run of the chine. It sits on the 'ledge" of overhang to the bottom planking when first trimmed down. The angle of rise is 9-degrees.

[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **231**.

1) Trim the paper templates as shown in **Illustration 121**. Note that the templates were not trimmed very "close to the line." You want enough edge to hold the drawn plank paper to maintain the actual shape during the spray gluing and positioning process. if trimmed too tight to out lines, it can be easy to stretch or distort the lay of the paper and the plank.

2) **Illustration 122** shows the fore and aft plank extensions for both options. Note that I have extended both fore and aft ends about 1/4", The extra length is "wiggle room." When actually fitting the plank to the hull you will get a "perfect" fit to the length you need, and that may not necessarily be what you cut.

3) You can shape the six planks singly, or you can spray glue 2 basswood blanks together and place the template on one side to cut 2 planks, port and starboard, at one time. I suggest, if you haven't done this before, that at least make a practice test plank singly and see how you do. The drawback to two at a time, is and loosening of the bond between the two planks for the 2nd plank will have no reference markings after shifting during the cutting and or sanding to finish.

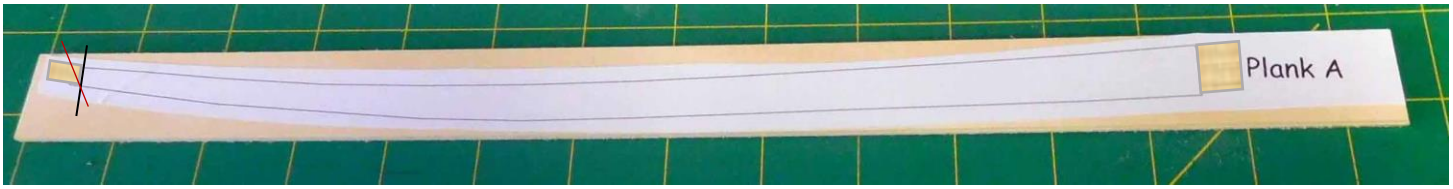


Illustration 122: Sketch the "wiggle rooms!"

4) You may be feeling uneasy about this "shaping" a plank, especially if you are doing this by hand and not power tools, and this if is your first attempt. So, let's walk through the process and make a small plank before we move on to the real thing.

5) If you're ready now to proceed with Plank **A**, jump to page **84**.

A practice plank:

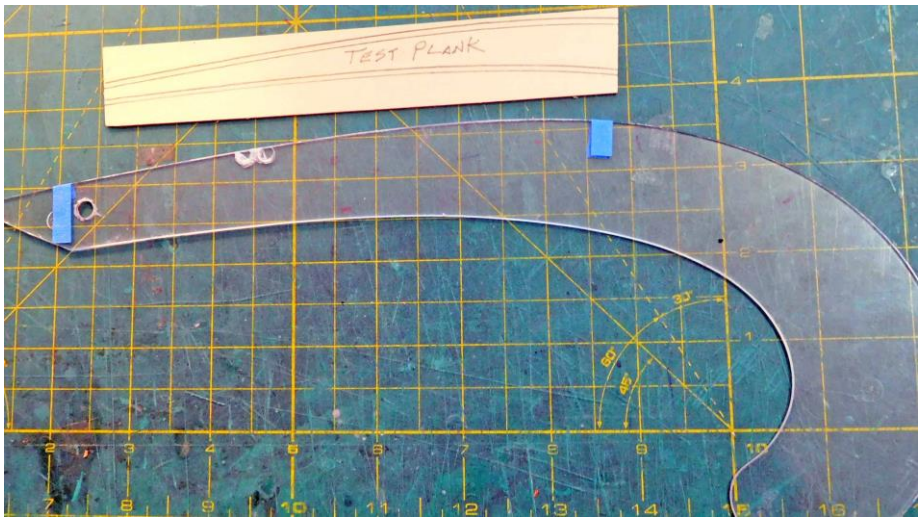


Illustration 123: ships curve and 6" blank.

1) Make your own template. I took a 1/16” 1” x 6” piece of basswood and a drew small plank on the face. I used a ship’s curve to “sketch” the plank and added a 1/16” cut line border, top and bottom**.** I used small pieces of blue tape to make the curvature I’m using.

2) Placing the curve over the bottom edge outer line, take the X-Acto in one hand and put pressure on the curve with the other hand and proceed the scribing: light pressure, several short draws of the blade along the line, as discussed above. (It took me seven passes to achieve a final “unforced” separation). **NOTE:** I often use the word “scribing” for this procedure. (I scribe cuts, I scribe pencil lines, et al)

Illustration 124: Houston, first stage separation is complete.

1) **NOTE**: To assist you in keeping the curve in place as you **scribe** through the basswood, you can take some double stick tape and place it on the backside of the curve before you set the curve in place.

2) The process is then repeated to form the top edge of the side plank.

3) Let the blade do the work. It took me seven passes to achieve final separation.

4) I call this “freeing” the plank for final shaping. Now to the free the actual **A** planks.

Note: For clarity, the illustrations coming up will show me taking the small plank above to completion following the instructions of making the actual plank.

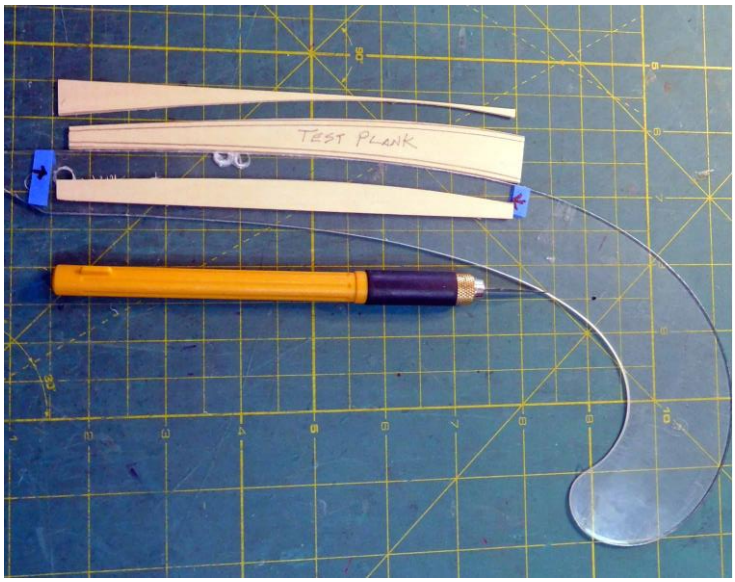


Illustration 125: You have a plank blank.

Shaping and installing the side sheer plank A:

1) Go back to **Illustration 122** and sketch the fore and aft extensions lines onto the template. Use the appropriate ship's curve. If you don't have a ship's curve, use a 1/16" square length of basswood as a batten.

2) Spray glue the template to the wood.

3) I freed the first plank from the basswood with my scroll saw. A band saw will also do the trick.

4) If you're doing this task by hand, note that this is a longer cut. Place the curve that matches the line on the template. Realign it to the recently drawn "free" line, and lightly make a scribing cut with the #11 blade. Don't try to go more than 3" or 4" at a pass, securing the curve with pressure, a weight, double stick tape, or your other hand (or a combination of all 3). Without moving your curve, (re-position if it has slipped out of place) do another pass, a little deeper than the first one, and so on for a few more passes, as with the practice plank. Make sure you go to the end of the extensions.

5) Now flip the curve over and do the other edge in the same manner.

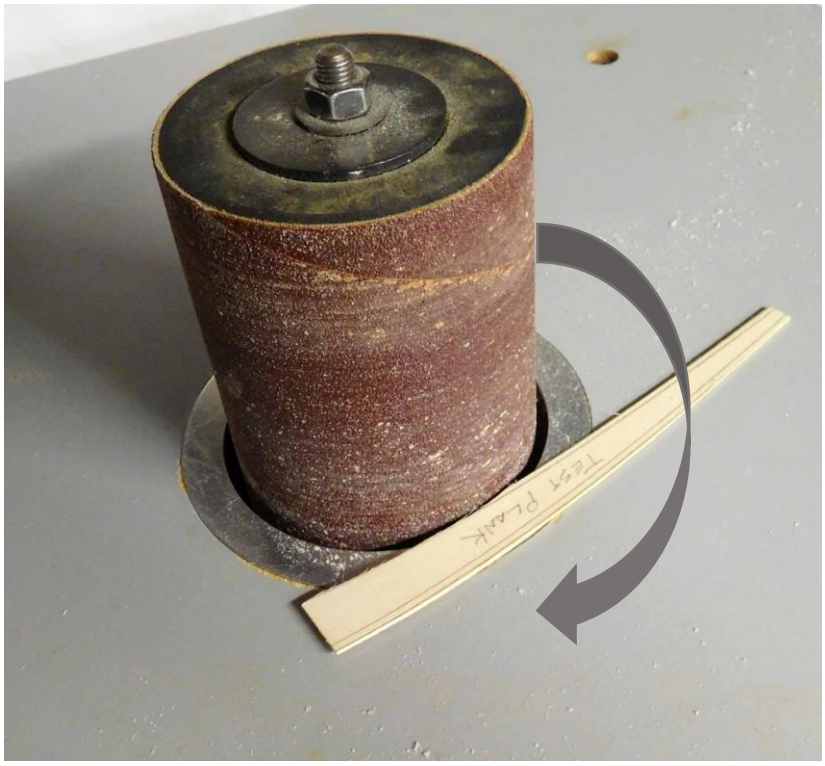
6) The ends of the plank can be trimmed down to the extension line by cutting, or sanding (disk sander).

The final shaping of Side Planks A:

1) If you did your **A** planks by hand, you can make the finished shape in the same manner, or you could sand down to the finished plank by hand.

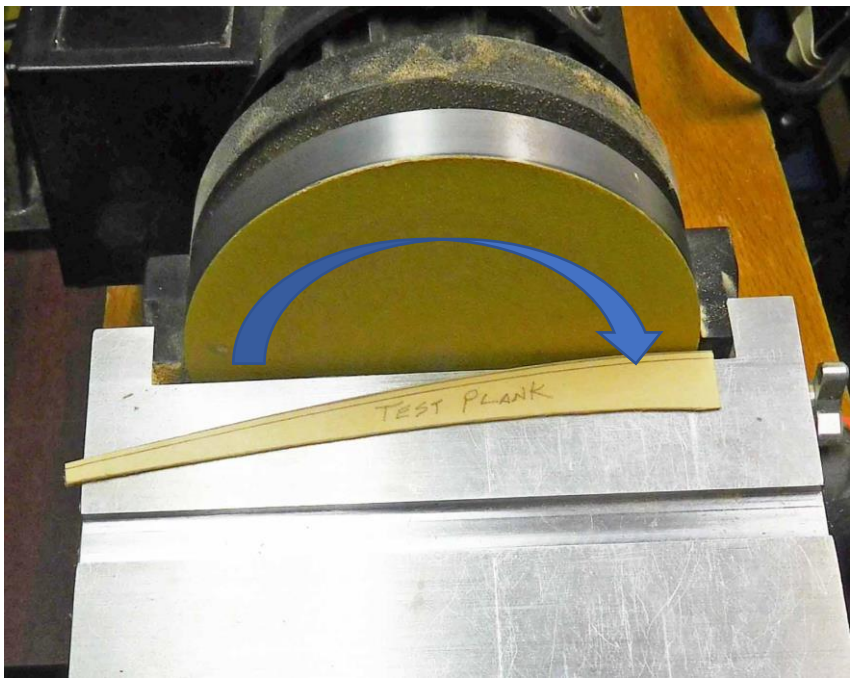
2) I did my sanding on both the 5" disk sander and oscillating sander. The disk spins clockwise on my sander and that means you must stay right of center with the surface area that is in touch with the disk. **Note:** it can be done accurately using the down turn, 2-1/2" of facing on the disk sander. My rule #1 is to start the sanding of the plank at the end closest to the sanding face, and in this case, it's the stem.

Note: For clarity, the illustrations coming up will show me taking the small plank above to completion following the instructions of making the actual plank.



Illustratration 126: Note the rotation.

3) The top edge of the **A** plank was done on my oscillating sander. With this sander, you must work with your fingertips. Never put pressure directly into the sanding face, rather "shave it down" by guiding the plank edge along the sanding surface with a light push forward and pull back motion. You want to see the line when done, but go as close to the line as you can.

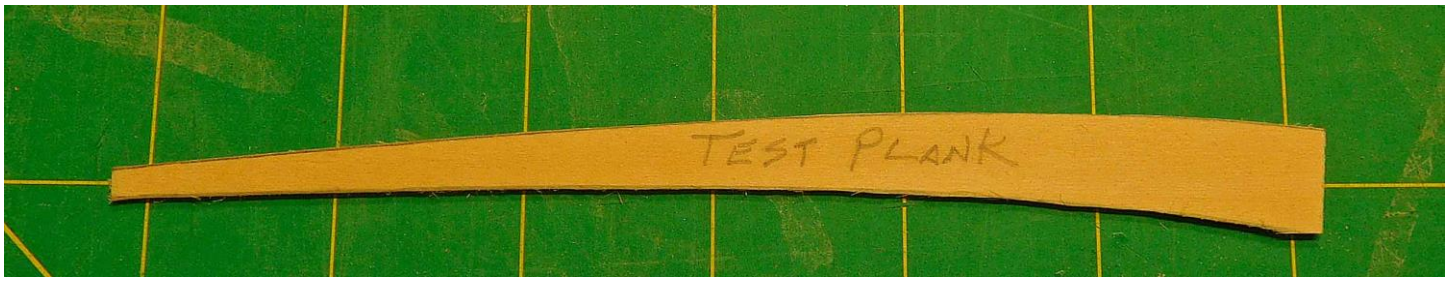


Illustratration 127: Keep contact on downwrd spin.

4) I started with the bottom edge of the plank using the 5" disk sander. **Remember there is a 9-degree rise of the planking, so I set the table angle accordingly.**

5) Use the oscillating sander technique, back and forth manipulating the plank with your fingertips. Go to the line but don't take away the line. The final finish sanding will take place when it's time to affix the plank to the hull.

6) When you feel comfortable with the knife or the sander, or some other method that better fits your talent (band saw, i.e.), finish all six planks and set **B** and **C** aside for now.



Illustratration 128: practice makes it easier in the long run.

Option #1- leaving the outer stem until later

1) I have a 1” x 30” piece of PVC pipe with a cap glued to one end and a threaded cap screwed on the other end. After scraping (single edged razor blade) the paper template off the surface of the “A” planks, I dropped them into the pipe and filled it with water. With the screw cap in place, I went to bed.

2) The next morning, I removed the planks and, using a small variety of clamps (**Illustration 129**), secured the sheer planks to the chines. With the “stronger” clamps I used small pieces of scrap wood to ‘buffer’ the contact of the clamp with the outside surface of the plank. Being wet, the basswood is very “impressionable.” I then put the assembly aside to dry. **NOTE**: At the stem, I overran the port sheer plank and then butted the starboard sheer plank to the port sheer plank, and clamped the “intersection” to the inner stem post (the **blue arrow**).

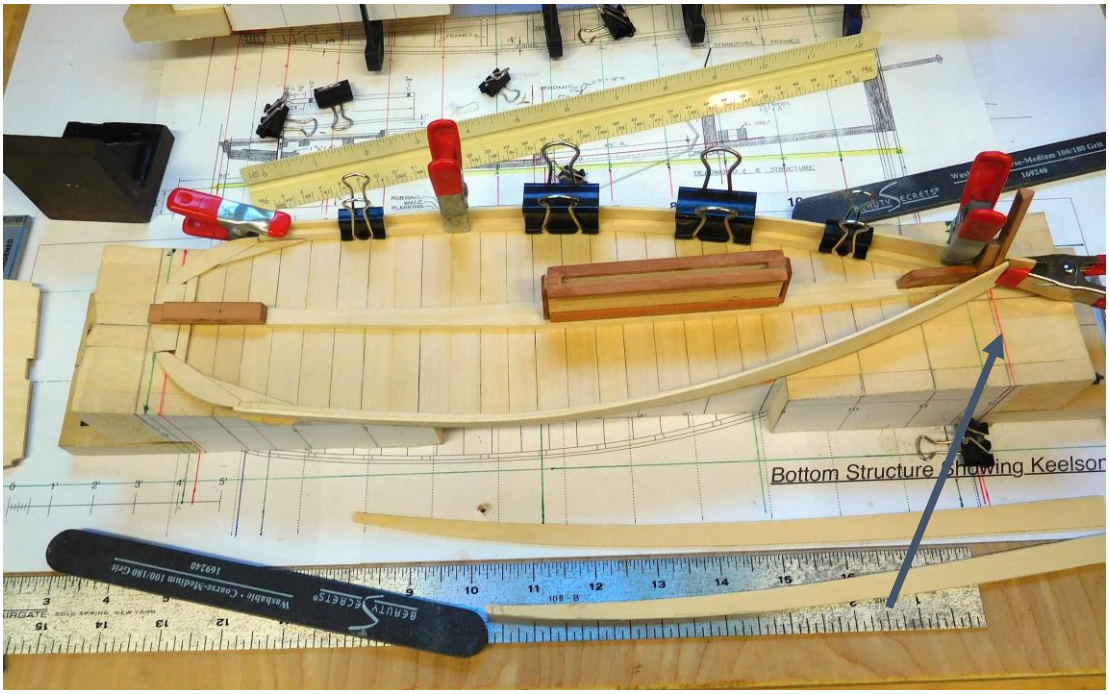


Illustration 129: Note the overlap at the blue arrow.

3) When dry, I marked a “**P**” or “**S**” on the inner side of the appropriate plank. As an alternative to the method of beveling and shaping outlined with the test plank, turn the plank upside down (you’re now looking at the “**P**” and “**S**”) and position the bottom edge the plank along the edge of your work bench. Hold the plank steady, and sand a slight angle of approximately 9- degrees using a sanding block. Sand in a downward direction only making sure not to remove anything off the edge running against the chine. You need to keep track of your plank bottom angles so you don’t create two planks that are identical.

4) **TIP**: Place one **A** plank on the bench with the forward end facing your right hand. The second plank should be facing your left hand: one **A** is then beveled port and the other starboard. Label the inside of each plank at the stem with a "**P**" or "**S**" identification.

5) The important thing for the sheer planks is that they remain identical. Take the port plank and set it in place with a few clamps. Now do the same with the starboard plank. Look straight in from the bow and they should be the same height at the inner stem post. If they are not, you have a little "wiggle room," so loosen one plank, gently slide it forward, or back to achieve equality. You can then do a similar check at the aft end of the planks. When satisfied, run a pencil up the inner stem marking the location onto the inside of each plank. (the **yellow dotted line** below). The line is on the inner surface to make seating with the stem "a snap."

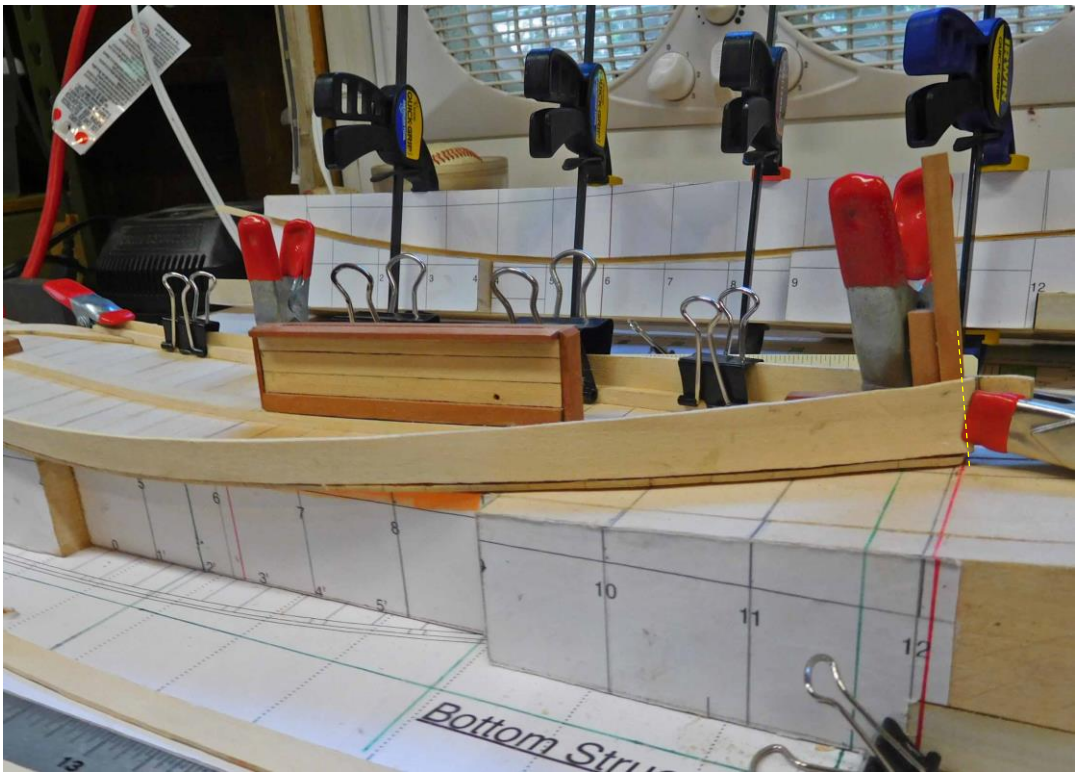


Illustration 130: Not the angle of rise.

6) When the **A** planking dry fit is completed, and you are using this option, there are several ways of securing a good bond at the inner stem. A small clamp, as above, is one method. The clamp should be "coated" so as not to mar the plank and to provide a better grip to the surface. However, I do not recommend "super glues". If you have a rabbet stem, we are going to a "V" block system. You might want to read ahead, because that system can also work here.

Gluing the A planking:

1) I glued up the starboard sheer plank first as this has the least overrun. There are two ways you can do this: (a) Use an applicator, the glue bottle itself, an old brush, or a Q-tip, and run a bead down the outer chine and bottom planking "ledge", or (b) place a run of glue onto a plastic lid or piece of wax paper, and using you index finger to "pick-up" a dab of glue, run the index finger down the length of the plank's bottom edge. It will leave a nice bead sitting atop the edge. You may have to re-load a finger a couple of times to finish the run.

2) Now, using the inside forward scribe you just made, position the plank in place. Starting at the stem, begin clamping as you go aft. You need to apply pressure two ways: against the chine to keep the angle of rise at 9-degrees, and at the bottom planking coming down from the top edge of the plank.

3) Once both sheer planks are in place, I took a razor saw and trimmed off the overrun at the stem. Then finish by sanding flush with the angled rise of the inner stem post (your scribed **yellow dotted line**).

4) Once both sheer planks are in place, I took a razor saw and trimmed off the overrun at the stem. With a sanding block, I finish sanded the plank flush with the angled rise of the inner stem post.

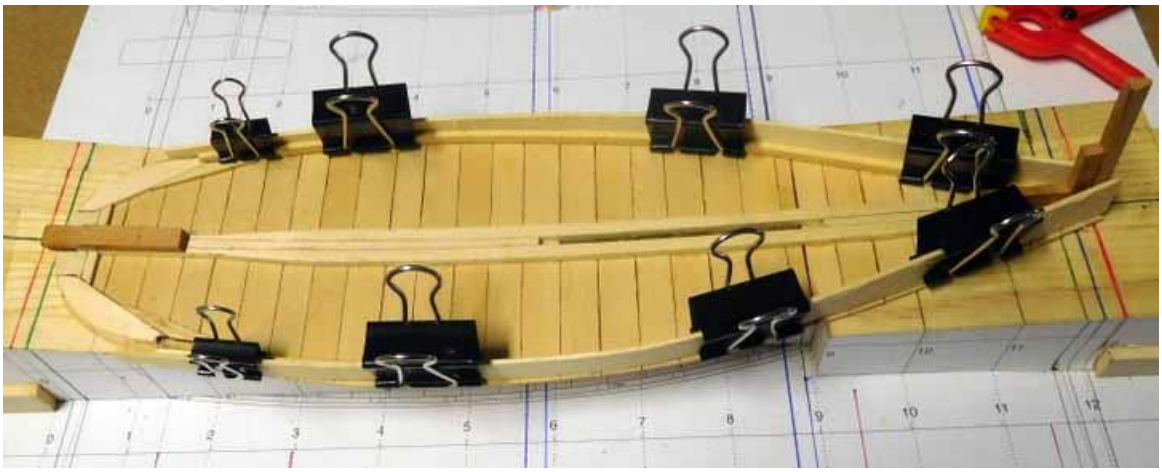


Illustration 131: This shows the clamping for both pressure points.

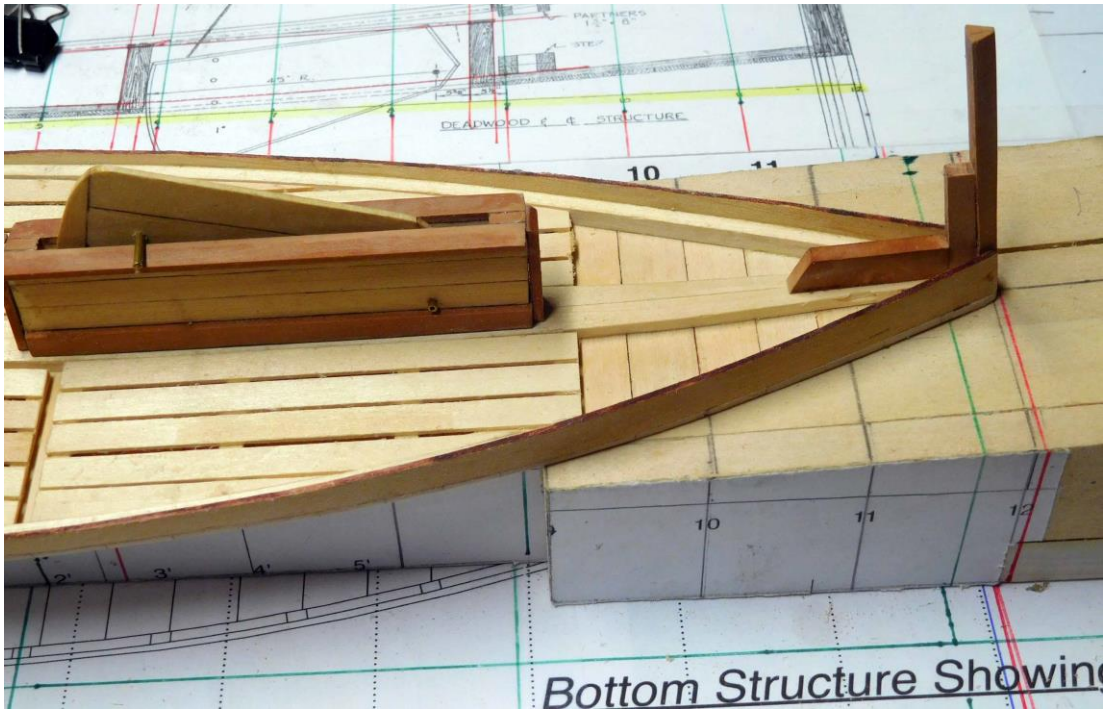


Illustration 132: The stem with plank **A** attached.

Option #2- with the outer stem applied and rabbet shaped

1) The only difference in Option #2 is at the stem. Instead of “over running” the inner stem post, you create a real rabbet in the stem assembly by gluing the outer stem post, in place, right from the start.

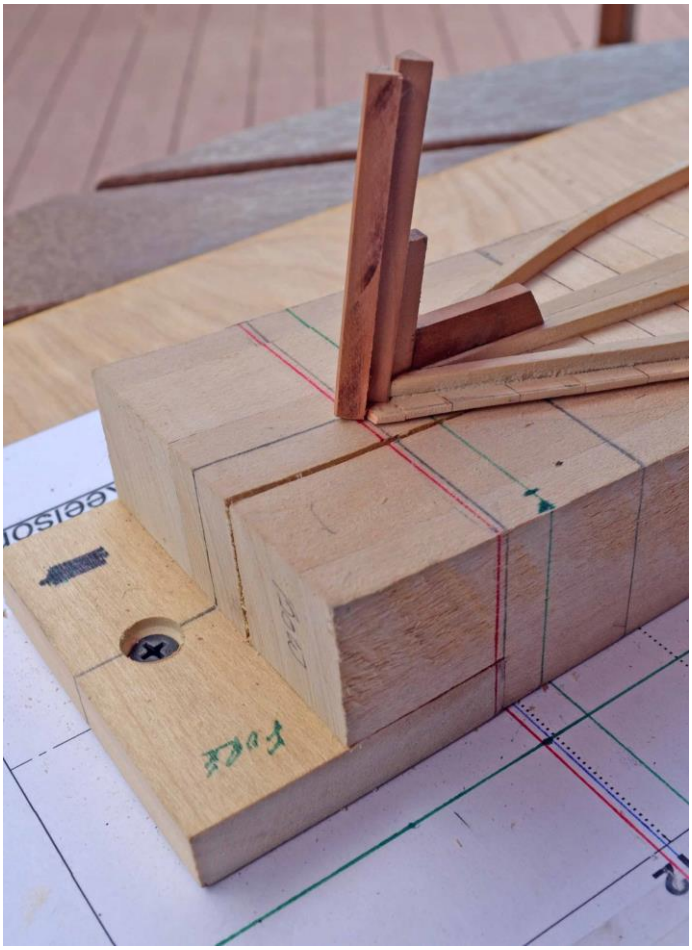


Illustration 133: The completed stem rabbit..

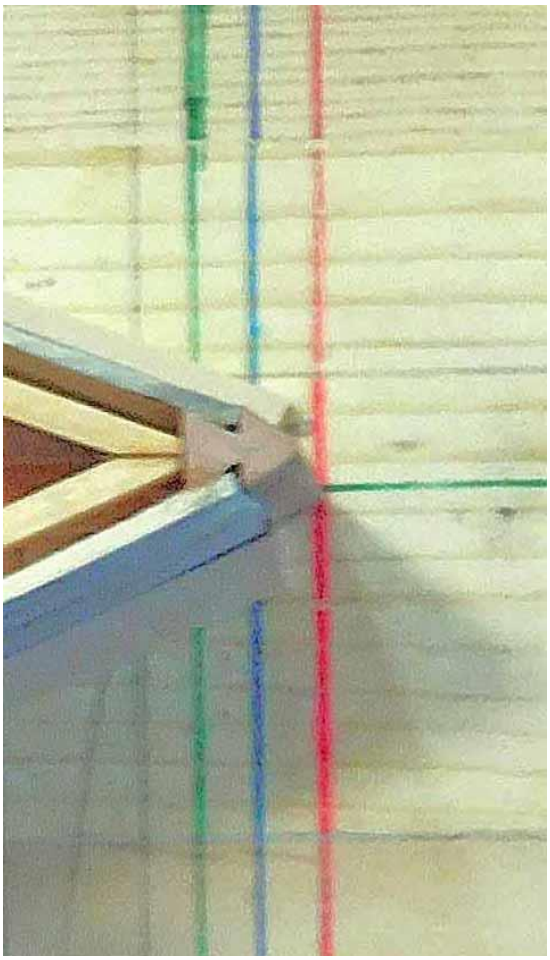


Illustration 134: The deck will eventually cover the stem top.

2) You have 3/16” in which to seat two, 1/16” shear planks. When the inner stem post was constructed we “squared off” the forward face to receive the outer stem post. So, examine the face of your inner stem post and make sure the length of the forward face is even, and no wider than 1/16”. If it is less than 1/16”, but you feel it is close enough to bond adequately, leave it alone. If it is greater than 1/16”, file it or sand it down. Proceed carefully to preserve the triangular integrity that forms the rabbet.

3) With the sharpie in place on **BJ2**, dry fit the outer stem. Because the outer stem seats on the Jig itself and not on the bottom planking, you must recognize the angle of rise of the inner stem already in place (3-degrees), the angle of the Jig’s surface going forward (4-degrees). It’s no big deal. You simply want the outer stem’s lower end to rest against the bottom plank that the inner stem seats on, and rises, as one, with the surface of the “squared off” inner surface.

4) You might have asked yourself “why are the stem pieces so long?” Just personal, I prefer to go long for ease of application (my fingers need something to grasp, and this way I don’t need tweezers). Secondly, the extra length gives me a better clamping surface to keep the assembly in line while the glue sets up.

Planking with a rabbet:

1) As with the “overrun” method, where you use the inner stem to scribe the proper angle on the end of the sheer plank. You can do the same thing using with the outer stem piece in place creating the rabbit. Scribe the angle onto the inside surface of the planks using your “wiggle room” (see **Illustration 133**). You know how much “extra” length when you fashioned these planks, so stay within that boundary when locating and scribing. Make sure you scribe the angle at the same location to keep the plank widths at the rabbit at the same width. Now trim (I disk sanded) to the scribed line.

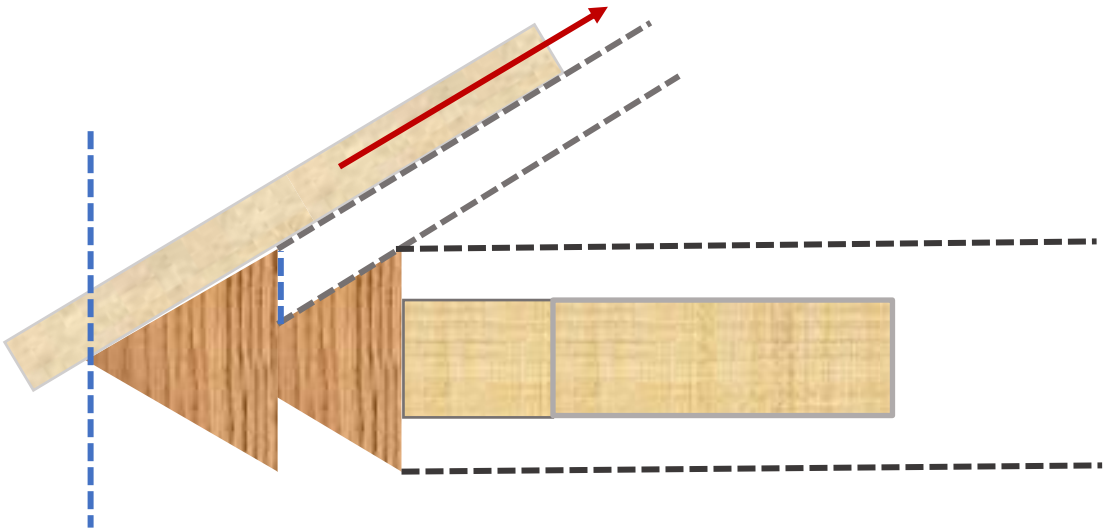


Illustration 135: Setting **A** to the rabbet.

2) Dry fit the two planks into the rabbet, adjust the “fit of the plank” with light sanding, if necessary. Remember to check that each plank is the same vertical width when viewed from the stem. With Option #2, when dry fitting I would add a small piece of shim stock if necessary to bring the outer surface of the plank even with the outer surface of outer stem.

3) From here, follow the procedures as described in option #1.

The "V" block:

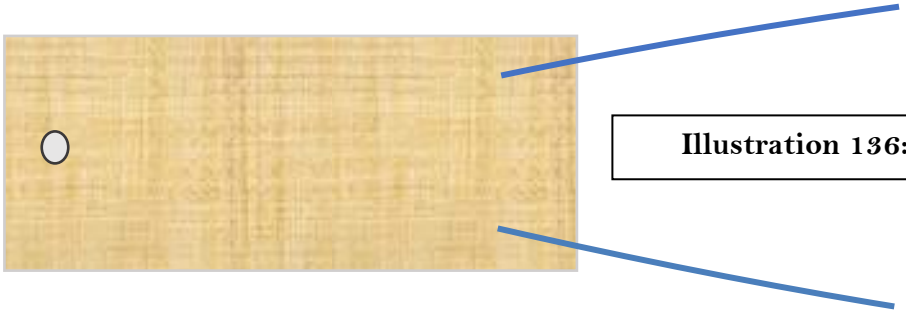


Illustration 136: Not to scale.

1) To keep the pressure on the plank/stem "seating," with Option #2, you can make two small "V" blocks. I used 3/4" pine, sized to the required dimension to "surround" the stem and cover the rabbet-side plank connection. I slid an index card (marked with a **C/L**) under the hull, properly positioned on the **BJ1** to accomplish to coverage described above. After scribing the outline of the stem section onto the index card, I removed the card and cut the notch template. Mark a **C/L** onto the block and align it with the C/L of the index template and scribe what will become your "V". Now cut out the notch. I used my band saw.

2) There is an angle to the rise of the sheer at the stem (the jig surface) and an angle of rise to the stem itself. Since the angel of jig will take care of itself when seating the block, you can create the seat to the stem by setting a disk sander at the stem angle. Then, with a miter gauge at 90-degrees, sand the front edge as you did to make the stem posts. Repeat this process to make a second block.

3) I then took the first block, selected a finishing nail about an inch long. I took the nail to my drill index case and found the right drill bit, for a tight enough fit to hold the block to the jig surface, and drilled a hole at the C/L of the block.

4) **NOTE:** I will line each insert edge of the blocks with a cut to size piece of scotch tape. This will keep a. block from adhering to the stem when glued up.

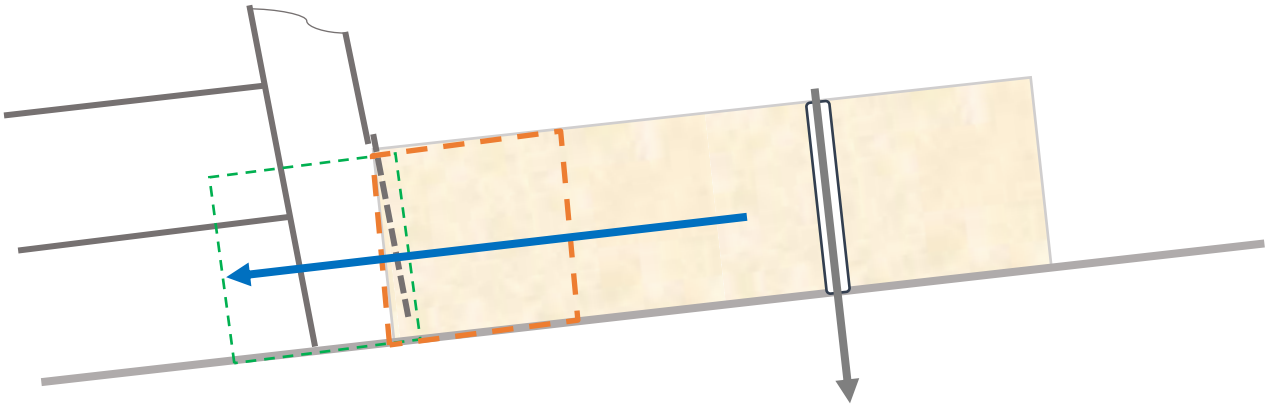


Illustration 137: A "V' block.

5) Remember a little extra was left on the planks. I “evened up” the stern ends of the shear planks, but I did not adjust then to final positioning at the chine ends. There is still “some wiggle room.” More on that when we get to the vertical planking installation.

Illustration 138: Note the centerboard case is dry fitted at this point. No glue!)

A note on finish sanding at the stem:

1) Now that you have the shear planks in place at the stem assembly, keep the sanding to a minimum.

2) With Option #1, I will remove the overrun with a razor saw, but only “close to the stem.”

3) With Option #2, at this point I would sand the plank flush down to the outer stem’s surface. This would be better done after the three planks were in place. If you start sanding down with “**A**”, you change the dimensions of the upper edge, and you must suffer through three adjustments instead of just one. Also, it maintains the full 1/16” edge of the gluing surface.

Illustration 138: It’s your choice.

3.6 The centerboard assembly and bottom planking shoes

Abbreviations:

CB Case – The centerboard case, or sometimes called centerboard housing or trunk.

CB – The centerboard itself.

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **157-160, 265**.

Here are some of the common components of a centerboard case for a flat-bottom sharpie:

1) **Case logs** – the two thick planks at the top of the keelson
2) **Ledges or head blocks** – often referred as the end logs of the case. They are the same width as the C/B opening.
3) **Shoe or rubbing stick** – 2 logs that that run the length of the **CB** case opening and are fastened to the bottom planking, the fasteners anchored through to the case logs.
4) **Battens or stiffeners**:

"The end pieces or ledges or head blocks, are run through the slot to the bottom of the keel; usually the tenon so formed is about half the fore-and-aft width of each ledge timber. This stiffens the case and protects the open grain of the keel at each end of the slot.... Vertical cleats or braces may stiffen the sides; these are screwed to the outside of logs and case sides.... The top of the case can be stiffened by a fore-and-aft seat which can be nailed to the case sides and supported by the top of the case- side cleats. If there is no seat the top can be stiffened with fore-and-aft battens, if necessary."[1]

In summary, the basic components of a modest CB case are:

1) Fore and aft vertical support logs ("ledges" or "head blocks")
2) Centerboard keelson logs (lower case logs)
3) Centerboard trunk side planking
4) The upper-case support logs

Materials: I used basswood for the painted sharpie and pear/maple on the unpainted sharpie. I'll mention the sizes of the material as I write this section up.

[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **157.**

Illustration 140: the fitted support logs

3.6 (1) The basic centerboard housing (trunk) assembly

Step 1: Fore and aft vertical support logs

Note: As I have two sharpies under construction, I am giving you two different centerboard assemblies to choose from. One has an open centerboard cap-top, while the other has a closed centerboard cap-top. The open top-cap is generic to the early 1880's while the closed-cap is generic to late 1880's. The two options differ, not only in the cap itself, but sometimes in the framing of the centerboard housing. For our build, the housing for each cap design will the same basic structure. The will be two designs of the centerboard itself, and the hardware associated with them will differ. Step one will tackle the first three components listed above.

1) Using the "Center Structures" drawing on **BJ2**, place two pieces of 1/4" x 1/8" basswood, leaving a little "overhang," and place a small piece of double-stick tape on the surface of the template to hold the vertical support logs in place (alongside their actual position). Scribe the lines with a pencil and sand each end (disk sander) "to the lines," getting the slight angle of rise into the bottom of the forward support log. Note that the support "tops" are parallel to the station baseline (no rise). (**Illustration 139**).

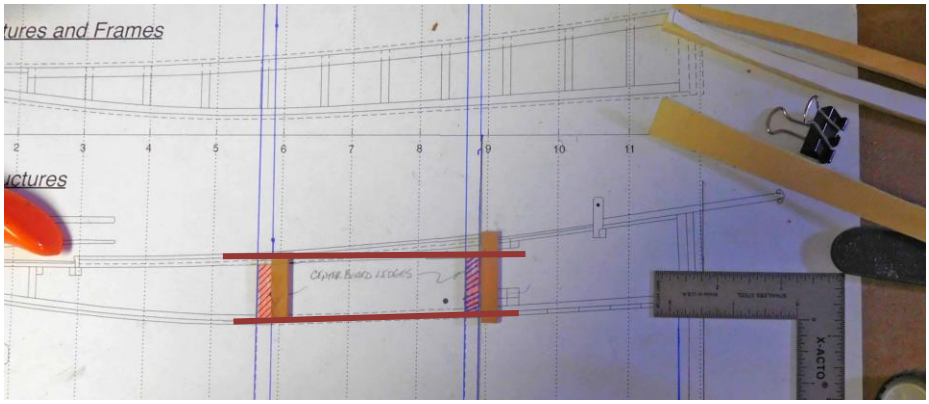


Illustration 139: Using the "Center Structure" template to scribe the end lines on each log, and note the rise of the bottom plank to the stem. It is very slight, but there.

Illustration 140: the fitted support logs

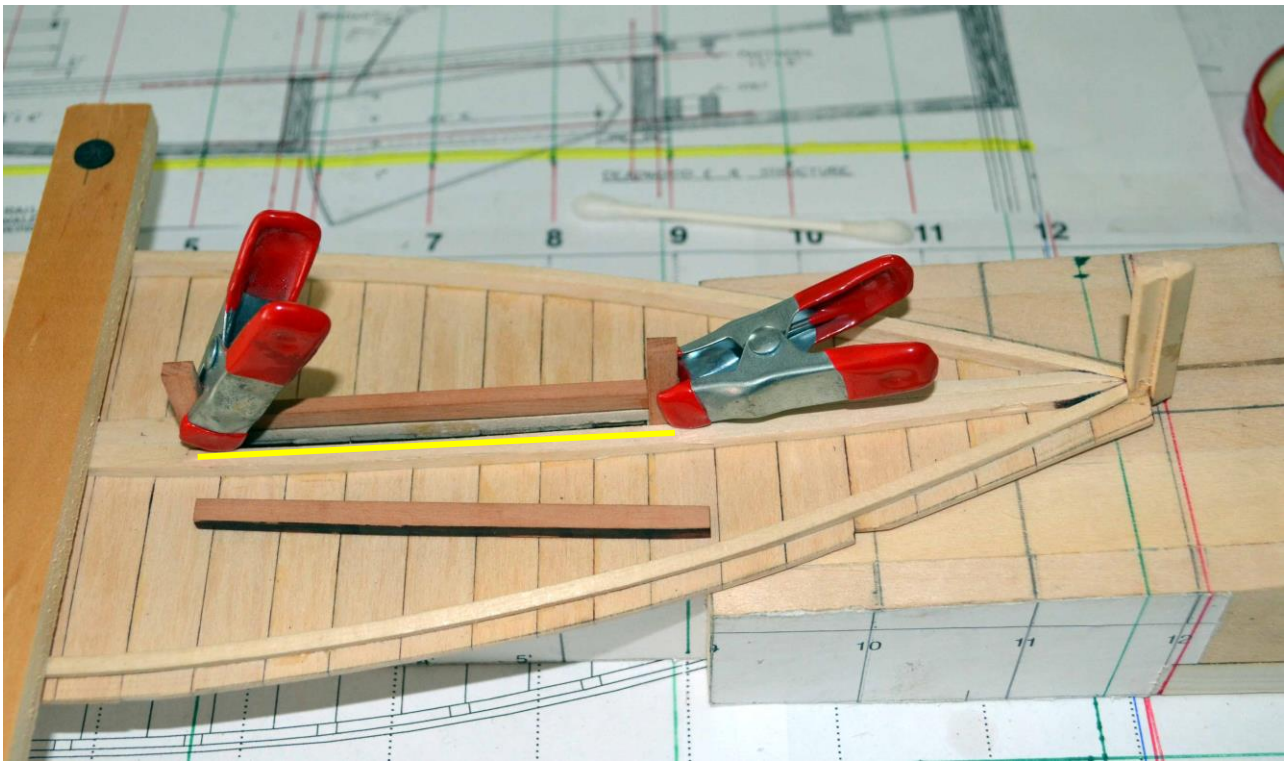


Illustration 141: Sizing the centerboard logs.

1) **Illustration 140:** Set the hull back onto **BJ2**, and weight to hold in position. Test fit each log into the centerboard opening making sure it is resting on the 1/4" exposed surface of the bottom planking. You can see from the drawing; the stem vertical logs rise at 90-degrees from the building board's surface

Materials: 2 basswood/maple "blanks" 1/32" x 1-1/2" x 4"

1) The centerboard planking must duplicate the same bottom sweep as the keelson logs do, so the bottom plank must be a plank seated against the vertical logs and the keelson logs.

2) Position the logs in place, but do not glue them in place. I want to be able to remove the assembly under construction from the keelson at any time. Removal will enable an off the boat work surface that makes the work at hand easier. The **yellow line** (**Illustration: 141**) indicates the position of the lower keelson logs. The length is 3-5/8" and the width is 3/16" wide by 1/8" in height. I recommend that you always take your own measurements to confirm.

3) **FYI:** The centerboard case, in actual practice, was built off the "the boat" and lifted into place when completed.

Step 2: Centerboard keelson logs and the centerboard housing shear plank

1) I never really trust my ruler. So, to be sure your logs are the right length. I cut them about 1/8" longer than your measurement. Clamp, with the vertical logs in place, and scribe the over-hanging ends to fit. Now disk sand or cut them to size to the scribe. **Caution:** Though the bottom sweep of the keelson is "gentle", it is there, so have one finger pushing down at the center of log keeping constant contact with the keelson when actual scribing the end logs. Put the finished logs aside.

2) Take a square piece of 1/8” plywood and trim it to fit the **CB** opening from log to log. Mark the **CL** onto the plywood. Lay the plywood onto a flat surface: I use my cutting mat and tape the plywood square to the surface at 90-grees. Now retrieve your keelson jig press. The surface of the press is already marked (with **red** marker) the end log position. Set the press onto the surface of the plywood and keep the top edge at 90-degrees. Now scribe the sheer line onto the plywood as close to the bottom edge and still maintain the full length of the sheer. Sand the sheer line “to the line.”

3) Check to make sure the hull is properly aligned to the **CB** location on **BJ2**. Take the plywood and plug the **CB** opening. It should sit on the floor of the jig and rise about a 1/4” above the keelson upper surface’

4) The purpose here is to maintain the integrity of the opening during the gluing procedure of the two logs. **Note:** These two logs will be glued in place now. The seating of the rest of the assembly rests upon the shoulders of the end logs. Hence the importance of the plywood “plug” to maintain the exact width of the end logs.

5) Place one log into position then press down with you index finger at the **C/L**, or a small weight strong enough to achieve the same result. With the other hand scribe, the sheer line created at the keelson logs surface onto the plywood **Note:** you may have to shift the weight, finger included, and scribe half a run at a time.

6) Now sand the spacer to the upper sheer line. Your plywood “plug” has created a level surface enabling you to cover the keelson logs with wax paper and hold the sheer to the jig with a more substantial weight while the glue is drying. It will also allow you to place a clamp(s) to the keelson-keelson logs to hold tight contact with plywood spacer as noted in step 3 above.

Illustration 143: Step 2 is done, Note the side planking.

7) If you are using basswood, run a bead of glue on the bottom surface of both logs. Try to minimize the "squeeze out" – not too much, not too little. I make Q-Tips and water handy to wipe away any excess glue from the inside the **CB** opening and union of keelson and keelson logs. After running a wet Q-Tip along the **CB,** I used my "heavy weight" to "press" the logs in place. This will cause the last of the excess glue to "squeeze out." Let the weight stay on for a minute or so, then remove and wipe clean again and carefully insert the spacer into position, clamp the center and the ends and put a weight back in place.

8) With harder woods, a "swim in the water" and a pressing workout with the heavy weight, before gluing, should do the trick. Keep the pressure on until the logs are dry, then finish as the basswood was finished.

9) When the logs have set up, put the vertical support logs back in place. We are ready for the side planking.

Step 3: Centerboard trunk side planking and the centerboard trunk shear plank

1) Trunk side planks will come from the same blank. The upper two planks are a standard 1/32" x 1/4" x 4", the full length of the blank. However, the trunk sheer plank will be formed first. The additional width of the blank makes it easy to scribe the bottom sweep using the keelson press as a ship's curve.

2) I used the grid of my cutting mat to double stick tape the blank, to have the top running with a horizontal grid line. Place your "keelson press" over the blank leaving about 1/16" visible at the bottom of the blank. The flat top of the press needs to run parallel to the top of the blank. Use a pencil to scribe the sheer of the press to create a sheer on the blank. If you can't find your keelson press, the blue tape and ship's curve method will do just fine.

3) **Illustration 128:** The **blue lines and dotter arrow** are representative of the actual 4" length of the blank. This "demo" blank is obviously shorter than 4-inches. It is also short of 1-1/2 inches in height. This increase in width allows the viewing of the top of the blank and the bottom of the blank when the press is aligned for the sheer. You should know now the value of "wiggle room."

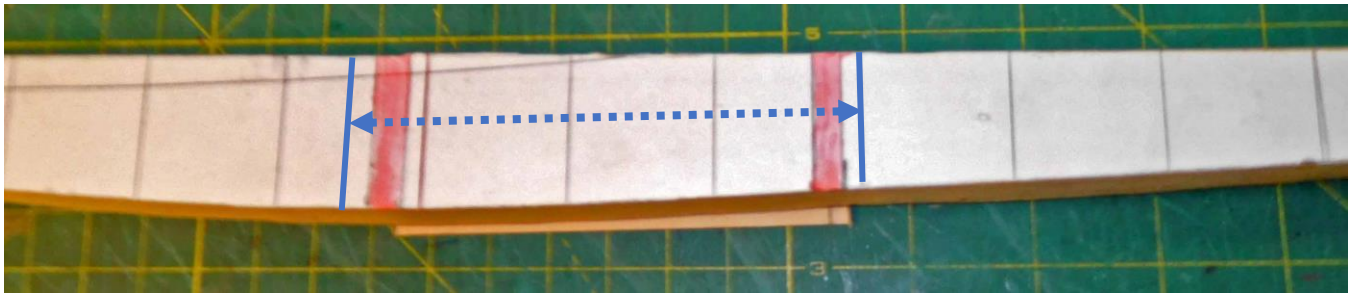


Illustration 144: Creating the **CB** sheer planks.

Note: In an effort not to confuse you, the side planking can be done in two ways. I did it both ways. The first way is to make a blank from two planks at 1/32" x 1/4" x 4" and one plank at 1/32" x 3/8" x 4" of your choice of wood (See **Illustration 146**). This procedure is described on p. **99**. The second method is to use a larger single blank and make the sheer side plank as a single. Then make 2 straight forward 1/4" planks to rise the top of the end logs.

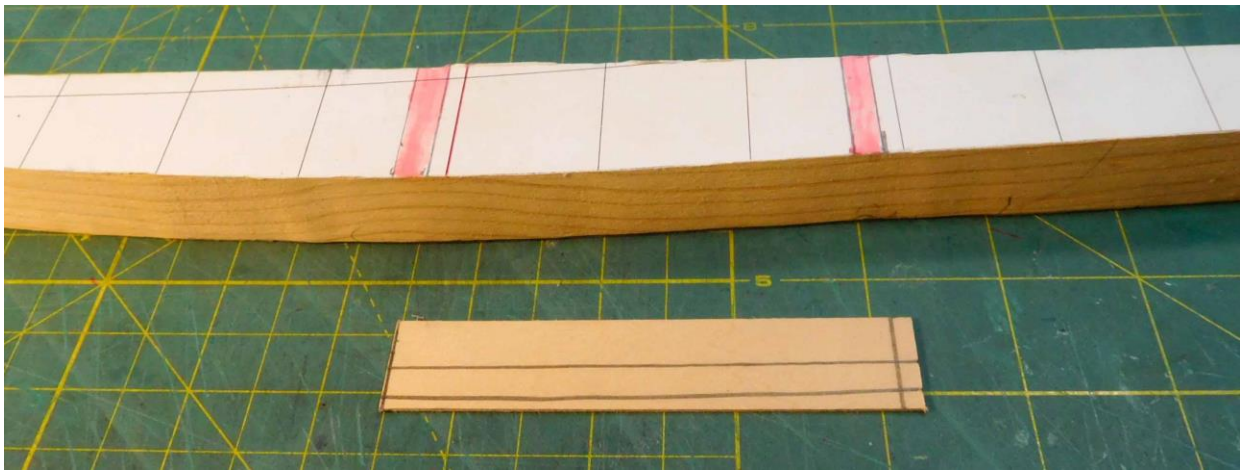


Illustration 145: The lower **CB** sheer plank scribed

4) Pencil in (the **red line**}, to delineate the top of the sheer plank. This is an estimated guess. The easiest way to determine the actual width of the sheer plank will start with the two upper side planks.

5) The 2 upper side planks need to be fashioned first. I used the Preac saw, set the rip fence at 1/4", and from the top edge of the blank, cut off these two side planks. The same separation can also be done with a straight edge and #11 blade, and a steady hand.

Illustration 146: The **CB** housing side planking.

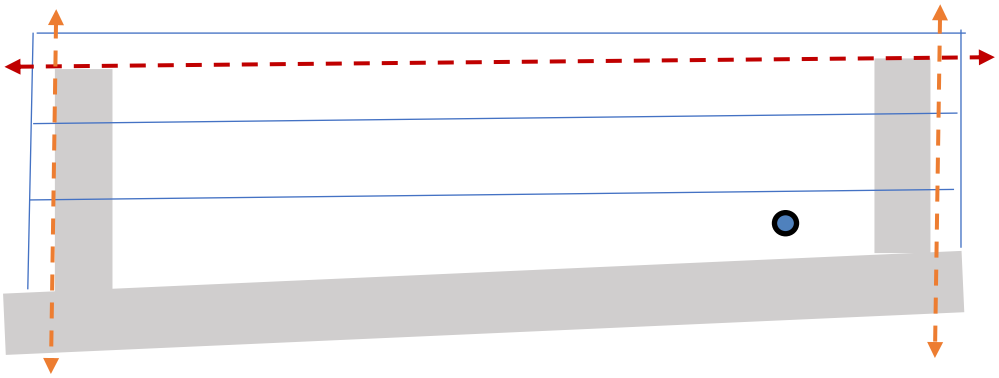


Illustration 147: The **CB** housing scan.

Building up the C/B case side planking "off the boat":

1) Back to the glass surface. Place a run of double stick tape to the glass, cover with wax paper, and finish with a top run of double stick tape. Now, run a taped straight edge in place on the wax paper. This will guarantee the horizontal top edge of the assembly. Run a second straight edge vertically, to guarantee a 90-degree "stop."

2) Start by "caulking" one edge of each plank. Take the top plank and lay it in place on the "jig" we just made. With the second plank, run a bead of glue along the top edges and set it in place tightly against the lower edge of the upper plank and, likewise, the sheer clamp's upper edge gets glue and sets in place onto the bottom edge of the second plank.

3) With my jig held square and vertical, let the glue start to set up. Any "squeeze" should be removed. If basswood, a wet Q-tip, swabbed down the two joint lines should do the trick. If a hardwood, you can let the squeeze dry and then scrap it off with single edged razor blade. The inside surfaces should be OK, for they were pressed against the wax paper, but it would not hurt to scrape the area at the ends which will be glued to the end logs.

4) Repeat this process for the other side centerboard planking. **Note:** You can use the same set up again, and when done, "flip" the assembly over, or you can move the vertical "stop" to the other end. Additionally, if you use the fashioned sheer log as a template for the opposite side, the two sides, when assembled, should be identical.

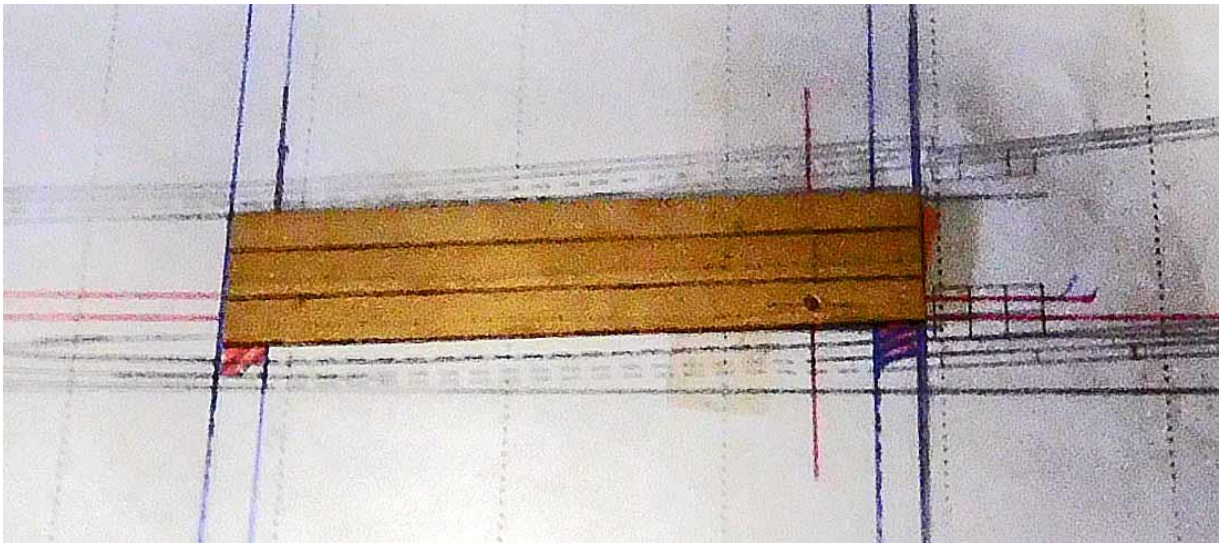


Illustration 148: The **CB** with pivot hole drilled.

5) Though not the best of pictures, this is one finished **CB** side planking assembly. Note the reference lines scribed onto the plan and how easy it is to transfer them to them to the actual assembly. Either way you go on the side planking, mark the **C/L** onto the blank, or the individual sheer plank and sand in the sheer. I used my disk sander.

6) Center starboard assembly to the centerboard log and clamp to the vertical logs. The overhang at each end should match. With a pencil, scribe the end rise of each vertical log to the inner surface of the assembly. Make sure that the vertical logs are “straight up vertical,” as they are not glued in position, clamping if necessary. I started starboard then repeated the process on the port.

7) I used my disk sander, to take down the overhang to the line of actual size on each assembly end.

8) Because we took the time to accurately size the sheer planks, your top edge should be “right there.” If for some reason, it goes a little beyond the top edge of the assembly, leave it, for now.

9) If you went with the single sheer plank and use larger piece of stock, shape the sheer into the lower edge of the sheet first. Place the whole sheet in place and centered and transfer all the lines to the full sheet. As you are marking from the plan in front of you, transfer the top edge of the sheer to the plank.

10) I then used my Preac saw and set the blank with the top edge to the rip fence, and adjusted the fence to cut to the line you have just drawn. Now set the rip fence to 1/4” and cut the remaining two planks. Since you lined the entire sheet, your finishing end lines can be easily sanded. Don’t forget the caulk one end of each plank.

11) Your next step, if you haven’t already done, is to mark the hole location of the pivot bolt. If you glued all three planks on the flat surface, face them back to back with some double stick tape. Mark the location and drill with a 1/16” bit. As a precaution, I use a small piece of blue tap on the bottom of the assembly to be drilled, to assure a clean pass through.

12) If you’re going one plank and a time, locate the hole, then glue the port side sheer plank to the assembly.

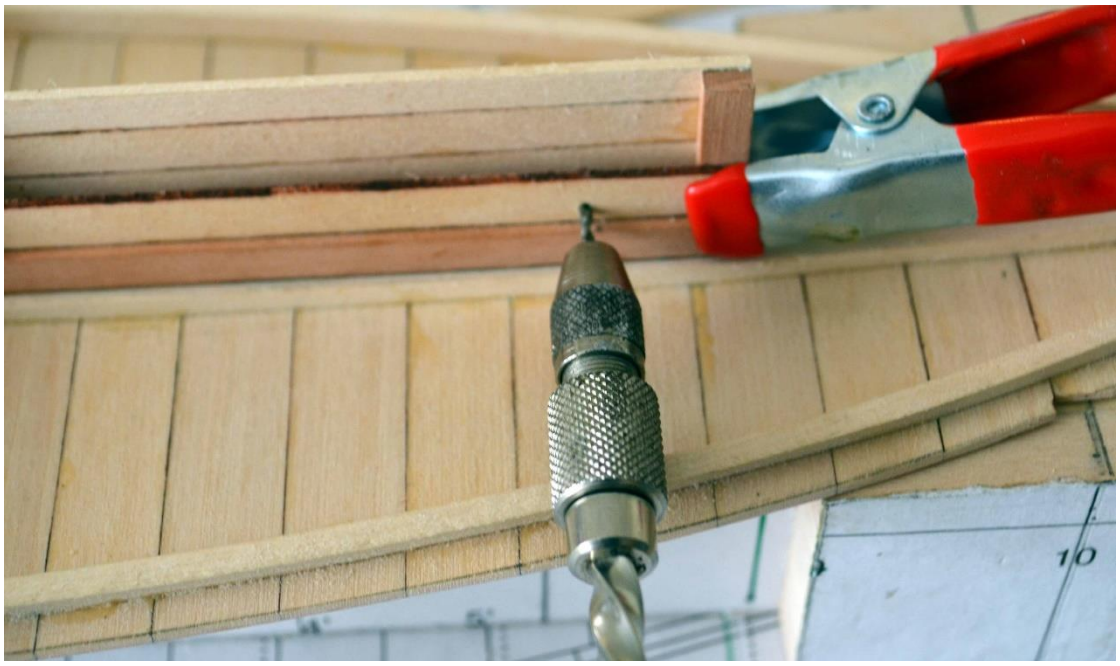


Illustration 149: The drilling process at sheer plank so you can see placement.

13) I then drill the pilot hole, but not all the way.

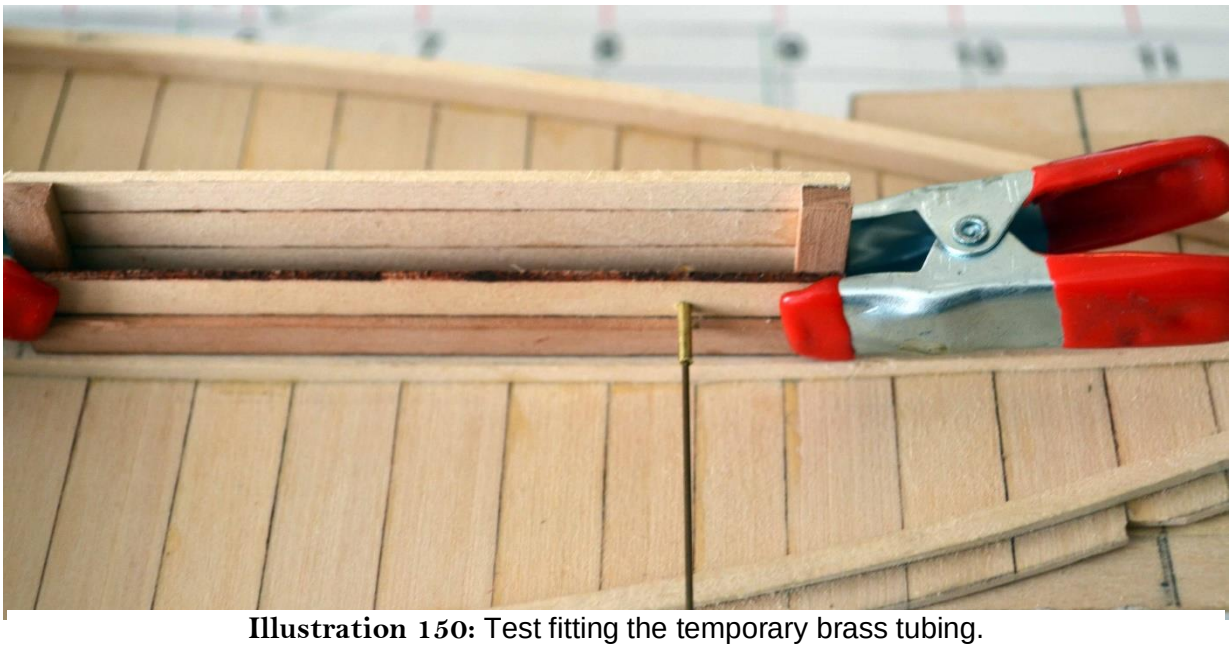


Illustration 150: Test fitting the temporary brass tubing.

14) I then used a 1/16" x 3/4" piece of brass tubing to act as pivot bolt. I use a telescoping brass rod with a filed "pin point", set the "bolt" into the single sheer plank and ran it the center of the opening. I then pushed the rod point to "tic" the port side sheer plank.

15) Finish the installation of the two remaining planks.

Note: To glue in place, glue only the surfaces of the vertical logs, and a bead of glue along the sheer plank bottom edge. Do not try to glue up 2 at a time. Do one side at time. Once the first assembly is glued in place, clamp it. Wait a few seconds, the remove the clamp, and cleanup the squeeze, interior and exterior. Repeat, for the other assembly. Here you will have to use a Q-tip, to reach the interior**. ALSO:** A scrap piece of 1/8" plywood, inserted into the opening, will help keep the top opening at 1/8".

Illustration 151: Ready for the cap of your choice.

6) Should you need to take down the upper side plank to the level of the vertical end logs top surface, use a sanding block to finish the seat of the upper-case logs (painted sharpie) or the closed cap top (unpainted sharpie).

7) **NOTE:** Place the brass tubing into the pilot hole at the second assembly glue up. If you are using the plywood spacer, don't block the pathway through the pivot hole to keep any glue for preventing the removal of the brass tubing later. It will be replaced by a 00-80 hex head brass screw, 2 washers, and nut.

Illustration 152: The centerboard housing for either cap.

FYI: I suggest you read the build descriptions of the open-cap and closed-cap before choosing which one suits you.

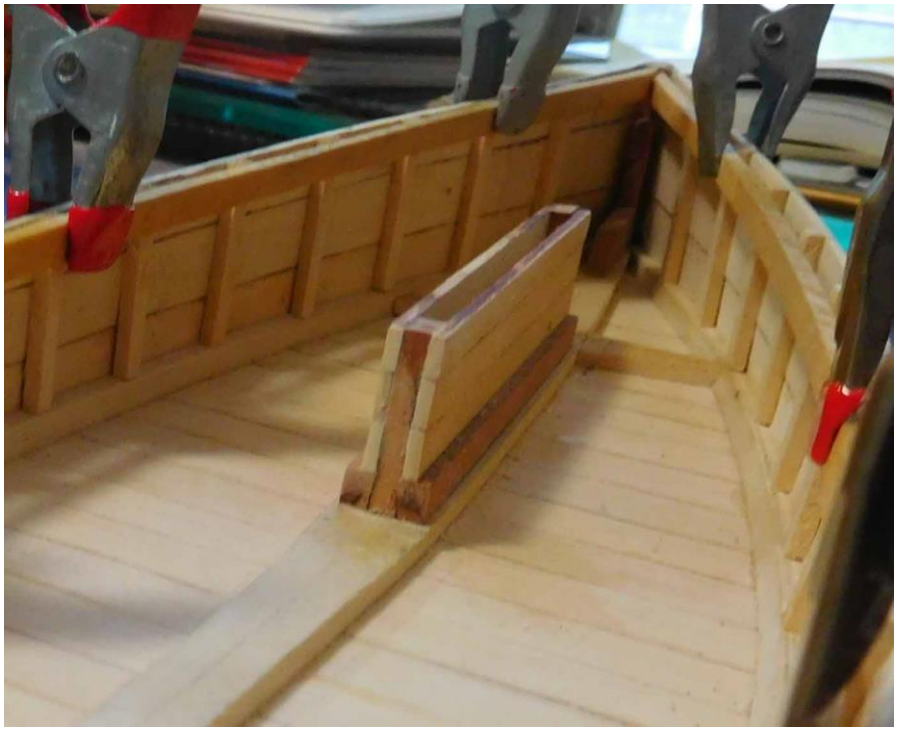


Illustration 153: It is still dry fit.

3.6 (2) The open-cap construction (the painted sharpie)

Step 4: The upper-case support logs for an open-top cap:

2) The upper-case support logs **(Illustration154)** and the fore and aft end logs **(Illustration155)** are from 1/16" x 3/16" basswood as are the end logs. The side logs run the length of the trunk and are flush with the top of the side planking. The end logs cover the end grain of the upper side support logs.

3) I set some 1/8" plywood into the open center as a spacer to guard against compression of the side planking while gluing and clamping the logs in place.

4) Use the same process you used on the lower-case logs to install.

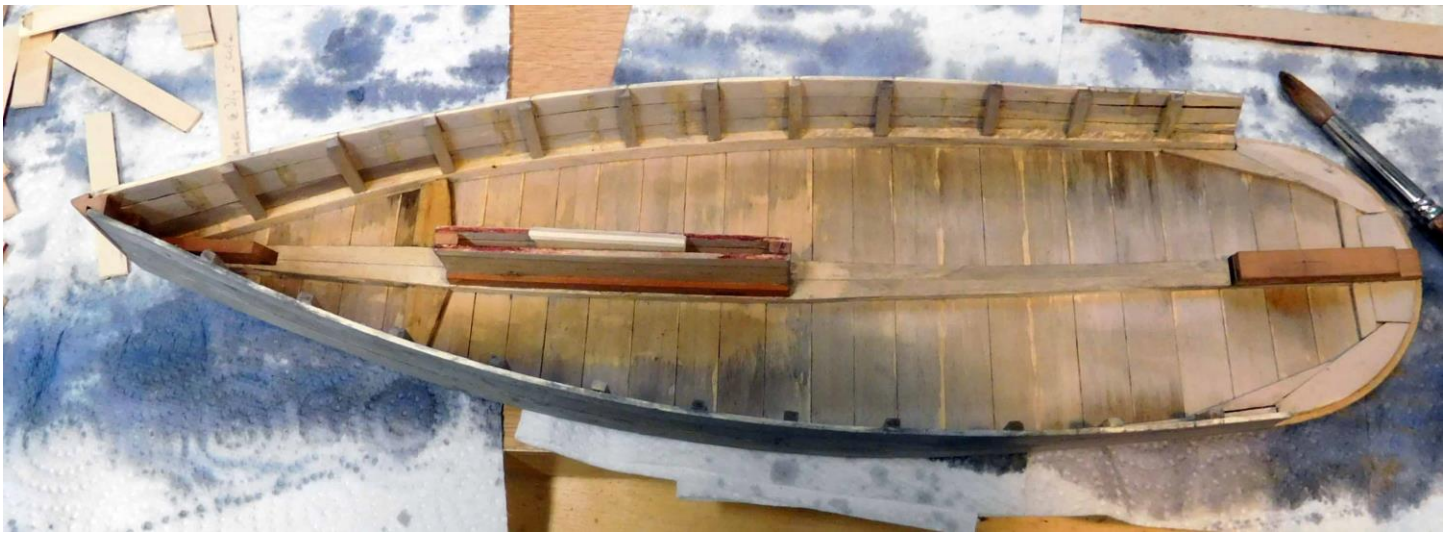


Illustration 154: Note the spacer plywood. Like the primer paint job so far?

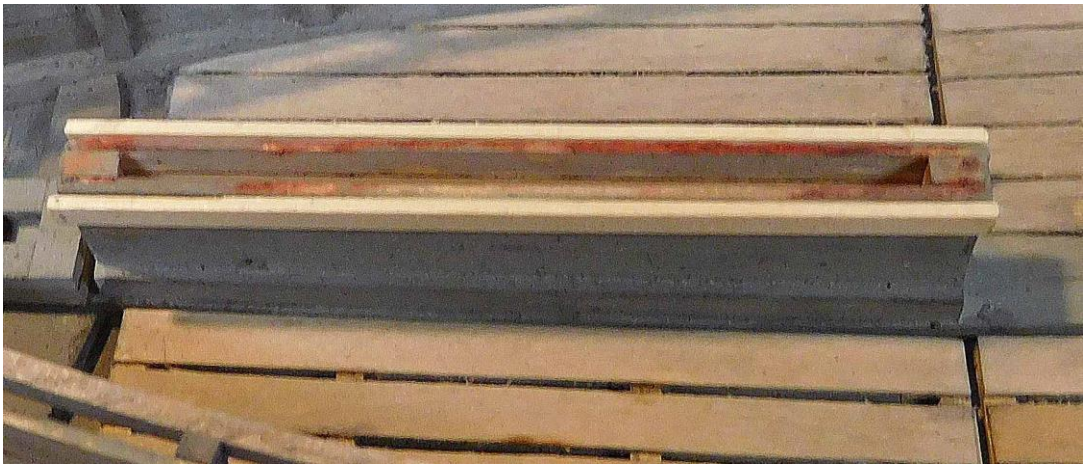


Illustration 154A: Monet painted this view for me.

FYI -Terminology: I have found, in the researching, that some components have aliases. For instance, the end ledges can also be called “head blocks,” support logs et al, and upper-case logs referred to as “fore and aft battens or stiffeners”.

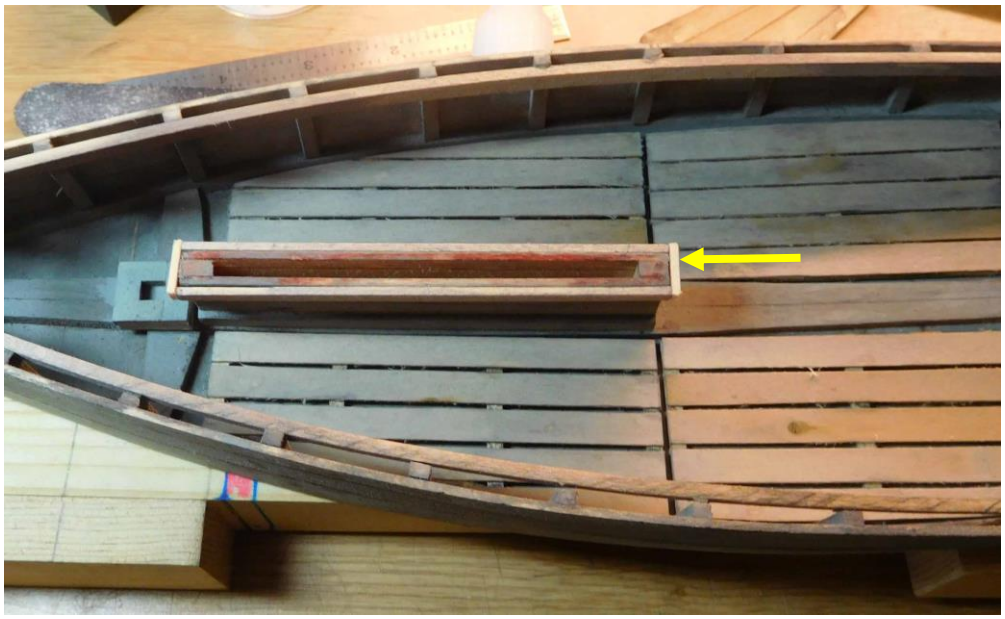


Illustration 155: The open CB housing completed.

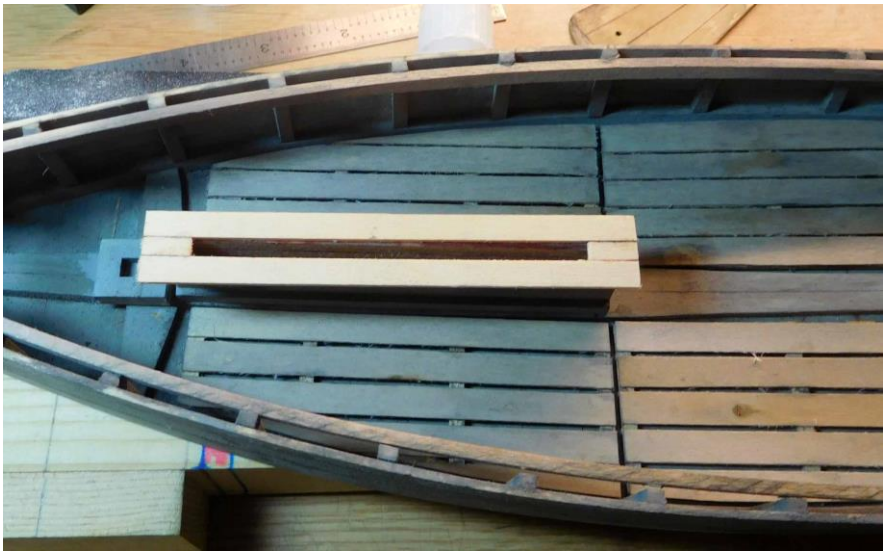
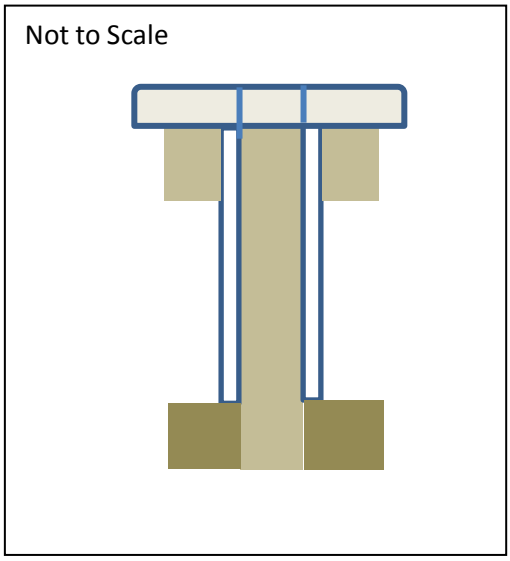


Illustration 156: The open case cap-logs installed.

The open-top cap logs:



1) Follow the directions of the upper side support installation.

2) The caps are 1/16"x1/4" with the "spacer" caps, at the end logs, being 1/16"x1/8"

3) Use the plywood spacer.

4) When the glue dries use some sandpaper to "round" (take the edge off) the cap logs, especially at the 4 corners.

Illustration 157: The open CB housing completed.

NOTE: You are beginning to see that first sharpie prototype is 'aging". You are not seeing things. I will discuss the weathering process I used at the end of Phase 4. If you are wanting to weather your build you can fast forward to Phase 4, section 4.9 and read it now.

3.6 (3) The open-cap centerboard construction

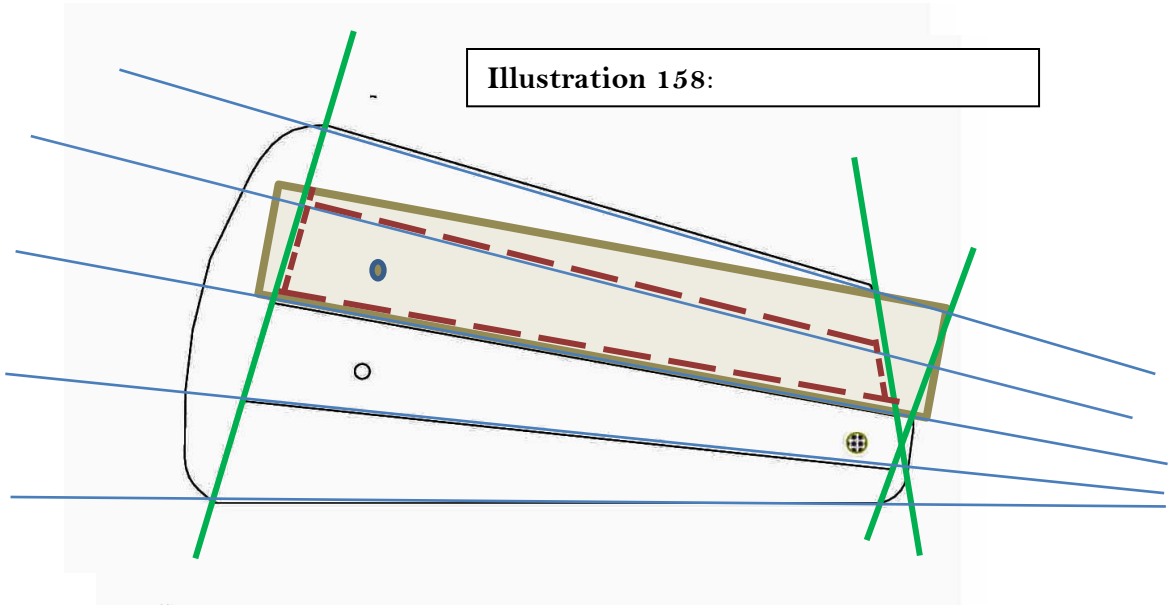
Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **153-156**.

The characteristics of a CB:

1) The **CB** is usually rectangular.
2) In this period, timber planks were "edge-bolted together".
3) At the lower forward corner, a pivot hole is bored, for a pivot bolt, which will allow the **CB** to swing into position for lowering and retracting through the **CB case.**
4) At the aft corner of the **CB**, a rectangular hole is cut to receive lead ballast, if ballast is required.
5) The inner edges of the hole are V-grooved to secure the lead weight, when the lead is poured into the **CB** and left **to** cool.

   "The lanyard is secured to the board by an eyebolt, or screw-eye, when the board is small and light. When the board is heavy, two straps, one on either side of the board, and through-fastened, are required. The straps may be made of flat-bar, galvanized wrought iron, or bronze... The straps should be let into the sides of the board so that they are nearly flush. The length of the straps should be sufficient to permit the lower through-fastening to pass through the plank next below the top one of the board at least. The top of the straps should stand high enough above the board to give room for a bolt and shackle, or bolt and splice." [1]



[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **153-154**.

Materials:

4 center Basswood planks: 1/16” x 1/2” x 3”
1 aft Basswood plank: 1/16” x 1/2" x 2”
2 fore Basswood planks: 1/16” x 1/8” x and 1” 1/16” x 1/8” x 1/2”

1) Tape the centerboard template to a flat surface. With a straight edge, extend all the individual planking outlines, as shown in **Illustration 158:**

2) Prepare the basswood plank to the sizes listed above.

3) I then laid 2 strips of double stick tape on the surface of the template to hold the ends of each plank, in position, to transfer the lines to the plank’s surface.

4) Start with the top plank, positioning the bottom edge of the plank against the top edge of the plank below. With a straight edge, use the extended lines appropriate to each plank and scribe the outline on the surface of the plank. Remove the plank, and position the next plank, etc.

5) I used my 5” disk sander going “to the line” to shape each plank. I added “caulking” to the inner edges.

6) To glue up planks, I first cut an overlay of wax paper. The 2 strips of tape on the template should have enough “oomph” to hold the paper in place. If not replace the tape.

7) Set the top plank in place. Take the 2nd plank and run a bead of glue across the upper edge and set it in place, making sure the alignment is “right on.” Repeat for plank #3 and #4.

8) You will have some “squeeze out” to clean-up on the top surface, but the wax paper should cut, to a minimum, the underside squeeze. I used a wet Q-tip; wiping with a paper towel might loosen Elmer’s bond. After clean-up, I covered the assembly with another piece of wax paper, and used my heavy weight to press flat.

9) When the glue sets on the center assembly, remove the top piece of wax paper, caulk the inner edge of the aft plank, and set it in place against the aft ends of center planks.

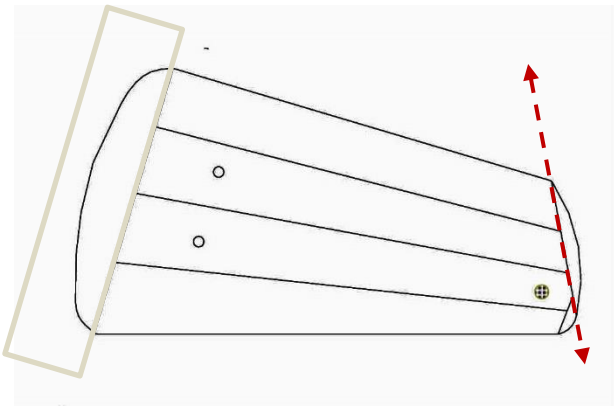


Illustration 159:

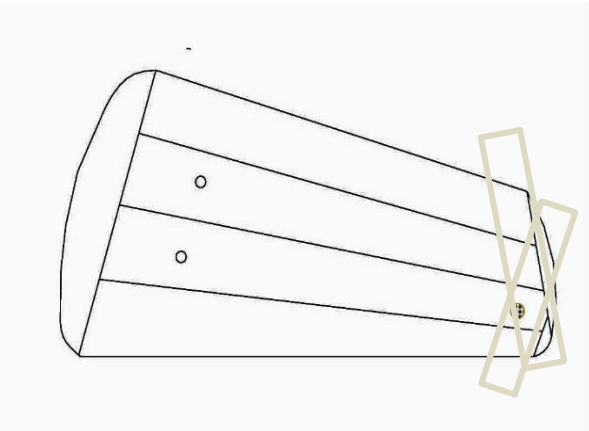


Illustration 160:

10) Do the same with the two planks at the forward edges. You can get a perfect fit if you use the red line to transfer the angle of cut onto the surface of the smaller plank.

11) Freeing the centerboard from the wax paper, is easier, when you lift the whole assembly by the paper. You can then turn it over and peel the paper and any tape left in contact with the assembly.

12) When your centerboard assembly looks like **Illustration 156**, carefully cut out the assembly template with a small pair of scissors, cuting "to the line". I then spray glue the template to surface, and using my disk sander, I sanded the centerboard to shape.

13) I scraped both surfaces with a single edged razor blade to get a clean surface. Then, I used a strip of sandpaper to put a rounded edge all around. If you place the centerboard in a small vice, you can take a 1/4" sanding strip and "shoe shine" the edges quickly and evenly.

14) Finally, the pivot hole and the "stop" holes to secure the centerboard are drilled. To prevent "tear-off," make sure to back the underside tight against another piece of wood.

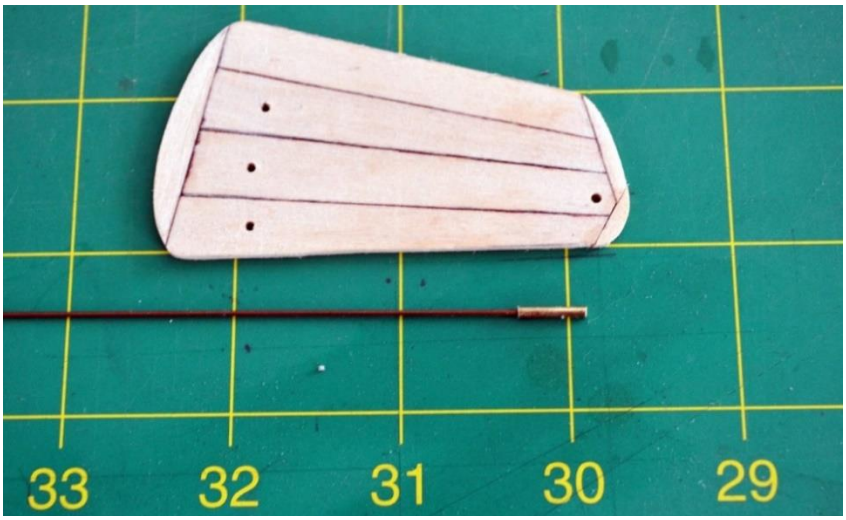


Illustration 161:

Hardware:

1) An eye bolt (not shown), a small strip of brass tape, a small strip of aluminum foil (the lead weight), nut-bolt-washers to form the pivot bolt, a cleat, a stop rod, and a lanyard.

2) **Illustration 139: Note:** I have used brass foil tape to create the straps. Small pieces of aluminum foil are used to simulate the lead weight. You could use a very thin strip of brass, or you could notch the location hand fill a 1/16" piece of wood, painted a "galvanized or bronze" color.

Illustration 162:

3) At this point, I set the assembly aside. When the shear clamps have been installed, we will complete the installation of **CB** in conjunction with the seating of the thwarts.

4) Since the eyebolt to the lanyard that raises and lowers the CB has no cap to contend with, locate in front of stop holes.

5) The lanyard will be done after the final seating of the finished assembly.

The closed-cap centerboard trunk construction:

Research Locator: I give two quotation passages from this section of Chapelle's listing below. The reason is their importance is your understanding of why I chose the period of 1880 to 1889. I recommend the reading of the all the locator reference, but those that don't have the book, I don't think Mr. Chapelle would mind my giving this information to you.

Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, pp. **100-133.**

"In the early sharpies, it is apparent that **the centerboard** was deeper and somewhat shorter than in later boats. The 1879 sharpie shows the old style with the board coming above the case-top. This was eventually discontinued, as it was in the way of the rather low-cut foresail, and with the open center board cap, was easily jammed by shells, being accidentally thrown into it, when culling oysters."[2]

In the late 1880's "**the centerboard** had become very long and rather shallow, as had the case, which was now topped with a cap. Both lanyards and lifting handles were in use; the pivot bolt was an oak pin. The board was sometimes weighted with lead but usually depended upon the weight of its edge-bolting and water-soaked oak to sink when lowered. When the lifting handle was used, the board need not be counterweighted, as the lifting handle was shoved under a special cleat that held the handle down when the board was lowered."[3]

NOTE: In my build, the weathered sharpie's **C/B** represents the early sharpie as described by Chapelle above.

In my build, of the unpainted sharpie's **CB** represents the late years as described above.

The difference is in the **CB case** cap or no cap.

The open-cap or the closed-cap, that I describe next, are using the generic housing

Illustration 163: Your generic housing ready for a closed-cap installation. It is not glued in place!

[2] Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, pp. **110.**

[3] Ibid, p, **114.**

The closed-cap centerboard construction:

The closed-cap center board is rectangular, and when lowered or raised, it is by a lifting handle. The goal here is to mount the lifting handle to the cap surface so that when in use it slides easily through the cap hole. The "V" formed actual handle shape will prevent the loss or damage to the centerboard, should someone lose their grip, as the size of the "V" will jamb to a halt at the hole opening. It is held into position one the cap by a wood 2-piece cleat.

On the other side the **CB** attachment to the eyelet on the handle, will be placed on the eyelet will extend up through the cap hole unhindered when the **CB** is raised.

The pivot hole location is determined to allow adequate clearance room to the end logs of the housing.

The Procedure:

1) The cap log with a center hold is fashioned first.

2) The **CB** is constructed.

3) The lifting handle and stop cleat are next.

4) The **CB** hardware is fashioned (all but the eyelet and straps).

5) Dry fit the **CB** with a pivot bolt (which is brass tube already in your basic housing) to test a smooth passage up and down.

6) Then with **CB** still mounted, raise it to the cap hole and mark the exact location required of the eyebolt connection with the handle.

7) Remove the **CB** and attach the straps and the set the eyebolt in the same manner as with the other **CB**.

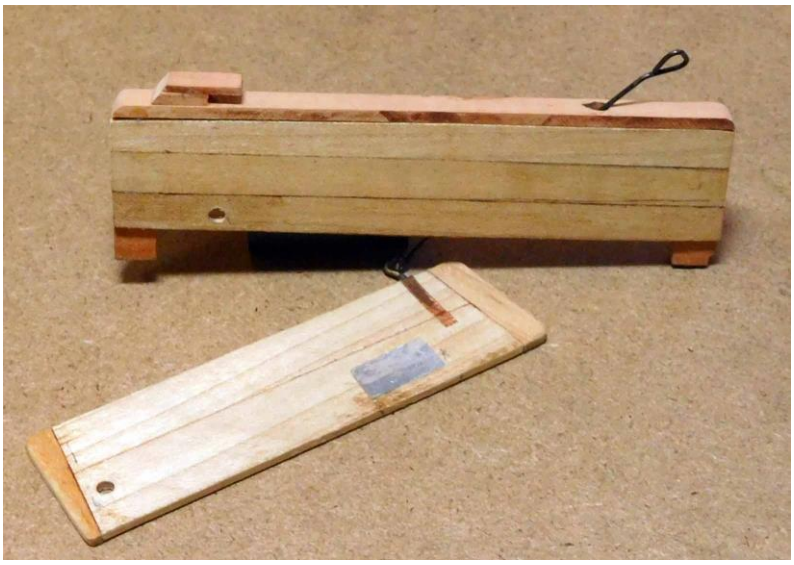


Illustration 164: The complete off the boat assembly.

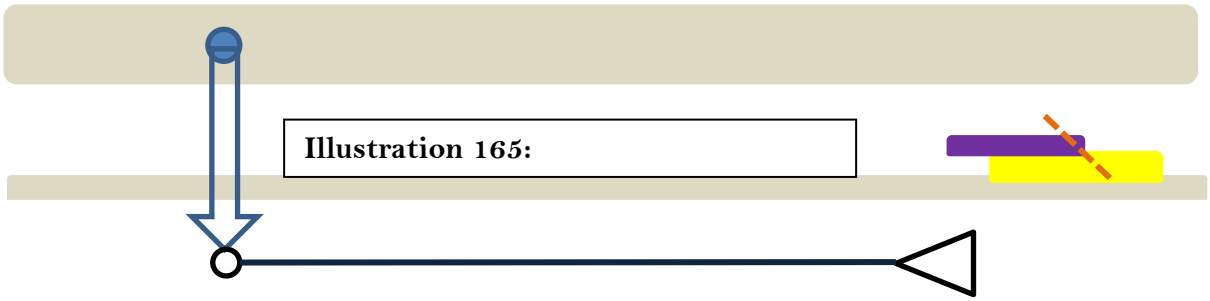
The closed-cap centerboard construction:

Component and Materials for the cap: 1/16” x 1/2” x 6’ cherry and 1/32” x 1/2" x 1” to be trimmed to a cap and special cleat.

Your basic **CB** trunk construction (above) is ready to fashion the closed cap in place, build the centerboard and install, all off the boat. The reason: As stated above -glue in place too early in the construction and there will no way you can seat the thwarts in place. (I know from experience.)

1) Below, this not to scale drawing shows the cap, with lifting hole, the stop cleat, and the lifting handle relationship.

The lifting handle:



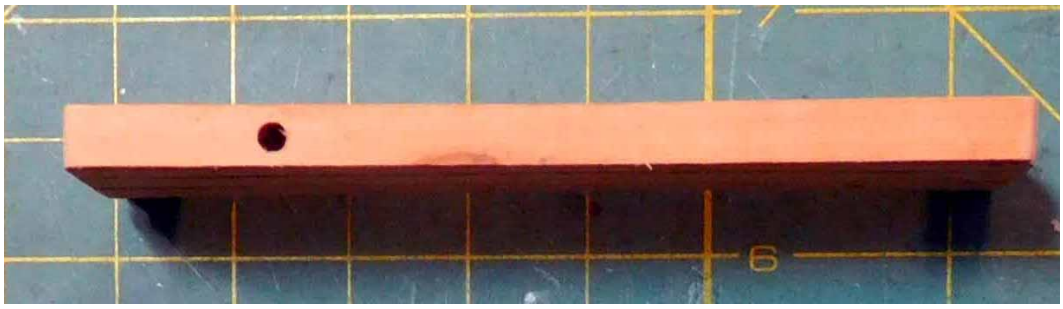


Illustration 166: The cap dry fit in place.

2) Lay your 6” wood strip on top of the **CB** assembly sliding one edge up against an end log. Hold in place, while you the other end log and scribe the length needed to set the cap in place, when cutting the overhand from the wood strip set it aside for use on the cleat.

3) Locate and mark the lifting hole from your plans. At that location, find the **C/L** of the cap, and use awl to scribe a “starter punch” to keep your drill bill center when the hole is drilled. The drill bit I used was 1/8.”

4) I chose to wait on the stop cleat to after the **CB** itself is fashioned, so test fit and set aside.

Materials and Hardware for the closed-cap C/B:

6) Two side planks, two end planks, and eye bolt, a small strip of brass tape (straps), a small strip of aluminum foil (the lead weight), the nut-bolt-washers to form the pivot bolt, and the lifting handle.

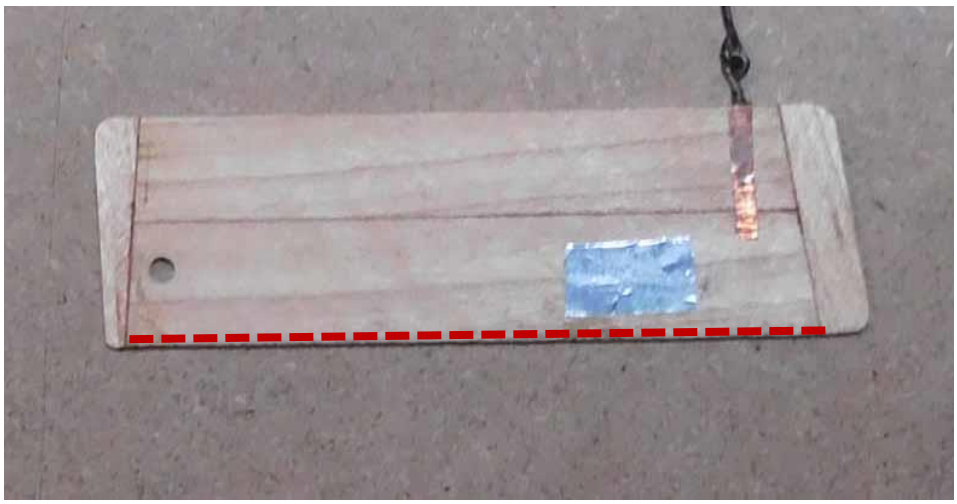


Illustration 167: Your

1) The procedure used to shape the **CB**, is the same used for the open-cap **CB (**pp. **106-108).**
2) The side planks are made from 1/16” x 1/2” stock.

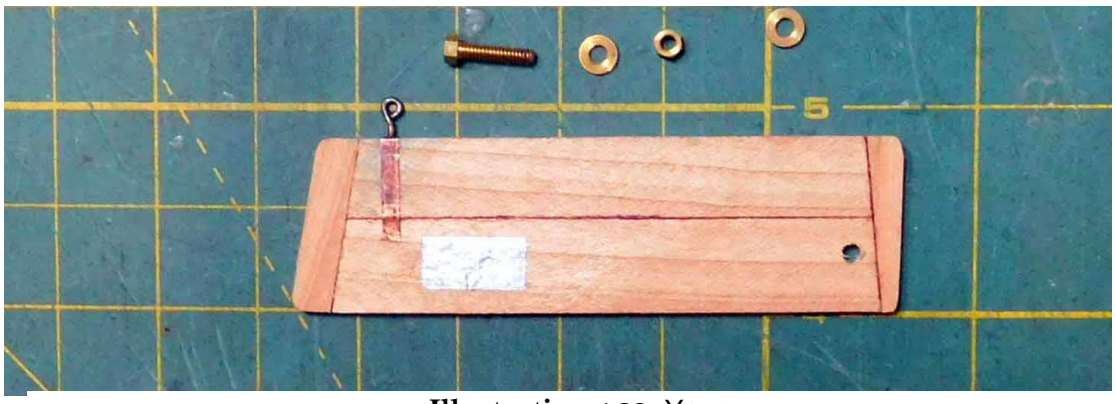


Illustration 168: Your

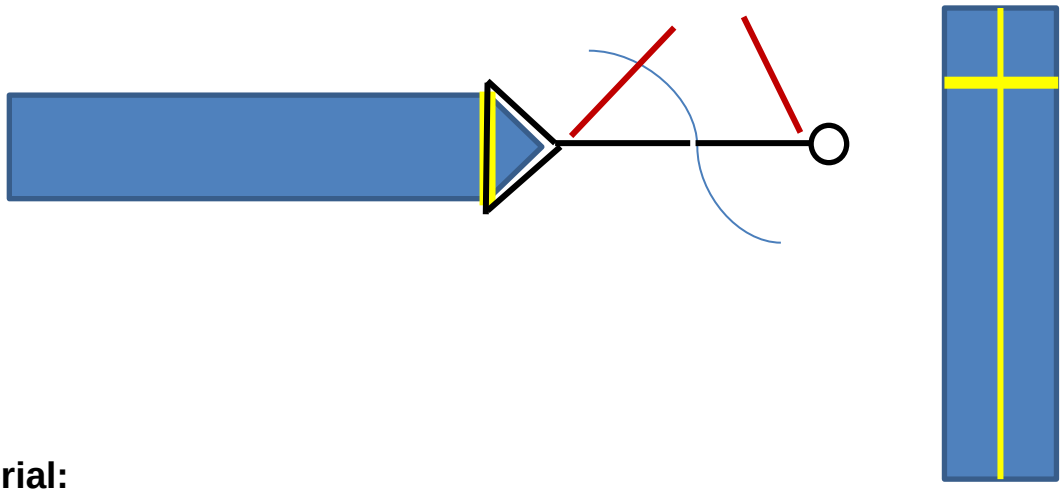
3) **Illustration 163:** Here are your pivot bolt, straps, weight, and eyelet.

Construction of the lifting handle:

Research:

With an iron rod in place of a lanyard: this is split and welded to form an eye for the bolt in the straps at the top of the board. The rod may be joined by use of any eye-in-an-eye, if necessary. In some small-craft the board is not ballasted, so the rod is not only used to raise the board but is also used to force the board down. Some arrangement is made to hook or lock the handle of the rod when the board is down. One very common way of doing this is to form the handle of the rod in a narrow V shape that will jam in the case but which will be knocked loose and out if the board touches the bottom."[4]

Illustration 169: The iron rod handle jig.



Material:

A piece of annealed .032" brass rod 5" to 6" wide.

A piece of 1/4" x 1-1/2" x 3" wide hard wood

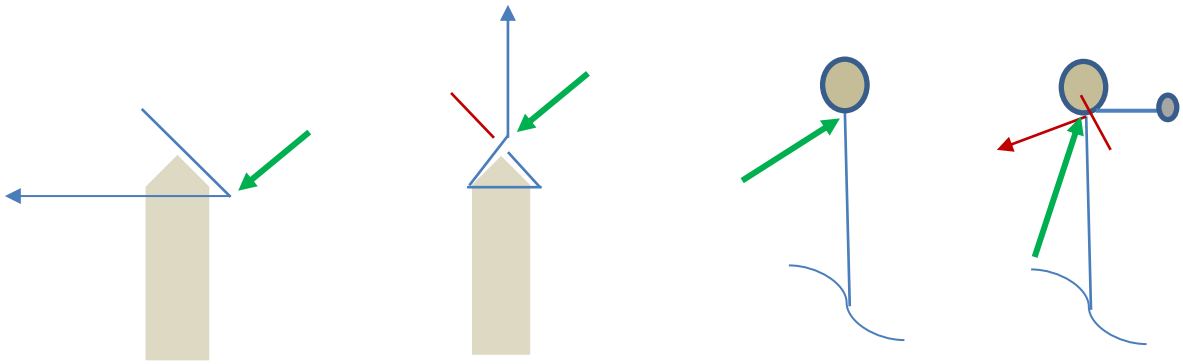
A small vice

1) Remember how you shaped an inner and outer stem? Good: because you going to make one more in the same manner, at the same size, using the piece of hardwood stock. Before bending, the brass rod will need to be annealed.

2) Once the edge of the blank is set into the wood, draw a line connecting the "bottom" surface of the pyramid. A notch needs to be inserted to a depth of 1/4", the slot being only wide enough to seat the brass rod. I used a Zona saw.

3) Seat the hard wood into the vice and tightly clamp. Here is the series of steps I did:

[4] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **154.**



The iron handle sequence **Illustration 170:** The eyelet sequence

The eyelet formation:

4) The **blue lines** are the brass rod. The **red lines** the overhang to be cut off. The **green arrows** are the location of each bend.

5) Since the hardest bend is the eye that will connect the lifting handle to the center board. The eye must be small enough to fit through the hole in the closed-cap. I took an appropriate sized finishing nail and hammered it on small piece of 3/4" pine. I then took the vice and set the wire vertical, at a depth of 1/4".

6) Now I took a 0.032-drill bit and drilled a hole about an 1/8" from the nail and set the "ell" into the hole. Put some pressure over the hole (a small piece of scrap wood will do) and grab lithe free end of the wire with a pair of pliers, squeeze tightly, a pull the wire around the nail, as tight as you can. Remove the nail, and test fit the passage way through the hole. If it is too large, take a smaller brad, reset the wire, pull tight, or, you could make the cap hole larger.

7) I the cut at the cross-over to complete the eye. I used a Xuron Corp cutting tool. I have also found a pair of cuticle cutting trimmers does a nice job.

The iron handle formation:

1) Lay the eyelet over the cap hole and down the center line to a point about 1/2" from the forward end of the cap (the **black line**). Note the first bend location (the **blue line**). Mark this location (a pair of pliers, a piece of tape, anything that you can see when you pick it up and take to the jig.

Illustration 171: Look back at **Illustration 165** (p. 111)

2) The iron handle and the eyelet on the same plane. Make sure your bend keeps it that way. I used a sharpie marker to record the blue line position. I placed the eyelet end into the vice vertically. I set the wire with the sharpie marker just visible and lined up with the side ends of the jaws. I made sure it was parallel to the top surface of the jaws. Then, by eyeball, I carefully set the first bend in place.

3) Now set the wire into the jig and side it into position for the next bend. Making sure to keep the same plane, firmly press to wire to the jig on the first bend side, then let the third bend be formed by the jig. Remove the handle and finish as you did your eyelet. If you desire to strengthen the handle, reheat it and let it cool on its own.

4) Finish the hardware assembly as described previously.

The final connection:

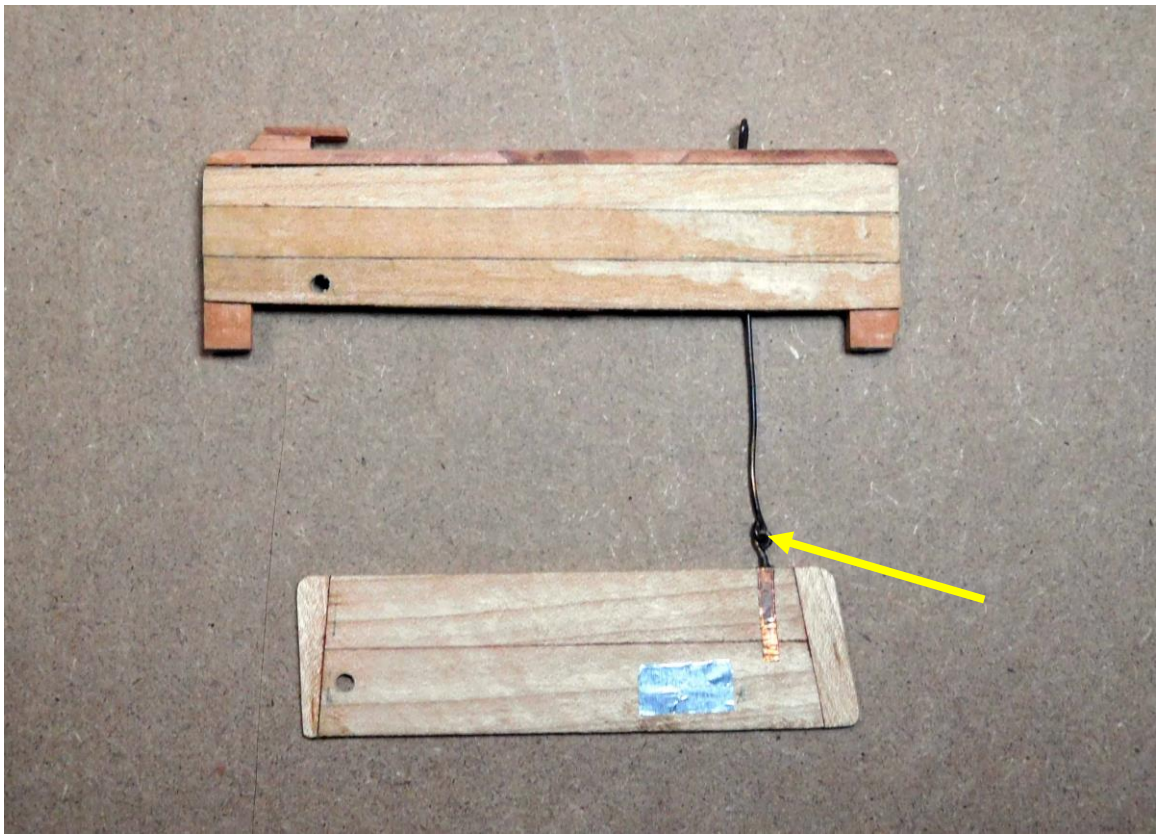


Illustration 172:

1) When you drill your hole for the for the **CB** to receive the eyebolt, open the eye bolt slightly to accept the iron handle. Lay the housing with the eyebolt on a flat surface. Attach the eye bolt and close the eye. Now putt the **CB** into place and install the pivot bolt.

Illustration 173: Ready for installation

2) You will probably notice that my original iron handle looks bent and out of shape. It is a result of the constant handling and not being reheated after the brass wire came out of the jig. Remember: ABU!

Anneal – Bend -Un-anneal!

The finished prototype will have a new iron handle. I can do that and re-install because it was built off the boat.

3.7 The remaining side planking B and C

Research Locator:

Chapelle, Howard I.**, Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **231-235**.

"This is the art of scribing which must be mastered by every boat builder.... When one…. plank is in place; its opposite is then fitted and secured."[1]

Materials:

The upper side planking "B" and "C".
The outer stem piece, if not already in place.
A "third arm".

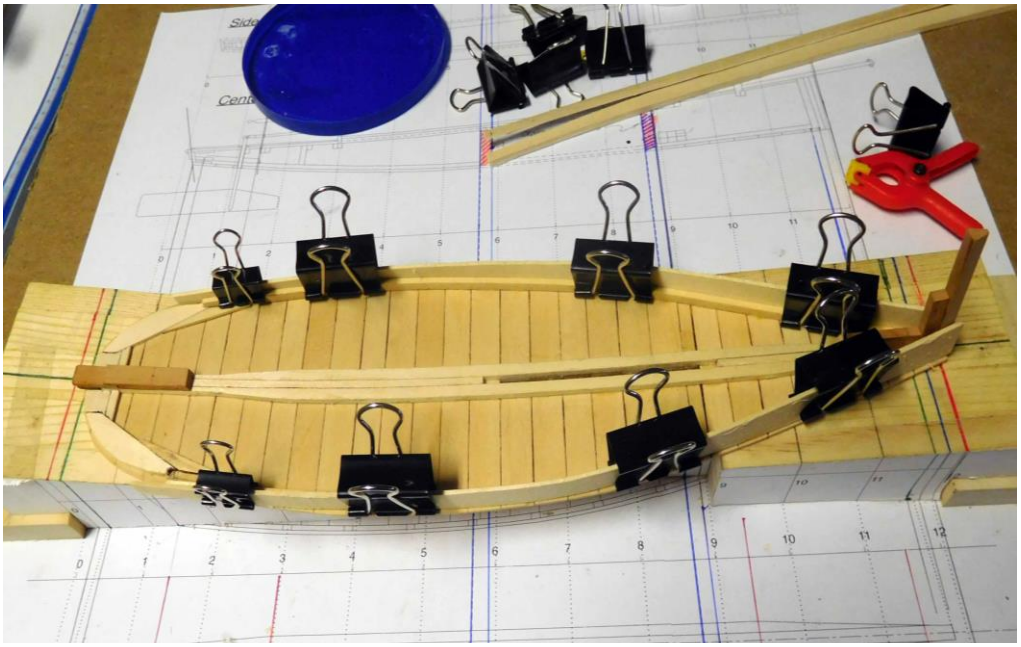


Illustration 174: Where we left off (Option #1).

1) Keep in mind that when making the **B** and **C** planks we left an overrun both fore and aft. So, no matter which method you chose when you "fit" these planks to the stem, make sure you maintain your aft overrun.

2) **If you choose Option #1** (no rabbet), make sure that plank **B** (and later **C**) runs no more than 1/32" past the inner stem, any more, and you won't be able to get both planks to seat at the same time.

[1] Chapelle, Howard I., Boat Building, A Complete Handbook of Wooden Boat Construction, W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. 231.

3) **If you choose Option #2**: trim the plank to fit the rabbet the same way you did the **A** plank. You need to scribe the angle of rise of the outer stem post onto the inside surface of the **B** planks. The forward end of the plank should run past the outer stem post only to the extent that there is just enough room to scribe the entire line onto the plank.

4) The easiest way to scribe the right angle is to set the flexible planks against the stem post and clamp at frames **1** and **2,** to hold the correct position first, then scribe.

5) With both options, I used the 5" disc sander to "shave" the plank (moving back and forth, not pushing forcibly into the sand paper).

6) I found the basswood side planking at **B** and **C** flexible enough that I did need to "soak" them. I suggest to you to dry fit the first plank **B** by clamping it into place. If it "fights the fit" you will know it does need a "bath, a re-clamp, and time to dry.

7) Once done, dry clamp the entire plank B into place. I used the Acco style clamps angled across both **A** and **B** planks and later **B** and **C**. I'm looking for a smooth seam. Any gaps or ridges found should be very small and easily sanded out (We HOPE!). If found, I pencil (lightly) the area in question, and go from fore to aft sanding, where needed. **Note**: Beauty Shop suppliers sells a plethora of manicurist nail files. I use a course-medium 100/180 grit file. It's perfect for this job. Do the same with the other side, then view from the stem for symmetry. Don't rush this process. I like to count strokes When I'm using a file of any kind, I count passes. (i.e. 1-2-3 test fit, 4-5-6, test, etc.). It prevents going "too far."

An A-B-C bonding:

Illustration 175: Note the **yellow arrow** points to the clamp holding planks **B** in place.

1) When you are ready to glue up both plank B's apply some "caulking" to the upper surface edge of plank **A**, and **B**. I used the same brown Sharpie marker I used on the bottom planks.

2) There are 3 things that you need to remember when gluing the remaining side planks:

    a) Clamp to assure plank **A** and **B** are rising at 9-degrees. Don't let Plank **B "**drift**".**

    b) Clamp to assure plank **A** and **B** are tight against each other over the whole run.

    c) Apply a "strong" bead of glue along the lower surface of the **B** and **C** planks, and at the full area of contact with the inner stem post, and stand ready to wipe clean the excess glue squeezed to the surface when clamped.

3) **NOTE:** I try to avoid super glues, but there are times when they aid the building process. The union of the inner stem post and side planking, whether in Option #1 or Option #2, is one of these times. My choice: Gorilla Super Gel Glue and it should be used very sparingly.

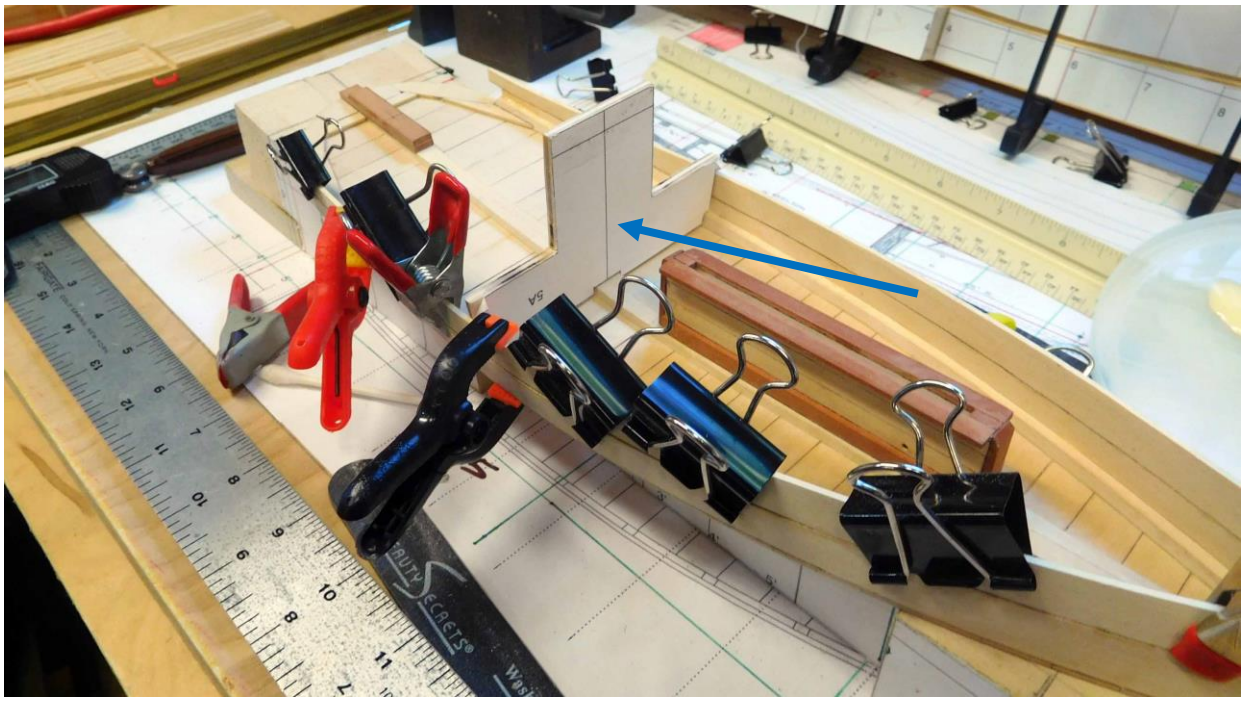


Illustration 176: You can never have enough clamps!

4) In planking you need an anchor. You are gluing a full-length plank of some 12," You need to act quickly, and carefully before the glue gets too tacky. So, I first run the **A-B** seam beading, stopping just before the stem. At the surface area of the plank, where it contacts the stem's surface, I put a light dab of Elmer's glue to the outer thirds of that surface and then, in the center third of the plank, I put a dab of Gorilla Super gel.

5) Place the bottom edge of Plank **B** (hold at about 45-degrees). Holding only the forward 4" to 5," join the **A-B** surfaces to the each. Slide the **B** plank along the A surface into position, hold, with finger pressure, about 10 seconds. Then quickly clamp at frame 1 and frame 2. Check the forward run, and, if the start is OK, continue down the plank to the end.

6) In **Illustration176**, note the **blue arrow**. It points to station template **5A** turned upside down and around. It is placed in the general area of that station line. This will help keep the upward run of **A-B** at the 9-degrees.

7) With that done I place clamps under the hull and on the surface of plank B clamp creating downward pressure to glued seam. This process will squeeze some of the glue to the seam's surface. I use a wet Q-tip to wipe away the excess glue where not covered by the clamps.

8) I wait about 15 minutes, and then, starting forward, I remove the clamps 1 at time and scrape away the excess glue that was hidden under the clamps. In **Illustration 177,** the **red arrow** shows the finished seam, with caulking very visible.

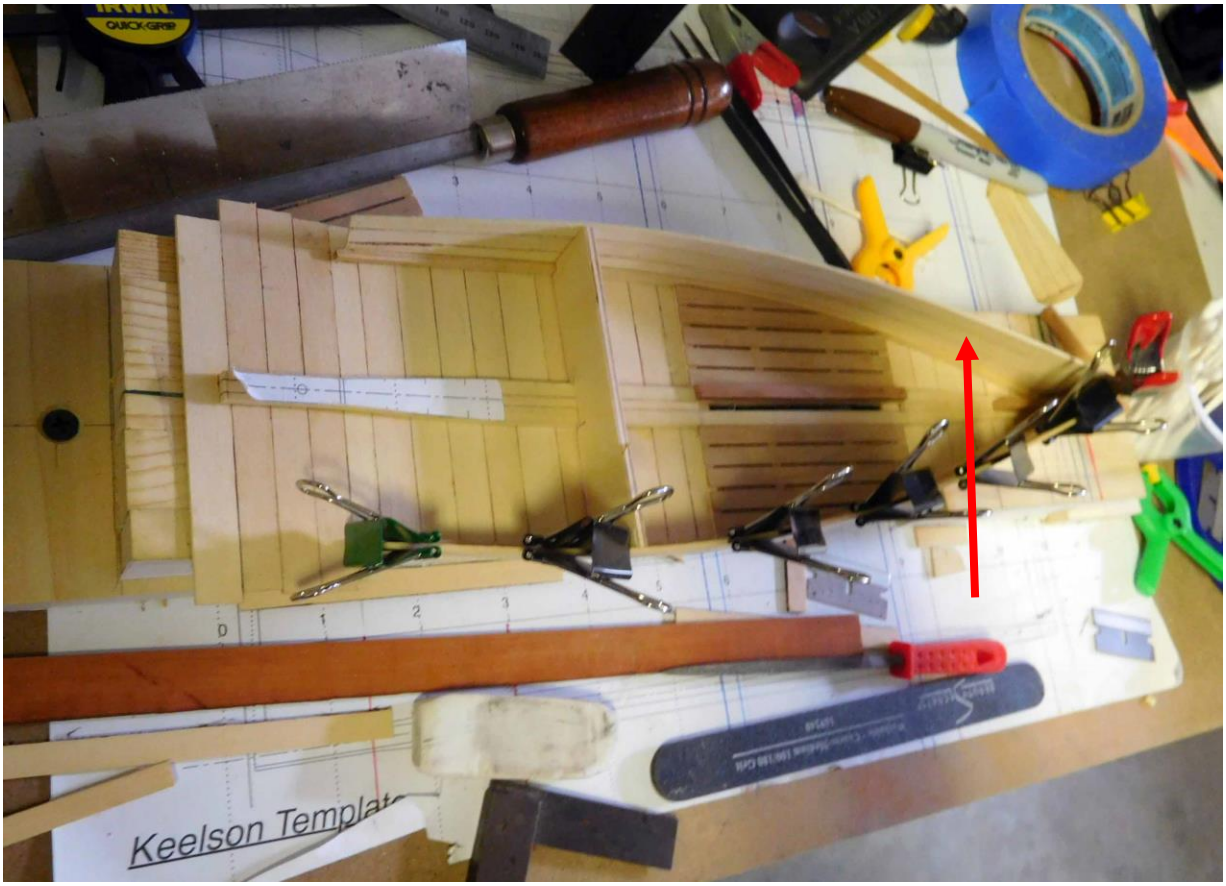


Illustration 177: Plank **C**.

9) The **B-C** connection is identical to **A-B**. **Illustration 179** which shows the final **C** plank in place.

10) One more test: I use the station template **10F** to see how I did. (The angle block is to keep the template vertical.) We will use it again when the frames are positioned (the **green arrow**).

11) I like to use "sanding sponges" to surface sand planking and I start with the inner surface. Make sure all the squeezed glue remaining is removed. I also use a single edged razor blade as a scrapper.

12) **NOTE**: A clean surface is required for both a natural finish and a surface to be painted. Dried glue blocking access to the wood pores does not make for great finish.

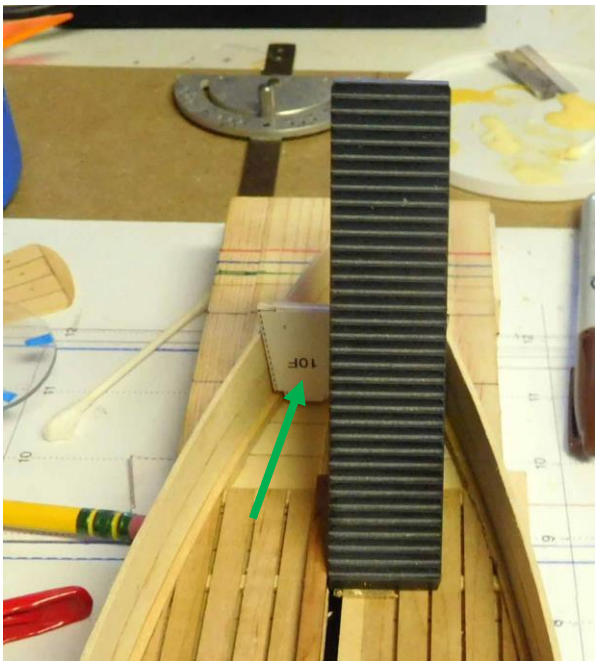


Illustration 178: to hold vertical.

Option #1, adding the outer stem post:

1) As before, sanding the small overrun of the side planking. The important thing is to match the planking's surface with the existing vertical surface of the inner stem post.

2) I used a homemade sanding stick made from a 1/8" x 1" x 10" piece of pine, and I spray glued 120-grit sand paper to the surface.

3) I got the best results by working the standing stick with passes at 45-degree angles across the sanding surface. Don't ask me why, but it seemed easier than going up and down the surface trying to maintain a flat surface area and the 3-degree rise of the assembly at the same time.

4) Lastly, the finished stem is 3/16" width. If you are a little wider with the planks during the dry fit, glue the stem piece into position anyway. When dry, carefully sand the excess plank to the outer surface of the stem.

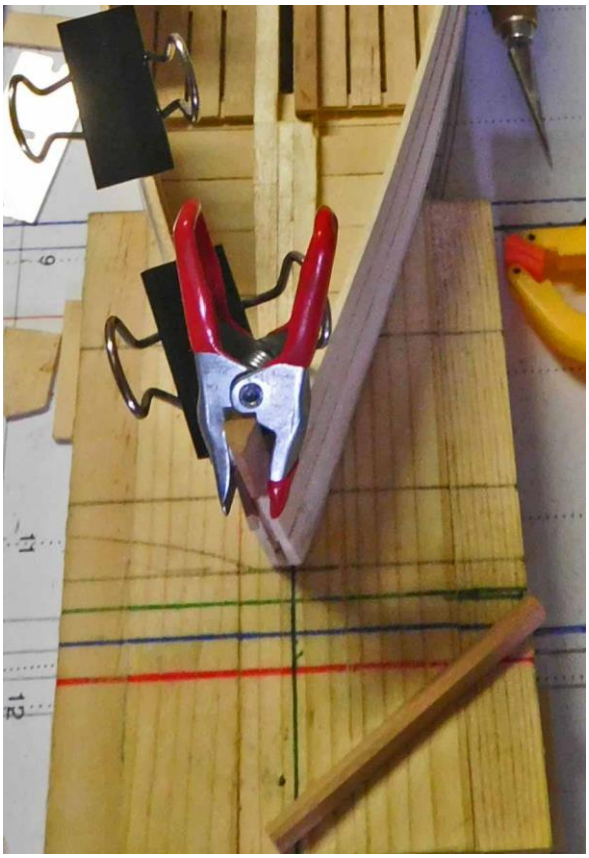


Illustration 179: Prepped for the outer stem.

5) Once the side planks have found a "permanent home," there is really no need for the overrun of the stem posts. I laid a 6" metal rule, centered at the inner step post, onto the top edge of the C planking. This will keep the cut of the saw blade off the edges of the planking and leave the assembly about a 1/64" from being flush with the planks.

6) The saw I used was a #82985 Zona flush cutting saw laid flat on the ruler's surface. Very slowly, making "soft cuts," not rapid back and forth strokes, I separated the overrun. I then took my sanding block and carefully sanded the remaining overrun flush to the **C** planks.

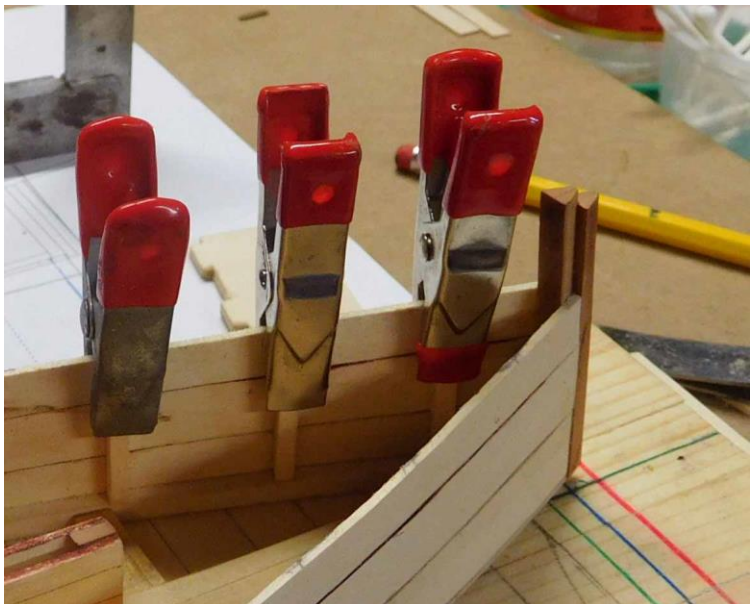


Illustration 180: On to the frames.

Illustration 181: A-B-C

3.8 The Frames

Research Locator:

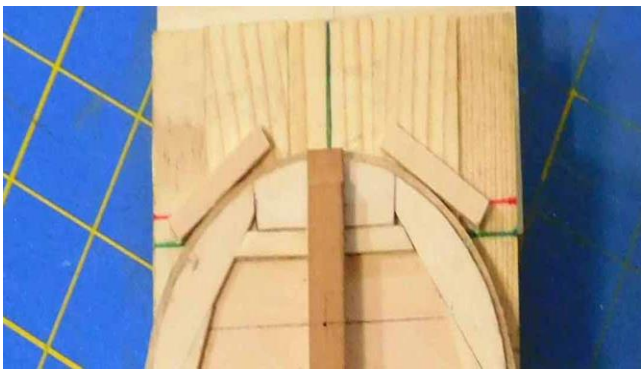
Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), **pp. 253-258.**

"If there are to be frames on the sides of the hull, these can now be fitted. These frames, in a cross-planked flat-bottom boat, are really nothing more than cleats laid on the flat and nailed to the planking between the sheer clamp or batten and the chine log."[1]

Materials: Framing stock: 2 pcs. 3/32" x 1/8" x 24" (I used pear for natural Sharpie and basswood for the painted sharpie.

Transferring the individual frame locations from the drawings to the inside plank surfaces:

1) With the side planking completed, set the hull onto the **BJ2** making sure it is lined up accurately with the lines that were originally transferred to the jig initially. I used 4, 1" x 1/8" pieces of basswood and created a stop on the jig surface that will keep the stem post properly located at the **C/L**. Likewise, I created an "alignment" stop at the stern to keep the hull from "sliding backwards and on the **C/L** while work proceeds. (If you still have you brass rudder tube in place, the stern stop might not be needed.



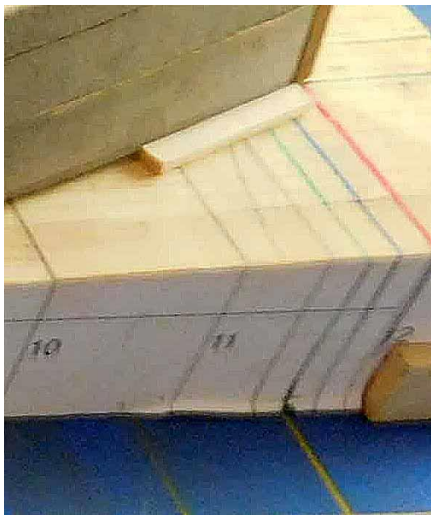


Illustration 182 & 183: "Stops".

2) It's time now to use the "Side Structure and Frames" drawing at the top of the **BB2** and locate each frames' location onto the hull for proper positioning. Don't confuse the numbered and dotted station lines with frame location. I took the time to extend a solid line from the centerline of each frame down to the base of jig, making sure that the centerline of the frame come down at 90 degrees to the jigs (and now positioned hulls) centerline.

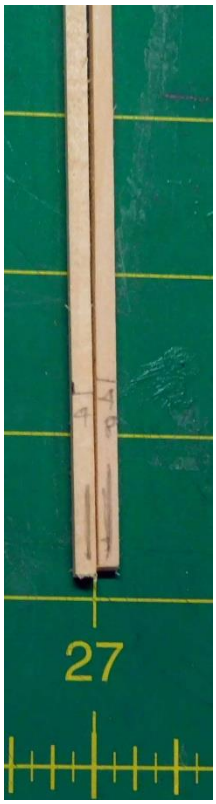
[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. 253

3) Now refer to section **2.5** (page **30 Illustration 39**), regarding how to get the intersection of the lines coming down to the base of the jig to the surface of the jig. Using a square, position the 90-degree angle to the jig line's edge. If positioned properly, the upward run will be the **C/L** of the frame. Scribe the location with a pencil. Continue the process for both port and starboard.

4) **HINT:** You need only to do one side with the square. Go to the frame closest to station line **6**. Lay a straight edge at the marked frame center across to the other side. With a drafting divider, go back the base **C/L** of the frame and measure the distance from your marked" position, to station line **5** or **7**. Now take the square to the other side and reverse the process. Place the divider to measure the point of the frame line and mark it on the base of the jig. Using the square at that location, mark the location onto the upper plank edge. Adjust the straight edge to both markings: Lay the straight edge from mark to mark and look down on the **C/L** of the keelson. If it looks 90-dgrees to the **C/L**, it probably is!

5) Now the process is easy. Use the divider on the notched side and measure the distance to the next frame. Take the divider to the other side and mark it, and so on and so on.

6) You will note from the drawings, the frames run down the inside of the planking and are 90-dergrees to the baseline. So, to mark the run of frame to the chine, place a larger square outside hull at the frame location centerline. This isn't rocket science: I took a small piece of basswood (1/16" x 1/8" x 4") as a straight edge. Placing the basswood to the **C/L**, I visualized a straight run to the chine using the square behind it – Hold steady and scribe it, and we are ready to frame out the hull.



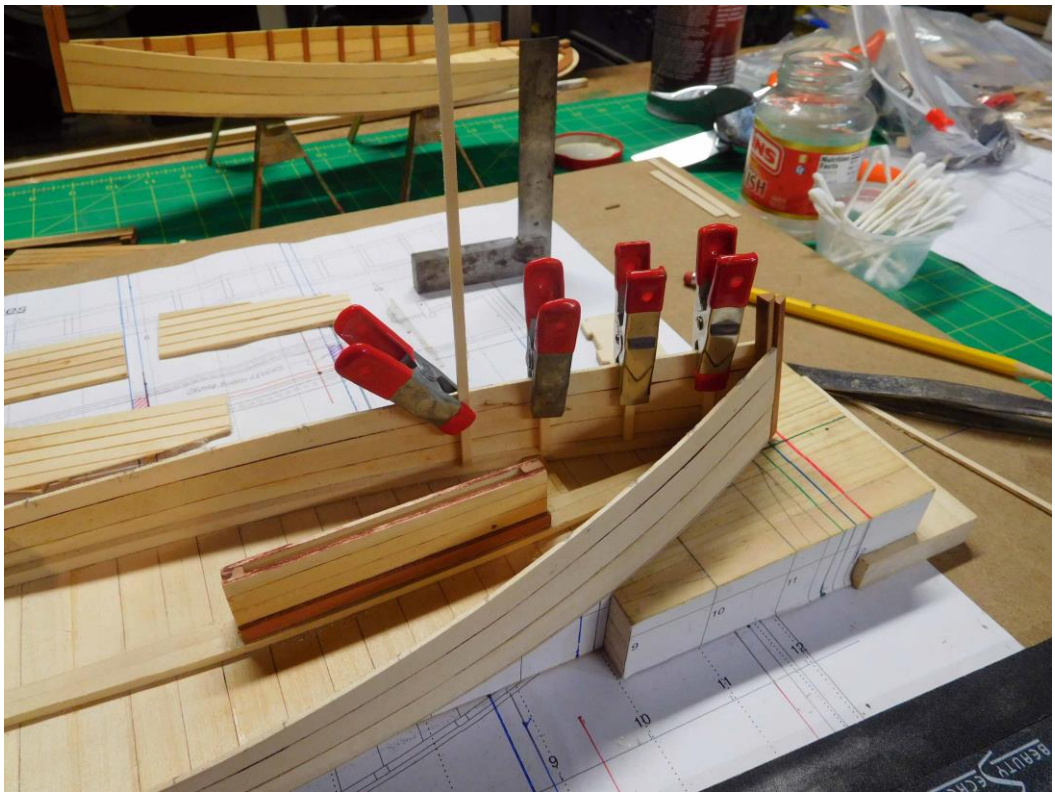


Illustration 184 and 185: sizing each frame individually.

The Union of the Frames with the chines:

1) If your chines were beveled to 9-degrees at the bottom planking and remained at 90-degrees and the top surface, then, your frames will seat on the chines top surface without adjustment. if the bottom of the frame is at 9-degrees.

2) If your chines have a 9-degree angle at both the top and bottom, your frames will seat only if the lower end of the frame is also beveled to 90-degress.

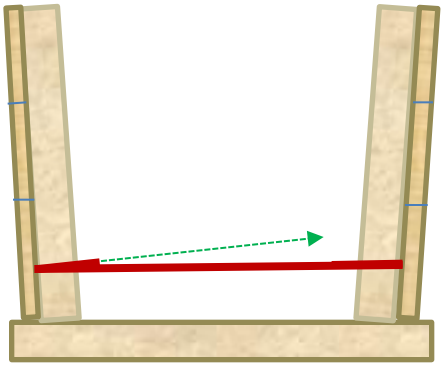


Illustration 186:

7) You will note the value below of a center line ruler. Lay the "0" on the hull's keelson center line and you can not only transfer frame location, but you can check the beam from side to side.

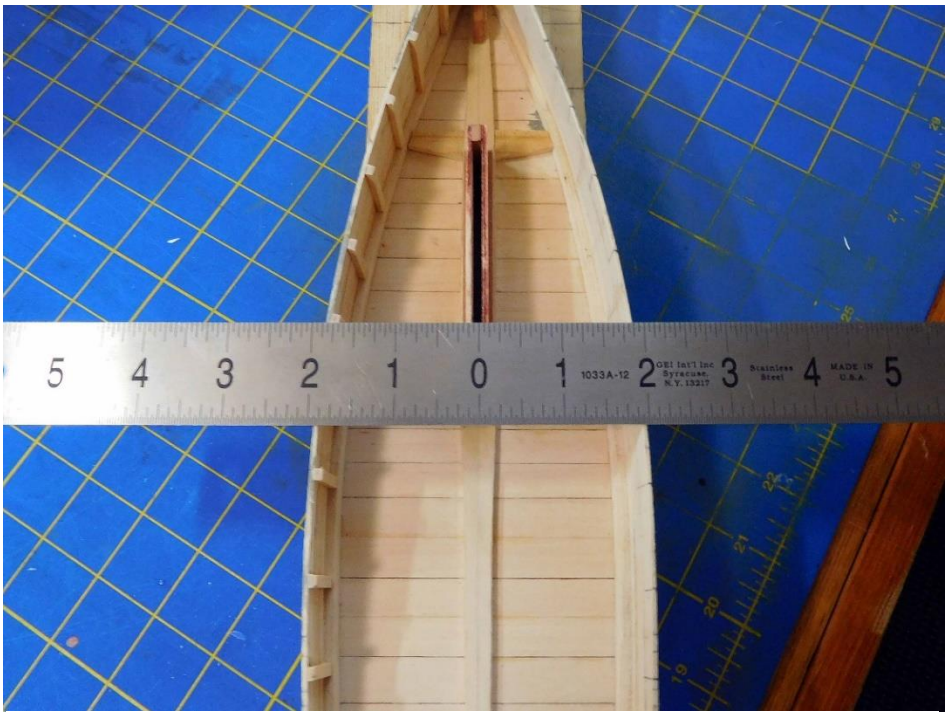


Illustration 187: The center line ruler.

8) I didn't try to cut the frames to actual size because it was time consuming and because over sizing them aids installation - you have a "handle" to something to grab onto when positioning and gluing up each frame. I brought the stub ends to about a 1/16" above the planking, before sanding, with an X-Acto saw blade in No. 1 handle.

Illustration 188: FYI: The first "fire ship" was framed with match sticks.

9) In **Illustration 184,** I have marked a port and starboard frame to show me the finished length of each and a center line indication. The finished length isn't important now for the frames at the top of the upper planking will be finished sanded to the actual length. The sanding procedure will also establish the 9-degree angle required of the flat deck.

10) **Illustration 188** shows the starboard frames have been installed and the port frames have been secured and ready to be trimmed down. This is Sharpie 1 and the side planking has received the first step in a weathering process to the finished model. More on that later.

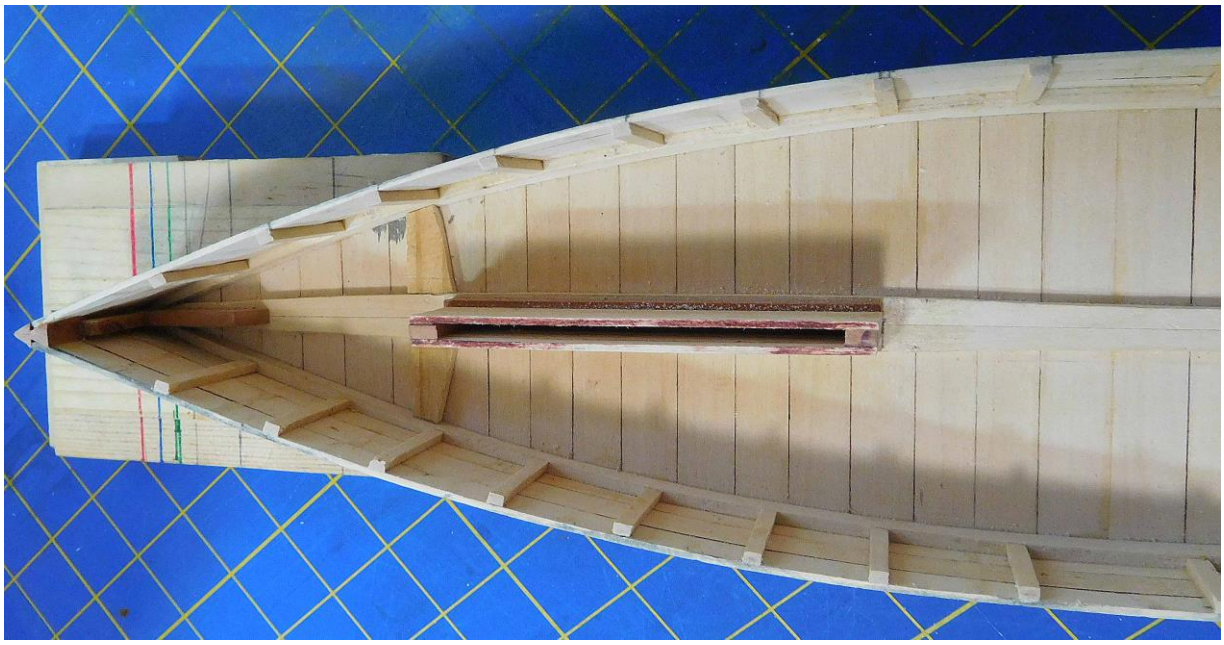


Illustration 189: Framed.

3.9 The Sheer Clamps

Research Locator:

Chapelle, Howard I., Boat Building, A Complete Handbook of Wooden Boat Construction, W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **25-271**.

"As a rule, the sheer clamp in a flat-bottom boat is really a batten at the sheer and is between the side planking and the frames."[1]

Materials:

2 Basswood strips 1/8" x 3/32" x at least 12" (Sharpie #1)
2 Pear strips 1/8" x 3/32" x at least 12" (Sharpie #2)

Fitting the sheer clamps at the inner stem post

1) I first soaked the strips in water even though the basswood seems flexible enough to go it alone, but there is the curving around the run of the frames and then the sheer of the run of the outer planking. The 9-degree angle of the top surface of the clamp, created when glued to the 9-dregree angle of the chines, will be sanded "flat" after installation.

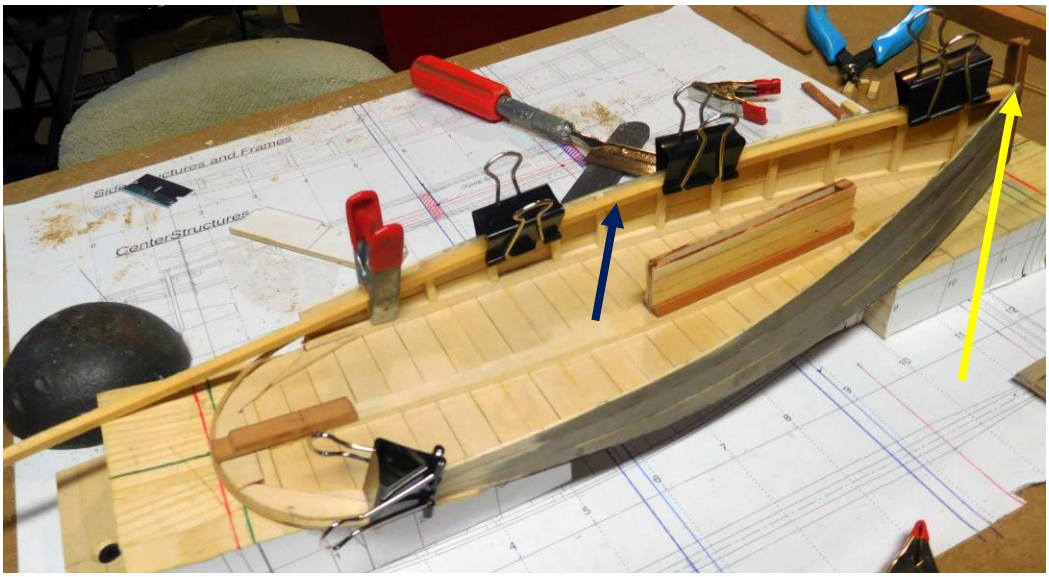


Illustration 190: OOPS, somebody forgot to trim the stem!

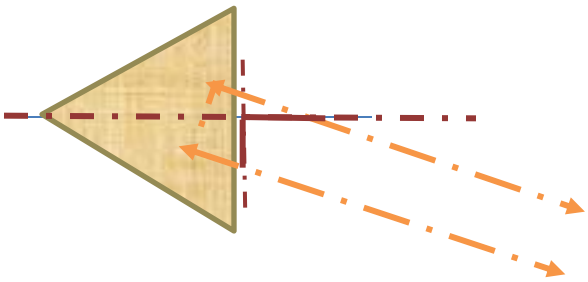
NOTE: The quotation from Chapelle places the sheer plank between the side planking and the frame. The **blue arrow** shows our sheer plank is outside the frame. There are always other acceptable options.

[1] Chapelle, Howard I., Boat Building, A Complete Handbook of Wooden Boat Construction, W. W. Norton & Company, New York*London, 1941 (renewed 1969), p. 227.

2) While the planks are soaking, I gather up my various clamps and place them on the building board. With the basswood, it is impressionable, so I also gather a few small pieces of scrap stock, to act as an intermediary to the clamping surface of the sheer clamp. The side planking surface is dry and shouldn't need "cushioning."

3) When you deem, the planks are ready, remove from the water and wipe down with a paper towel. Start at the stem. Position the forward end of the sheer clamp to the face of the inner stem post, and clamp. Proceed the clamping to the furthest frame aft. Now, go back at each clamp and check to see that the top surface of the sheer clamp is solid against the run of the upper edge of the **C** plank.

4) When placing your clamps to hold the sheer clamp in place, the clamps must be place direct over each frame. At the stem, the clamp to the first frame will draw the front edge of sheer clamp too close to the side plank **C**. Our goal here is have the clamps we use, hold the sheer clamp logs to the top edge of the **C** planks.



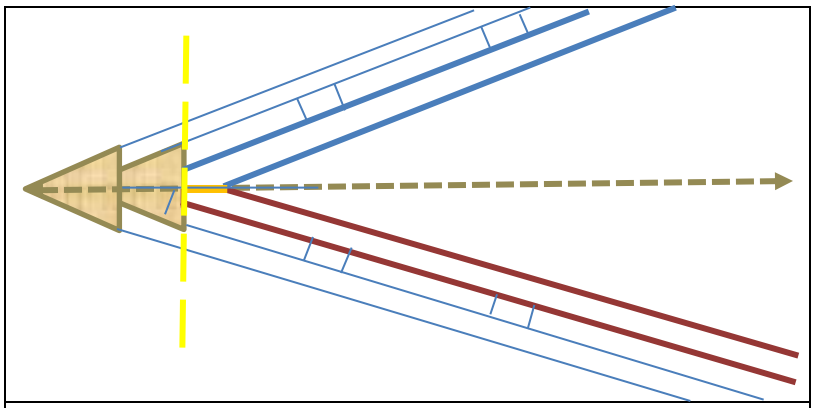
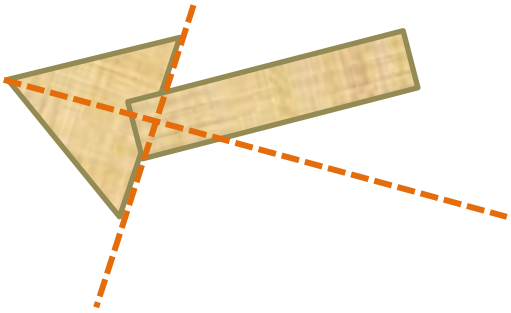


Illustration 191 and 192: The angle cuts required at the stem.



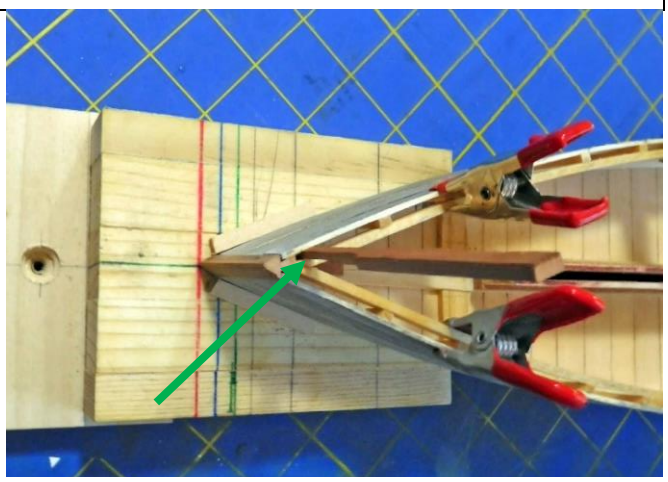


Illustration 193:

5) To transfer the angle cut lines to the sheer clamp, the first step is get the proper separation of the sheer clamp to the side planking. Out of some scrap stock, I created a 'frame spacer" with a handle. To get the clamp sheer to rise flush to the top of the inner stem post, this will act as a wedge as well as a spacer. Dry fit, the sheer clamps into position, one side at a time. Frames one and two are key here; use clamps that will make a "tight hold".

1) When in place, scribe the two angles needed, using a small straight edge.

2) When the above is completed, port and starboard, there are two other angles, for the technical modeler to address: the sheer clamp needs to be angled at the same 3-degress of the stem angle to fit flush against the inner stem post, and, to be a perpendicular to the center line the angle of the frames must recognize the 9-degrees of the angle of union of the two sheer clamps.

3) I used my 5" disk sander setting the table at 3-degrees and then 9-degrees and sand "to the scribed lines." **NOTE**: Make sure you are aware of port and starboard: one clamp is sanded from the left, the other from the right. Also remember that you have additional length to the sheer clamps so there is "wiggle room."

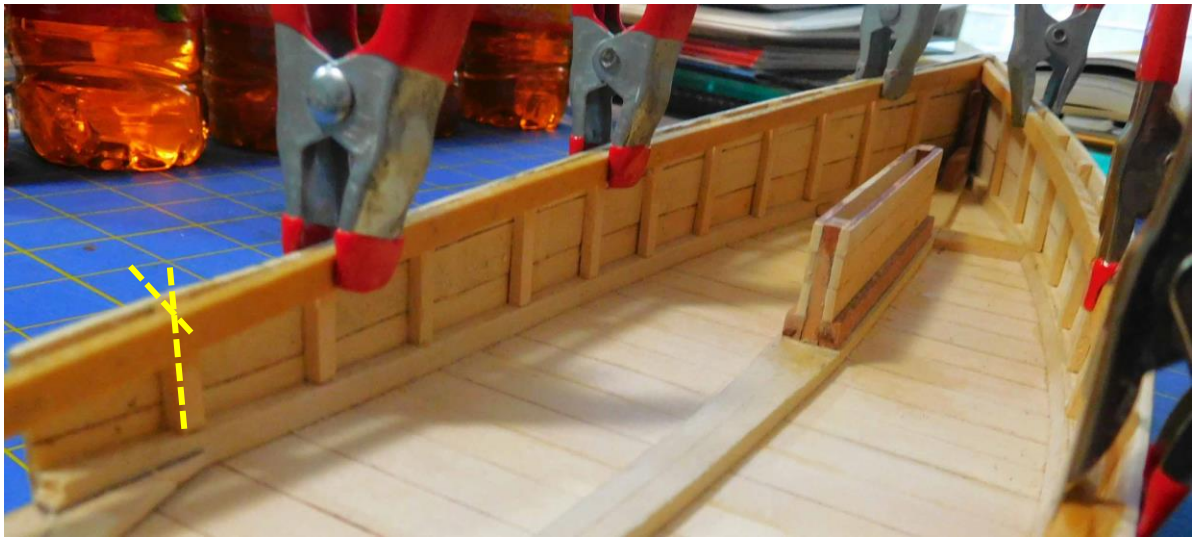


Illustration 194: Keeping the union of sheer plank, the top of the frame and C plank in alignment.

4) Test your sheer clamps with a dry fit, and when satisfied (tweaking is always possible) clamp them back into permanent position.

5) **Illustration 195:** The sheer clamps run to the aft end of frame **11** (the **orange line**). Scribe the location on both, making sure the stem area is perfectly aligned. I then trimmed the excess; still being cautious, I leave an overrun of about 1/8" (the **green arrow**). This will be finalized when the shear clamps are glue in place.

6) The sheer clamps will be scarfed to receive the deck beams and mast pendants, so put them safely place awaiting **Phase 4**.

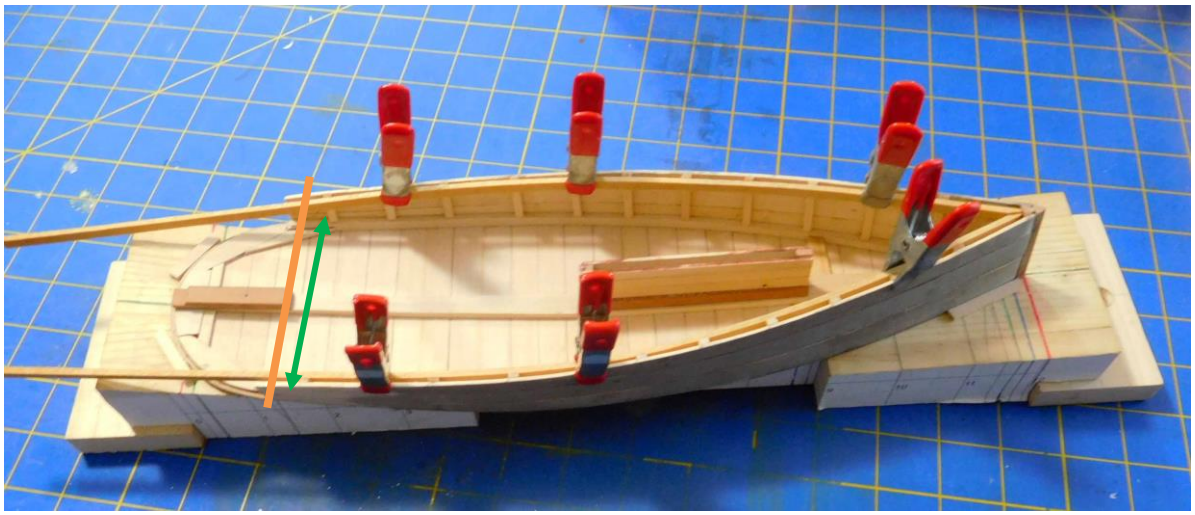


Illustration 195: Step 10 above.

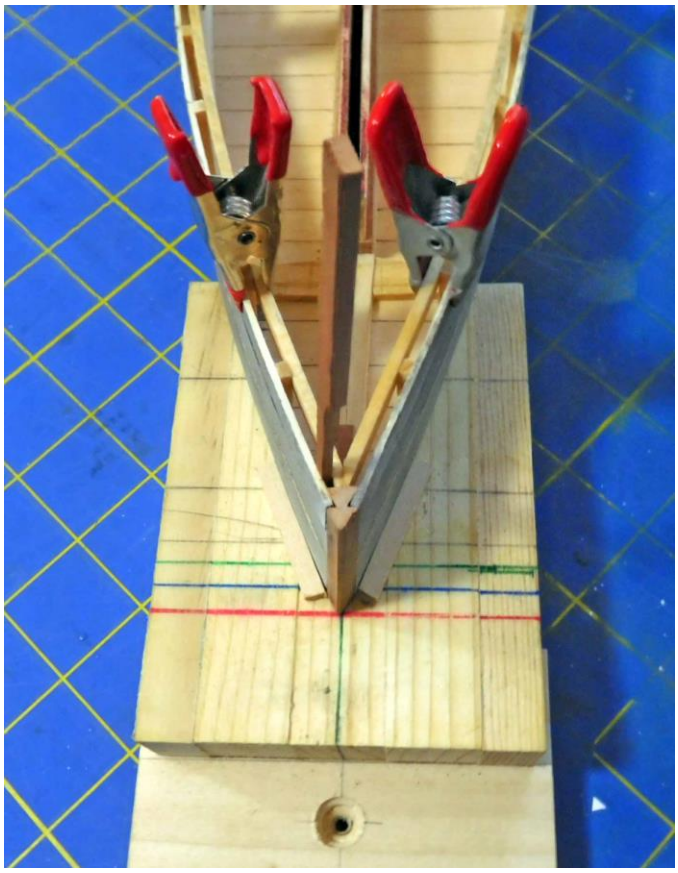


Illustration 196: One more look.

A suggestion before you move into section 3.10:

You have now reached, what I feel, is "most head scratching task" of this build: the round transom. Please note that there are two deck beams with cleats port and starboard (**Illustration 162**). They are an integral part of the upper deck framing. You might want to consider shaping and putting them in place before you move into this section. There is nothing complicated about the beams installation and they will strengthen, port to starboard, at the end of the run of the side planking. In the process of forming the beams, you can also make sure the distance outward to the side planking is on center. **Note: I encourage you to read the entire 3.10 section before deciding what you want and how you want to do it. You have two options on the verticality of the rise of the stern planks in addition to the above.**

Illustration 197: The stock is 1/8" square.

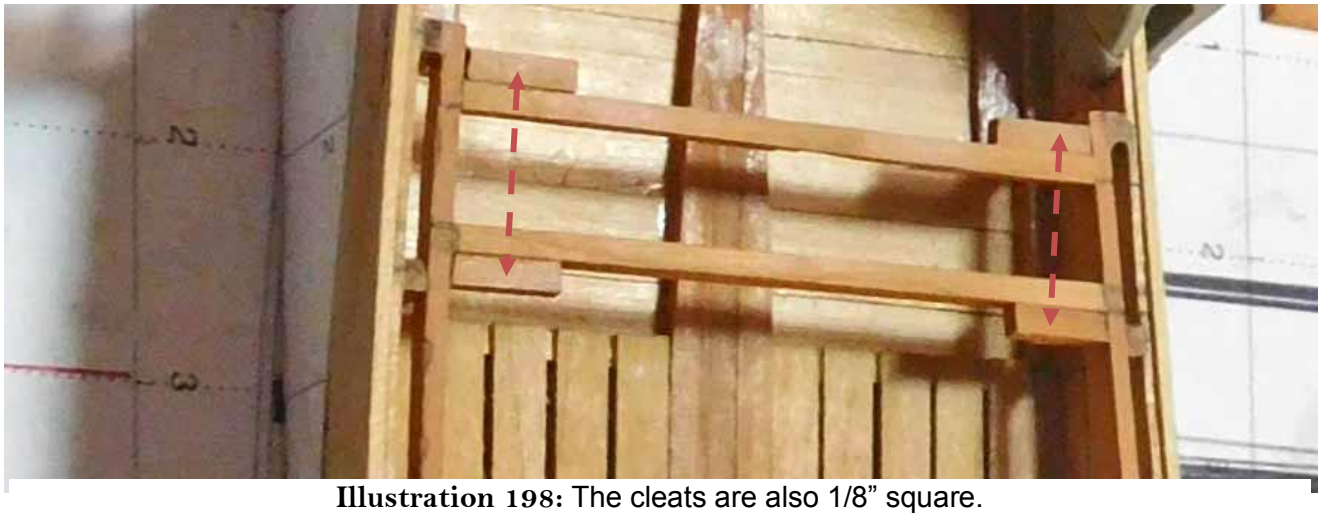


Illustration 198: The cleats are also 1/8" square.

If you wish to install these two deck beams now. How to do so begins on page 142.

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3.10 Conquering the round vertical transom: 2 Options

Research Locator:

Chapelle, Howard I., Boat Building, A Complete Handbook of Wooden Boat Construction, W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **222-223**.

"The round stern can be made accurately round, viewed from above, or in a flattened or sharpened ellipse. The stern in profile is usually given a sharp rake and makes a very handsome finish. The construction is not difficult, if understood."

Materials:

Painted Sharpie: 22 pcs1/16" x 1/4" x 3/4" Basswood; 2 pcs1/16" x 1/2" x 3/4" Basswood

Unpainted Sharpie: 2 pcs1/16" x 1/4" x 3/4" Basswood; 22 2pcs 1/16" x 1/2" x 3/4" Pear

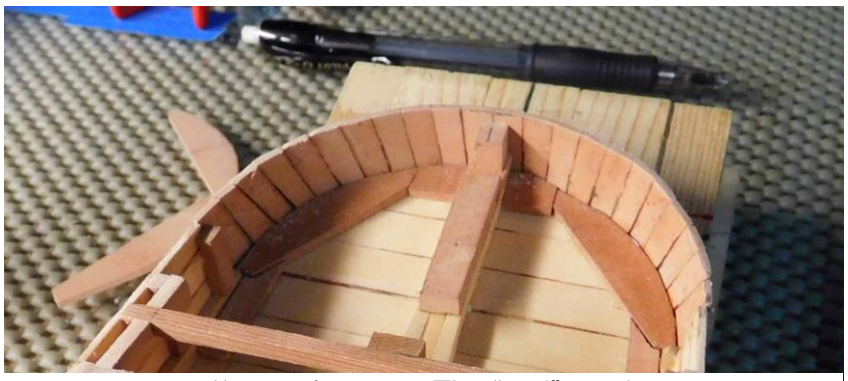


Illustration 199: The "end" result.

Option #1: If you are still undecided as to which round transom option you want to go with, now is the time to make up your mind. **Illustration 200** shows (**purple dotted line),** the "fantailed" termination of the **A-B-C** side planking. The **green dotted line** represents the end of **A-B-C** as vertical. There is also a third option: u **Illustration 201, u**sing the fantail planking, but ending the side planking vertically. This is the one option I chose in building the first prototype (the weathered sharpie), and what follows in this write-up takes you

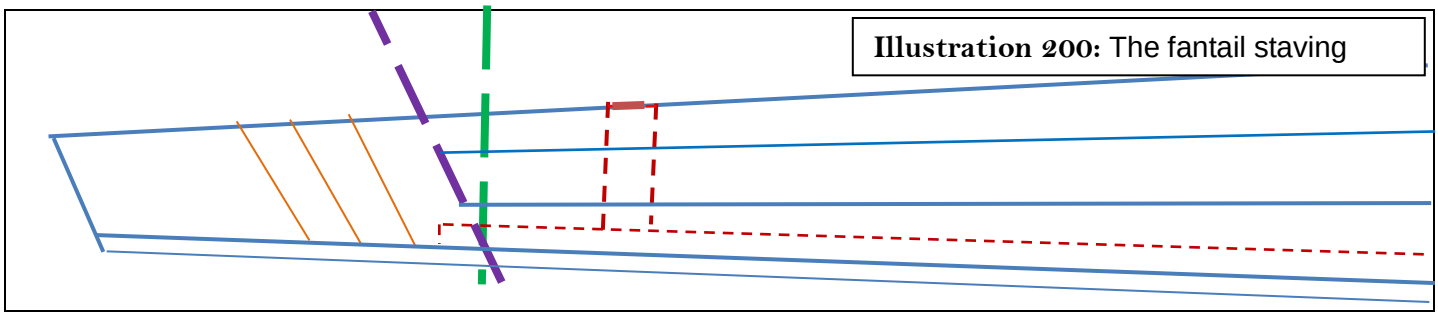


Illustration 200: The fantail staving

through that build.

Research Locator: Plan Sheet 001-1"Details & Construction of **IDIE**, a North Carolina Sailing Sharpie," Drawn by M.B. Alford, Morehead City, N.C.

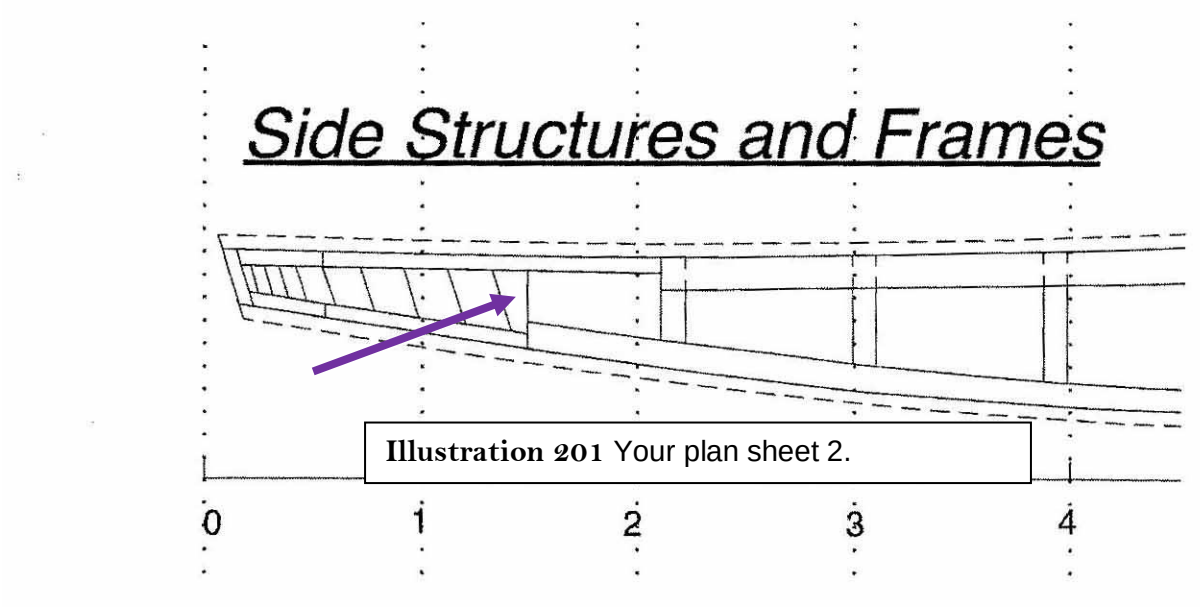
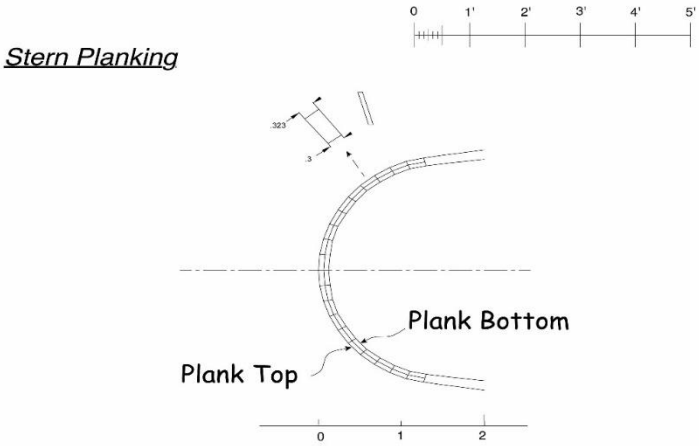


Illustration 201 Your plan sheet 2.

1) The **purple arrow** above is pointing to the end of the side planking and the beginning of the stern vertical planking at an angled approach. Note the location of chine ending and transom planking transition.

2) From your **plan sheet 6**, "**Stern Planking**", the squiggly arrows points to the "stern frames" which shows you the bottom plank flooring and the upper deck flooring rise at an angle.



Option 2 (the green option): This is the vertical option. The difference in the two options is significant. Option **1** is the more difficult of the two. Option **2** is more straight forward and if you have any doubts about **one**, go with two for your first effort. The vertical stern planking drawing to the right (**'58.**") is a detailed drawing from Chapelle.[1]

You will see both views of both options in the upcoming illustrations and descriptions. The weathered sharpie was built **purple** while the unpainted sharpie went **green**.

[1] Chapelle, Howard I., Boat Building, A Complete Handbook of Wooden Boat Construction, W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **222.**

The life story of an option #1 vertical transom plank:

1) This is a story of angles. At least 11 or maybe 12 planks are needed to go from the **C/L** to the side planking. Technically, each of those planks have multiple angles, but none of these planks are identical, close but not the same. You're going around a curve with a straight vertical plank fantailed **C/L** at 17-degrees. This also means that it's a longer trip around the top than it is around the bottom. Additionally, you have a flat-bottom rising at 22-degrees. So technically speaking, the only two planks that are the same length, are ports-starboard at each position.

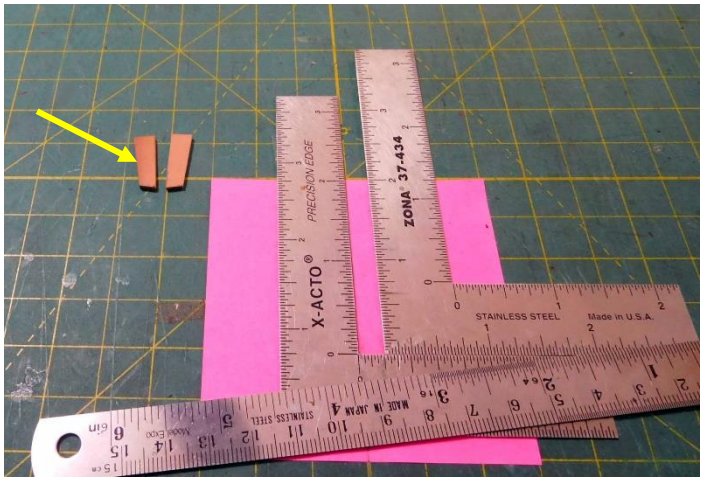


Illustration 202: a **BJ3** maybe?

2) The plan's "Stern Planking" drawing lets you know that the vertical edge tapers only slightly, 0.023" to be exact. In 3/4" scale, that translates to the actual boat size: 5" scale at the top to 4'6" at the bottom. In addition, the taper has a bevel to consider.

3) I used my 5" disk sander to shape these planks, and the table needs to be set at some angle to get the bevel onto both sides and at the bottom of each plank to seat onto the bottom planking with the correct angle of rise. Since we are using 1/4" to represent 5" that is going to be about the width of dull pencil line and I just happen to have a plethora of dull pencils. This should solve any problem.

4) So, we are going to work individual planking, alternating sides, starting with the **C/L** of the stern.

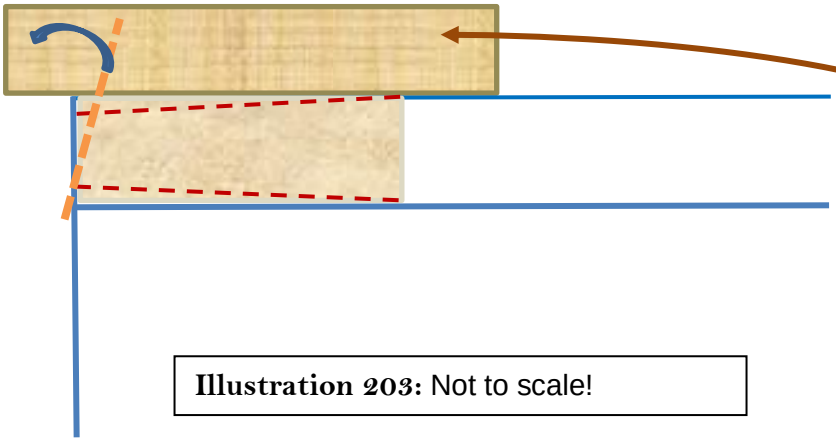


Illustration 203: Not to scale!

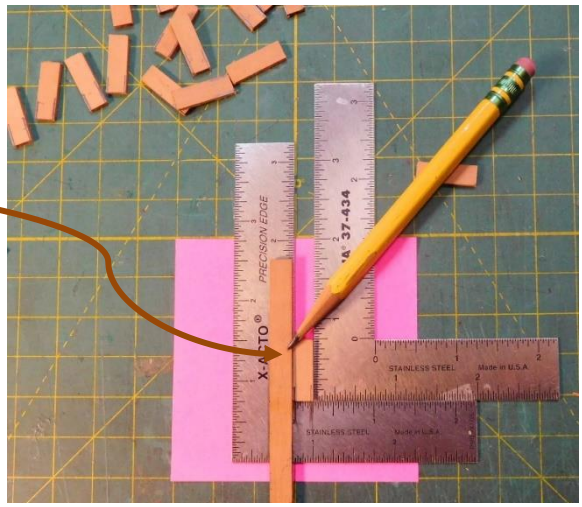


Illustration 204: Step 1 (2) below.

Illustration 205: Starting at the center.

Covering all the angles:

Step 1:

1) Go to plan sheet 2 of 7 and look at "Side Structure and Frames." You can see the rise of the bottom planking/keel is significant. Then compare that to the run created by the shear of Plank C, over the first three station lines aft, it's almost non-existent. As the vertical transom planks go aft, they decrease in length. So, do you deal with it now or wait until later? I chose the latter; I will trim them all after they are glued in place and have adequate support.

2) **Illustration 204:** I cut 24 plank blanks to 1/16" x 1/4" x 3/4 ". I then put a post-it-note on my cutting mat. I took two mini-X-Acto squares and, with double stick tape to the underside surface of both, I placed the lower square to the paper, placed a plank at the angle, and then placed the second square to the paper. I guess I will call this **BJ3**. I then took a 1/16" x 1/4" x 6" piece of basswood, to use as a straight edge, and, with double stick tape applied to the edge of the first square, I made sure that the union is free of any excess tape. The fit of the plank in between the squares should be a "tight" fit.

3) I then took a smaller piece of scrap wood (1/16" x 1/2" x a couple of inches) to act as a straight edge on the other side square; no tape, I'll just hold it in place.

4) Get out your stubby pencil now, and as each plank goes into the center of the jig, etch a pencil line onto edges of the plank, using the straight edges to guide the pencil nib. The line only needs to extend about ¼". Go ahead and mark both sides of all the ¼" planks.

Step 2:

1) Because small wood strips tend to disappear into the "abyss" of a disk sander, I take a small rectangular piece of 1/4" MDC board, held in place by a strong clamp to close the gap. The **yellow line** indicates the upper edge of top of the plank. (**Illustration 206**).

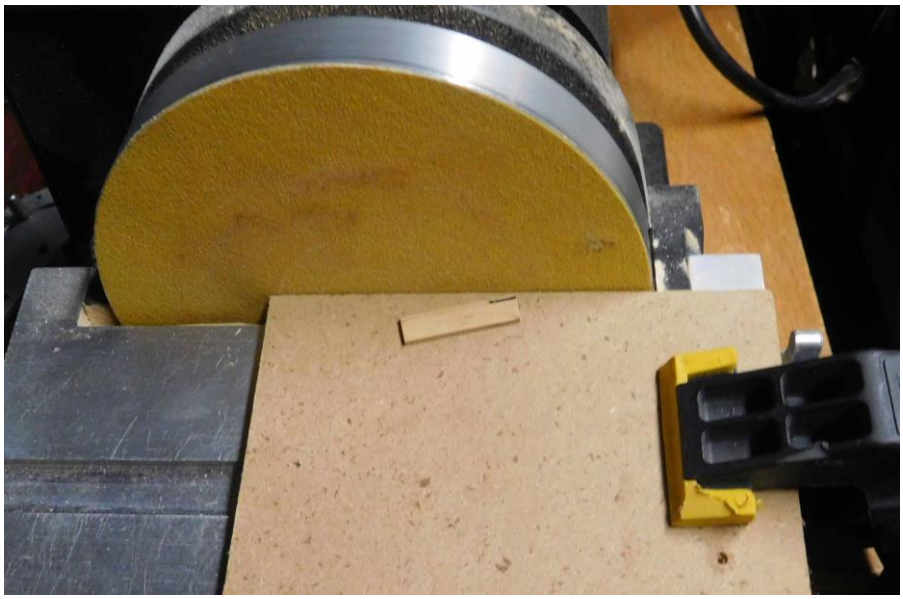


Illustration 206: I set a 4-degree angle at the sanding edge of the MDC board as the table was first set to 4-degrees. See Step 2 (7) and **Illustration 207.**

2) **Illustration 207:** I place the plank forward, edge up against the face of the sandpaper, before I turn on the machine. I'm going to use my two index fingers to guide the taper onto the plank (the **orange arrows**). and I bring the bottom edge of the plank down to the **pencil line**. Keeping the pivot point at the edge of the sandpaper, but making no actual contact, so bring the plank back about a 32nd of an inch before turning on the sander. Now turn on the sander.

3) The trick is to hold the pivot in place while using the right index finger, then bring the plank's surface carefully to the sand paper, but not making actual contact. Now, with your right index finger, lightly push the penciled end onto the surface, again, holding the pivot point in position off the face of the paper, but allowing you to guide an angled "shaving pass," with both fingers working together.

4) The process is the same for the other side edge, just a change of direction. **NOTE:** stay on the same side of the sander table. However, there is only one 90-degree butt joint in the round stern circumference, and that is at the centerline against the transom support log.

5) My calculations told me that the most common angle was at 4-degrees at the sides of these planks. So, from the start, had the table set at that angle.

Note: This is one angle that got me around the corner, and as you can see by the **Illustrations** that follow, did me well. But not all the angles coming up, are as easy to determine. I liken the round stern planks to a row of dominoes standing on edge. Push the first one, and others start to tumble. If you could "freeze frame" as they tumble, how many angles could you come up with. So, we now tackle that issue.

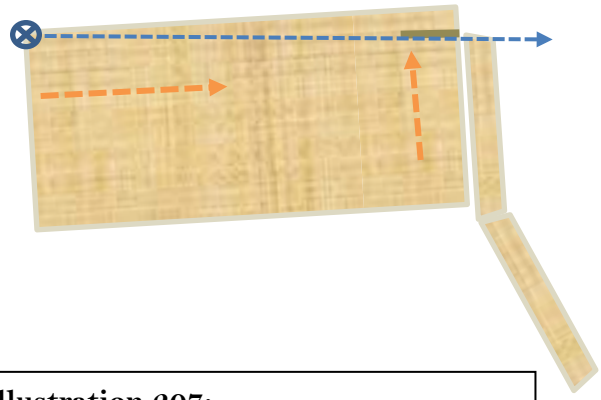


Illustration 207:

Illustration 208 the plank blank

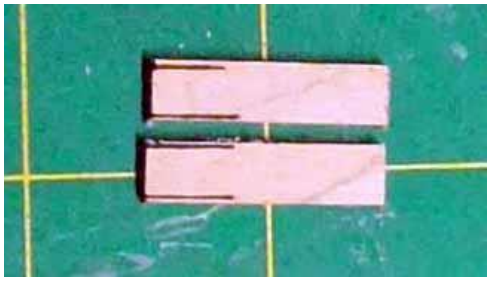
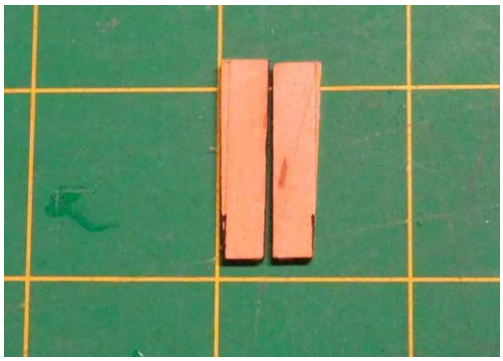


Illustration 209: a 2-sided bevel

Illustration 210: the 2 center planks.



1) The first two planks to be set in place are the port and starboard **C/L** transom planks. I scribed the **C/L** on the top of the stern support log and reinforced the scribe at the centerline of the "ledge" of the bottom planking. As the stern support log's surface was a good vertical gluing surface, I filed a little of the outer side edges of the log, the centerline edges on both planks were beveled at 2-degrees. This is what you must do: adjust your angled bevel to the severity of the curve it will seat on. **Note:** At this scale, several degrees off from perfect isn't going to mean a thing to the naked eye.

2) The plank's next adjustment is the seat of the plank on the ledge. We put a 17-degree angle on the transom log, and we must put the same angle at the plank floor. **Caution:** At this point you must constantly watch which side is which on the planks. I went one plank at a time all the way to a dry fit marking the inner face of the plank at the start of the process, to avoid confusion.

3) **Illustration 171:** With the sides beveled, lay the plank into position, and mark the bottom angle (**green arrow**) onto the surface. The **C/L** has virtually no "ledger" angle, but it needs a 17-degree angle to seat (**purple arrow**). This bevel marking at the bottom, needs to be marked on the "I" side surface, but the transom floor logs are in the way of pencil line (**orange arrow**). The logs are 1/16" thick, so mark the line at the top of the floor logs, and then re-mark 1/16" lower. Set the sanding table to 17-degrees, then sand to the line. Test fit. When ready to be glued up, take the sharpie marker and "caulk" one side.

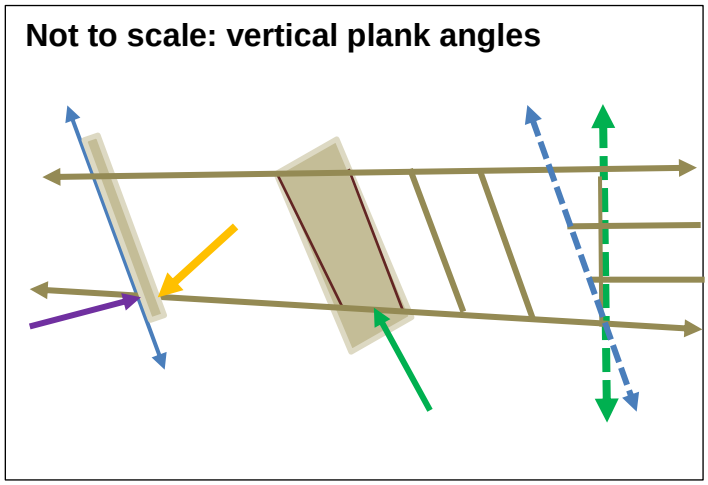


Illustration 211: It's about angles.

Step 3:

1) Now your plank is ready for installation. Put a dab of glue on the ledge and rear side of the floor log, and a bead of glue on the transom support log. Be ready with the Q-tips and the water. Place the plank down onto the "ledge" and clamp against the log. Wipe away the "squeeze." Now do the other side of the centerline in the same manner.

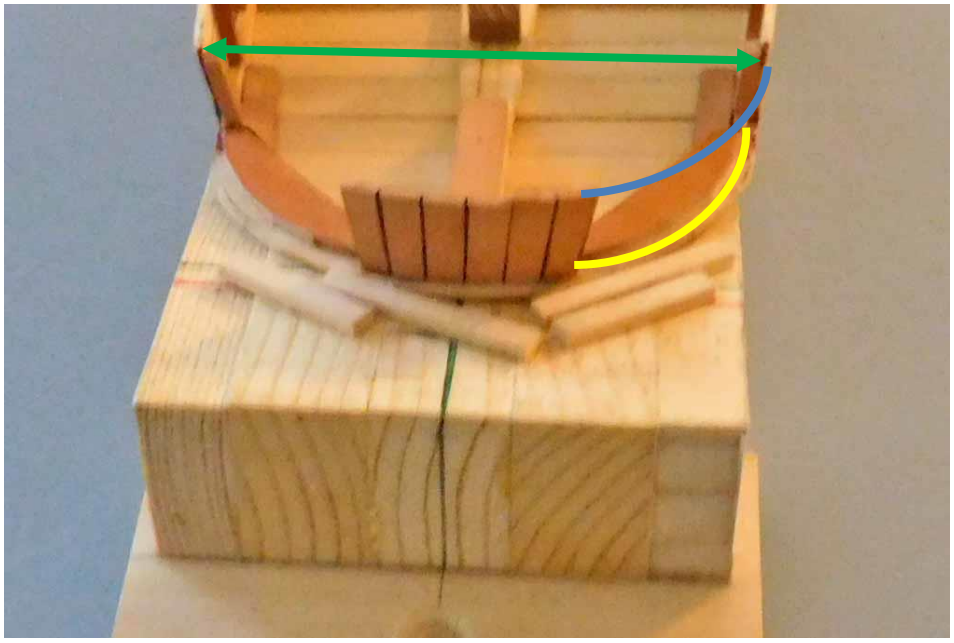


Illustration 212: The start of the "dentures."

2) **Illustration 176:** Shows the alternating side to side, plank by plank procedure. One vertical side will get glue, and one side "caulking." Just a reminder, the **green arrow** is where the side planking and the vertical planking meet up. So, as you make the trip around the transom, you're going from 17-degrees (centerline)to 9-degrees (side planking). You do not have to measure each angle. The angle is in the wood, just position the plank of the run of the previous plank, and pencil the needed angle to the interior surface.

- **Caution:** As you proceed around the **blue curve** watch out for too much angle (flaring). You are gradually pulling inward (shortening the angle of rise). The same is happening on the bottom floor above (the **yellow curve**). There is a gradual reduction of the 17-degrees. You can probably go two or three planks with the same table settings, because the change required is minimal, so check accordingly. If you are off on the inside, it will be hidden by the transom floor, but the exterior seat needs to be flush.

3) Eventually you will work your way around and find an awkward place to close from the vertical side planking to the vertical fantail planking. I call this plank a "vertical closing plank" (**Illustration 213**). This is a result of the side planking's 90-degree vertical and the angled fantail planking.

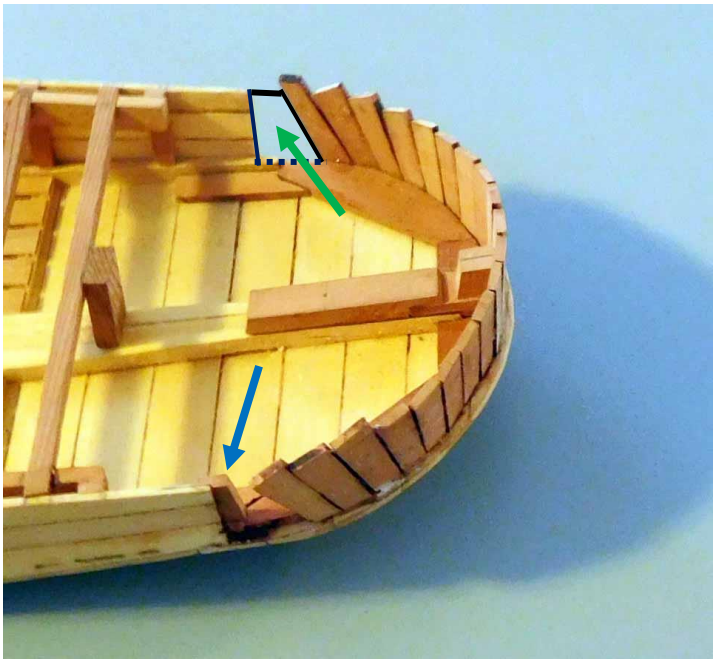


Illustration 213: The final vertical plank.

Illustration 214: Closing the transition.

Step 4:

1) **Illustration 214:** Now take the two, 1/2" x 3/4" pieces and cover, from the outside planking, the awkward opening, and using a sharp pencil, from the inside of the opening, scribe down the end of the side planks, across the floor log and up the vertical plank (**green arrow**).

2) Using a 5" disk sander, I sanded the outlined shape on both sides down, "to the line," and tested the fit. If still too large, I hand sanded until I got it right. At this point, there were no angle settings to worry about.

3) At the bottom of the last transom plank, I set the table of the sander to 9-degrees, then "lowered" the scribe line by 1/16", and sanded to final shape, to account for the flooring.

4) The **blue arrow** points to a frame which receives both side and transom planking and has the same dimensions of the other frames except that is 1/8" shorter. This is to accommodate the seating of the upper deck floor planking and a deck beam in Phase 4.

5) When you are satisfied with the transom planks make the two new frames and glue them into place to the side planking surface. Let the glue set up. You now have half a frame's surface to position the last two transom planks.

6) Mark your "caulking" on the 2 transom planks and glue them into place. Have yourself a beer! You made it.

Illustration 215: defining the upper stern.

Step 5:

1) I then used a divider to take from the plans to mark the actual top edge location of every fourth plank. I used a very flexible piece of 1/32" x 1/8" basswood, enough to run mid-ship to mid-ship around the transom. I then soaked it overnight. In the morning, the wet plank was clamped "down the run" starting and top of plank **C**. Keeping the run flush with top of the side plank, the batten went around the transom using marks scribed earlier, and back to midships, clamping as I went along. I studied it visually and made a few more divider confirmations, then left it to dry.

2) I now took a pencil and scribed the top run of the planks to the planks themselves. The batten was then removed.

Illustration 216: The batten in position.

Step 6*:*

1) I used a Zona saw (#82980) to remove the excess planking. I started at the starboard side, I'm right handed, and laid the blade flat to the top of the side planking. I angled the saw blade at an angle to the transom planking, and gently, one plank top at a time, took down the "angles" to a flat surface. As an aid, you can leave the batten in place to guide your saw blade around the rim. Finish sand with a sanding block. You will be surprised at the strength of the transom!

2) Next up was the remaining "ledge". I did this with the sanding block (120 grit paper). Remember, here we are sanding the outer edges of the bottom planking to match the angle of the transom's "slope," 17-degrees to 9-dgrees.

3) A sanding sponge was used to sand the surface of the outer transom.

4) I hand sanded the inner surface of the outer transom.

5) Did I tell you that you could have chosen a plumb or raking transom as an alternative? Sorry for that.

Option 1 completed:

NOTE: I presented this option first, based upon the fact that it was the method used to transom the first prototype.

Naturally, when you get a chance to "give it other go", you learn from your experience and make a few adjustments along the way. I decided it was much easier to maintain the accuracy of the build of the transom with the installation of the two deck beams mentioned in the introduction of this section.

So, I recommend you do so, when called for if you are building with Option **2**.

Illustration 217: Option 1 sanding finished.

Illustration 218: Option 1 weathered.

Option #2: The rest of the story.

Illustration 219: Option **2** done!

The option 1 components that are identical with the option 2 procedures:

1) Follow Option **1**, Step **1**. Make your plank blanks up.
2) Continue with Option **1**, Step **2**, **#1** through **#4**.
3) **Here we diverge:** This option requires only one side of the plank to be angled and beveled, the other side will remain at 90-degrees.
4) Now go to Option **1**, Step **4**, **#4** and **#5** and construct the frames that will span the union of side to stern **(Illustration 177).**
5) Take two plank blanks, shape your vertical port and starboard planks. Use the drawing below to "eyeball" the needed angles that will be etched into the aft port side of each plank. The 90-degree edge will face forward with no bevel.
6) Caulk the straight side of each plank. Bead the glue on the caulked and angled side of the plank.
7) The goal here is to shape it, fit it forward, and to the bottom planking, caulk it, glue it up, and clean it up.
8) Now we will leave Option **1** procedures and finish Option **2**.

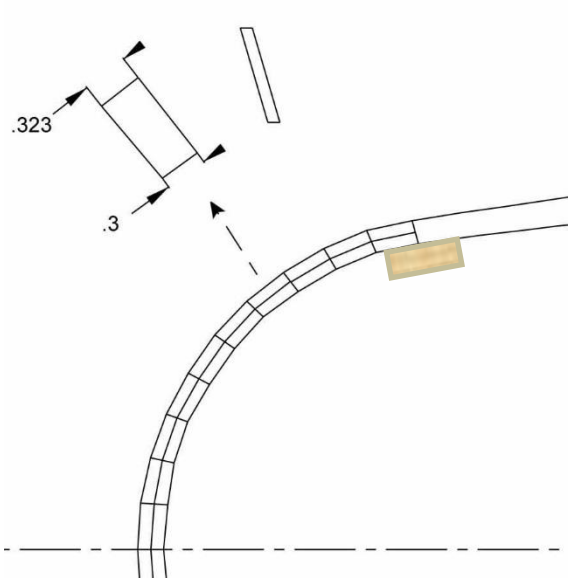


Illustration 220: From plan sheet 6. Frame representation I added to the drawing.

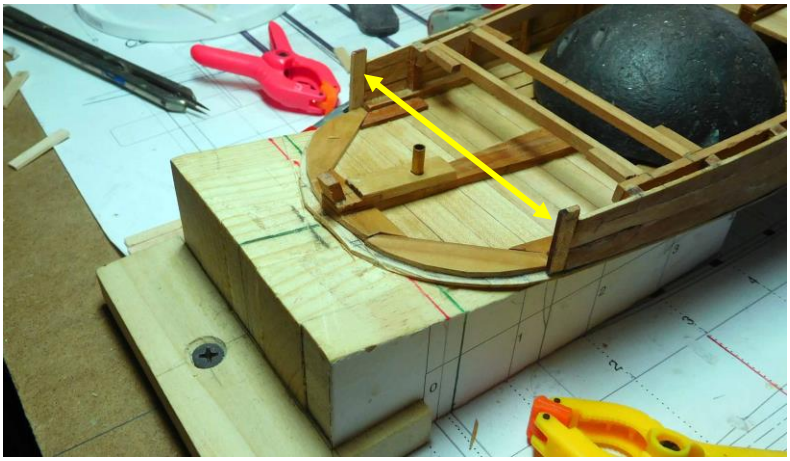


Illustration 221: The two frames.

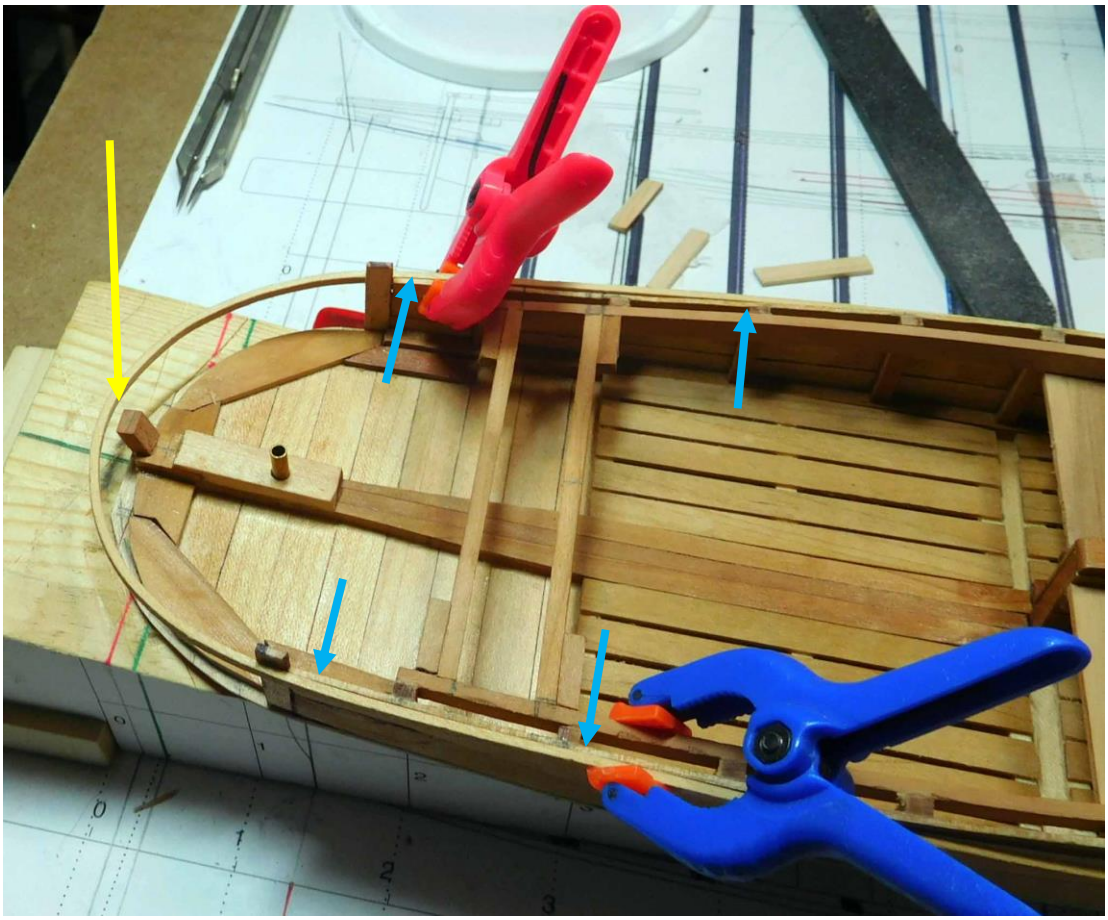


Illustration 222: The transition team.

1) **Illustration 186:** We are going to use a batten from the start in this option. I used a 1/16" x 3/32" basswood strip, soaked, and then wrapped it around the weathered sharpie's transom to dry. When dry, I clamped it into position. Note the **blue arrows** to maintain the run of the batten to the run of the top of side plank's "**C**". The **yellow arrow** clears the transom support log to create positioning of the two "centerline" vertical planks This is the same process used in option 1 but at the start of things not the finish of them.

2) The two planks that "straddle" the **C/L** will be first. With the rudder support log in place at 17 degrees there is a sufficient gluing surface to establish the proper angle of rise. The straight 90-degree edges of each plank were fitted and then joined at the centerline. Each of these straight edges were beveled at 2-degrees, only the butt of the two together was caulked.

3) Once the two planks were securely attached, the glue was left to set up. Using a divider, I then, adjusted the batten at the centerline to the correct height and re-clamped the batten in place (**Illustration 222**). **Note:** Try not get any glue on the batten. Have some water and a Q-tip handy.

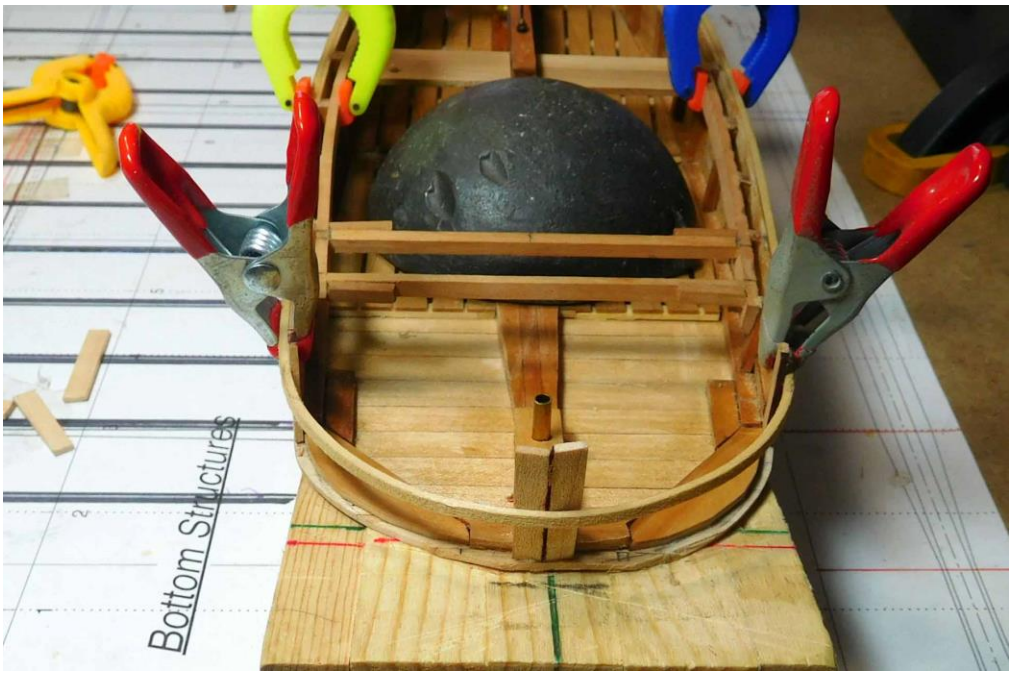


Illustration 223: The fun begins.

4) I added two more planks aft, to initiate the curve.

5) Be sure, as each plank is shaped and set in place, that the ledge apron surface to the vertical transom seat, is “tight” and doesn’t shift while drying. Pressure is applied downward and inward from the vertical plank into the floor planking. A clamp to the vertical plank, at the batten, will keep downward pressure, but it’s press and hold at the base, and that means making sure the seam plank to plank is maintained. Do not try to do more than one plank at a time. Give it time to set up. As you can see, once the first four planks are in place at **C/L**, then another deviation to option 1: I went back to the side planks junction and continued the planking side to side back to join them.

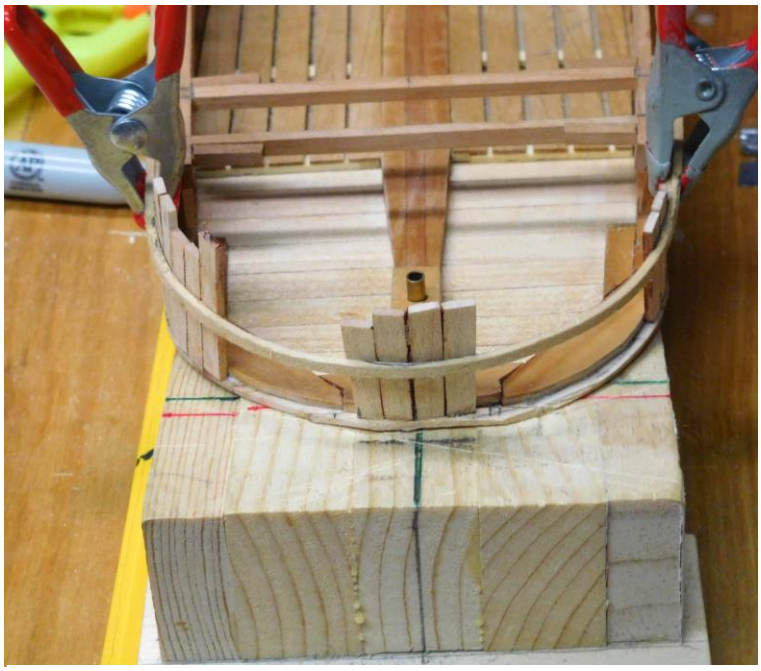


Illustration 224 The transom batten.

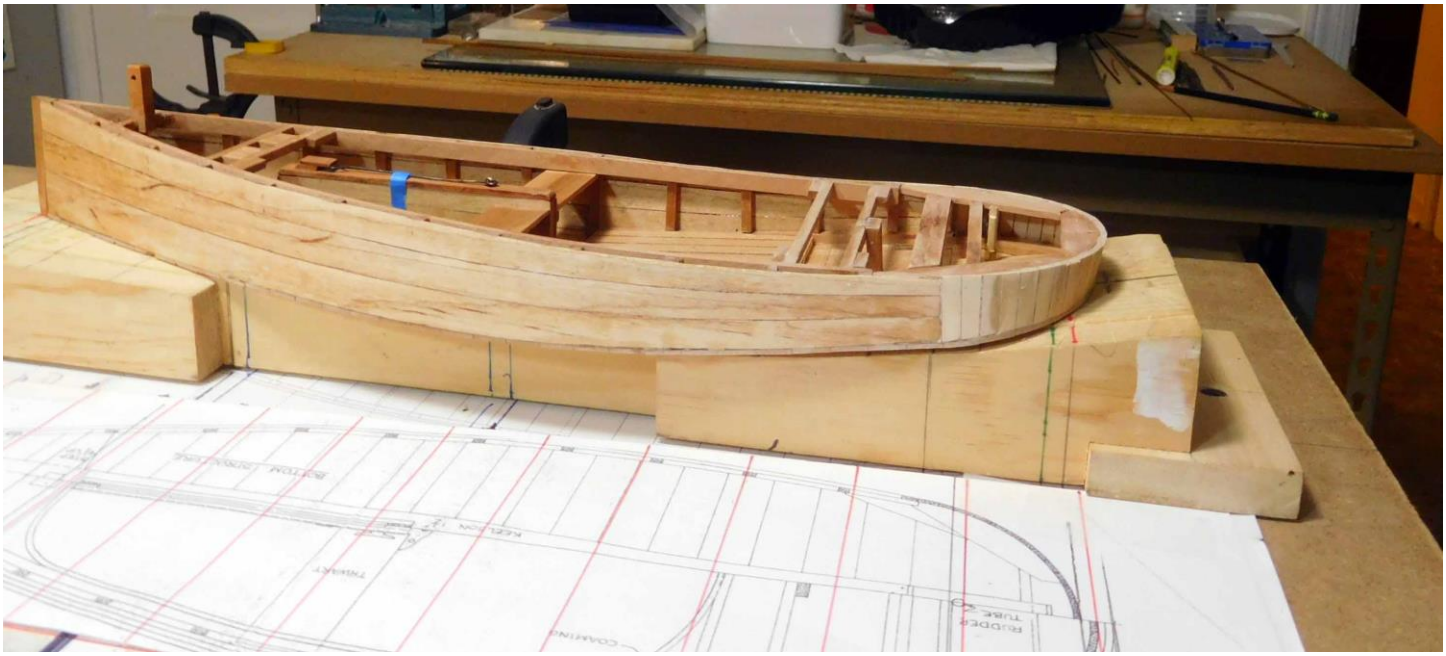


Illustration 225: Phase 4.1 next.

6) **NOTE:** A clamp can be used to hold 2 planks together. Place the clamp centered over the unioned edges of two planks you have set in place. Because of the extra length of each plank, the clamp can rest atop the batten edge.

6) When the circle is closed, double check the location of the batten and scribe accordingly.

7) At this point you can then go back to Option **1**, Step **6** and finish-up.

8) As to the batten used in both, **save it.** We will use it to seat the upper deck stern flooring.

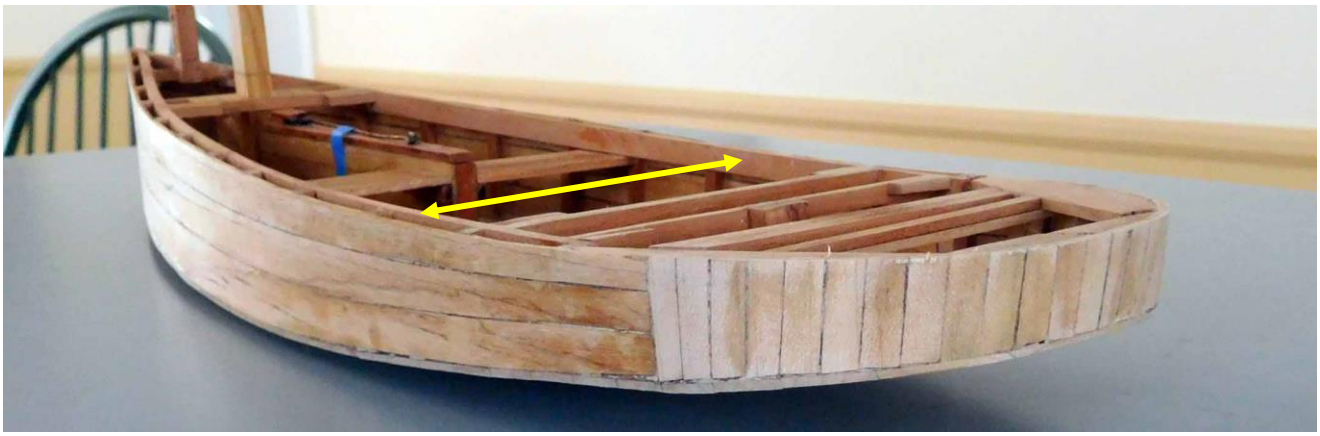


Illustration 226: The **sheer planks** and the start of Phase 4.

Phase 4

Deck the Halls...

4.0 An Outline of Phase 4:

1) The thwarts
2) Mast partners, deck beams, and bowsprit bitt
3) Upper deck flooring and the beams that support them
4) The deck planking
5) The bowsprit construction
6) The false wale, rub rail, toe rail with scuppers, cockpit coaming and molding, and bowsprit installation
7) The rudder, rudder logs, and iron pipe rudder tube
8) Painting and weathering the open-cap sharpie

Illustration 227: The journey through Phase 4.

4. 1 The Thwarts:

Research Locator:

"Thwarts are secured to the hull by carlins, or stringers, which run fore and aft along the inside of the frames at the desired height; these are screw, or nail, fastened to the frames, as a rule, but may be riveted through all."[1]

Materials:

Basswood/Apple: 3/32" x 1/8" for the stringers and 1/16" x 3/4" for the thwarts

The time is right to make and seat the thwarts while there is still ample room to work in. The installation is pretty straight forward for each type of centerboard housing. The open cap is a little trickier than the closed cap due to the upper side support logs and the overhang of the side cap logs. Our goal here is to size and shape the thwarts to fit the inner surface of the side planking and the outer surface of the **CB** housing. We must seat the thwarts in place, at the same time we position the **CB** housing in place. The housing is dry fit. The thwarts can also be dry fit if the fit is tight enough to hold them in place. Can you figure it out? (The solution is noted in step **6**, page **150**.) We do this with as little adhesive as possible, should later, for whatever reason, there is a problem with centerboard, you will be able to remove it easily, repair what needs repairing, and replace it, doing no harm to the assembly. I will run through each type of cap fitting, individually.

Illustration 228: Ready for the thwarts.

[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), p. 458.

The thwarts construction and fitting for both cap options:

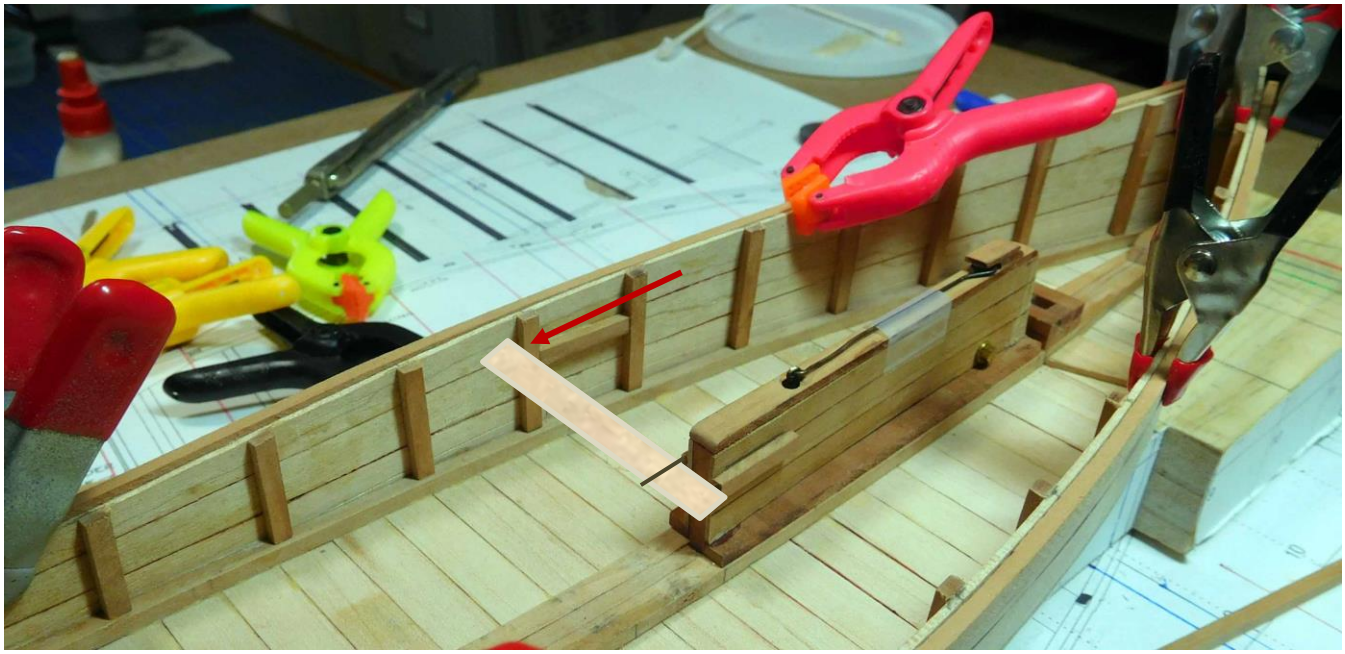


Illustration 229: The stringers in place and note the scribing of the length of the thwart.

1) **Illustration 230:** You will notice that the thwarts run parallel to the bottom-planking, and that means that the seating of the stringers must be carefully placed to assure that happens.

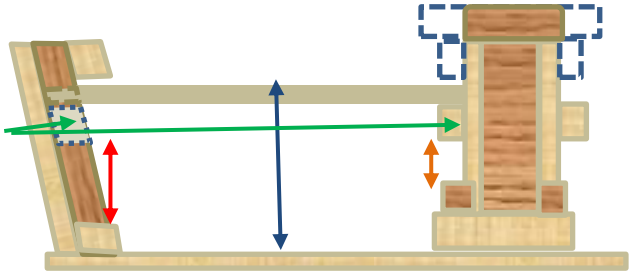


Illustration 230: thwarts
Option 2 Closed-cap
Option 1 open-cap (**blue dash** lines)
Stringers (the **green arrows**)
sheer clamp to chine components

Not to scale

2) The **blue arrow**, to the right, determined from the plans, rises 7/8" from the top of the flat bottom-planking to the top surface of the thwart. Here's how it breaks down:
   a) 3/32" is the chine.
   b) 5/8" is the rise form the chine to the underside of the stinger (the **red arrow**).
   c) 3/32" is the stringer.
   d) 1/16" is the thwart.

3) Now take a piece of thin scrap stock (1/32" x 1/8") and cut a piece 5/8" long. Lay the piece on top of the chine up against the side planking, and scribe a 1/8" marker.

4) At the **CB** assembly, determined from the plans, the rise is still 7/8” from the top of the flat bottom-planking to the top surface of the thwart, but breaks down slightly different:
    a) 1/8” is the keelson.
    b) 1/8” the lower centerboard keelson logs
    c) 5/32” is the rise form the keelson to the underside of the stringer (the **orange arrow**).
    d) 3/32” is the stringer.
    e) 1/16” is the thwart.

5) Repeat **step 3** with a scrap piece at 5/32”.

The stringers and the thwarts:

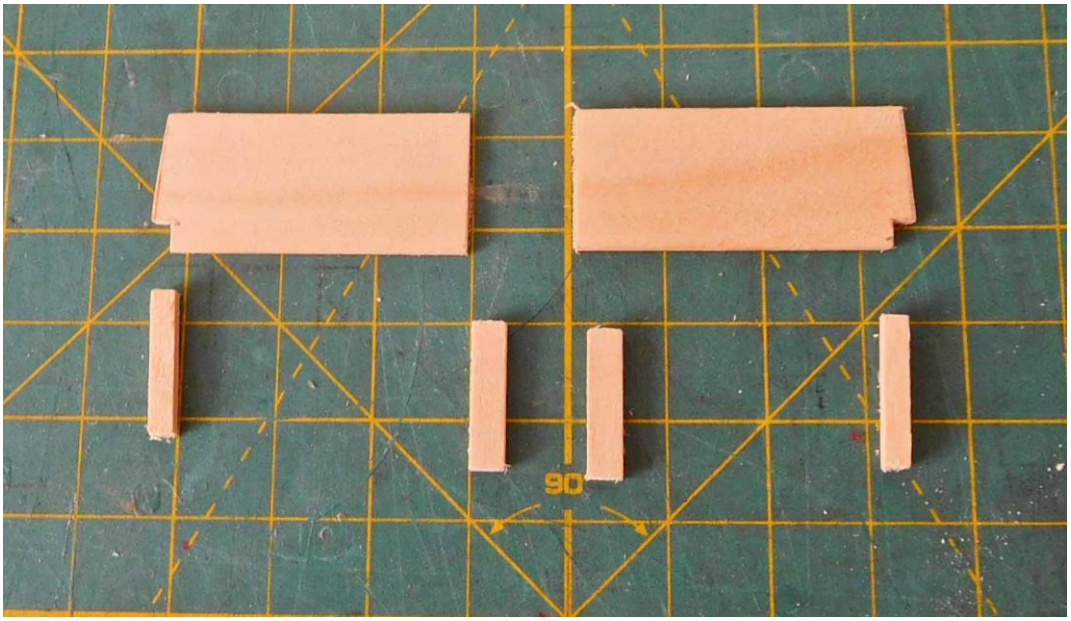


Illustration 231: The components

1) The frame locations will dictate the length of the two side-plank stringers. Take a slightly longer piece of stringer stock, or measure with a divider, and mark. Now cut the stringer to fit using your mark and your eyes to set it in position. Dry fit for now, and to make gluing easier later, scribe the top of the in-place stringer, with pencil, onto the inside of the side plank. Going to the **CB**, repeat at the side planking with the **CB** thwart stringer. I used a small piece of double stick tape to backside of stringer to hold it in place. Set the **CB** in place. I use a pair of dividers to assure both stringer marks line-up. If OK, glue them in place. I then took a strip of 1/32” basswood to determine the length of the thwart. Placing one end against the frame while holding the other end to the **CB** housing (**Illustration 229**).

2) Back to **Illustration 229:** The thwart itself is 3/4” wide and if you look at the side plank frame, it is positioned in line with the end of the **CB** housing. The **CB** stringer seating runs to the very end of the housing. That means the thwart must be notched to the frame to seat properly. It also must run with side planking curving slightly forward as it approaches the stem.

3) Use your spacer to cut a thwart blank to size. The gentle turn of the side planking toward the stem can be taken and transferred to the thwart from the plans, as you have done before, using a ship’s curve. Sand the curve to the blank.

4) Now that the gentle curve is in place, take the thwart; we know the frame is 1/8” wide by 3/32” deep. I used those measurements and scribed the top surface of the blank. Using a single edged razor blade, I cut out the notch. Now test fit into position and make any adjustments necessary.

Illustration 231: The thwarts stained for weathering.

5) For those who are weathering their model, before installing the thwart components, I gave them a wash of water and India ink. (Section **4.9**, if you haven’t read it, outlines, from the beginning of the build my weathering procedure.)

6) Now, take the **CB** housing and insert the fore end log in place. With the other hand, take the thwart and set it onto the plank side plank stringer. Now, as you lower the aft end log into position, bring the thwart against the **CB** stringer, on both sides, and seat the housing. Check the fit, adjust if necessary. If you feel that pressure alone is insufficient, a little dab of rubber cement to the side plank stringer, will do the trick. There you go: it is secure, but can easily be removed in necessary.

Illustration 232: Open cap

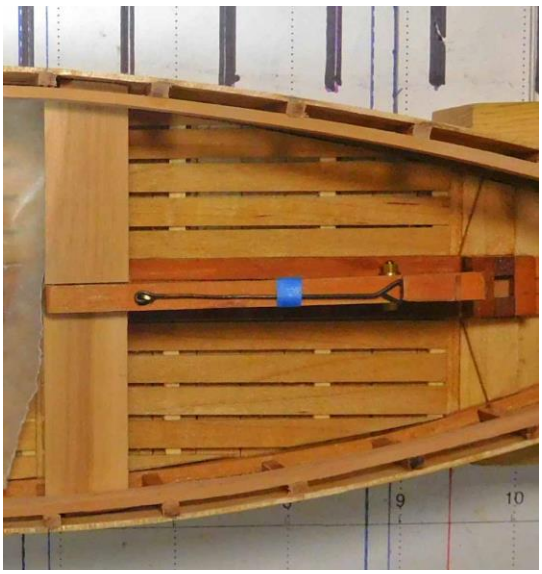


Illustration 233: Closed cap

4.2 Mast partners, deck beams, and bowsprit bitt

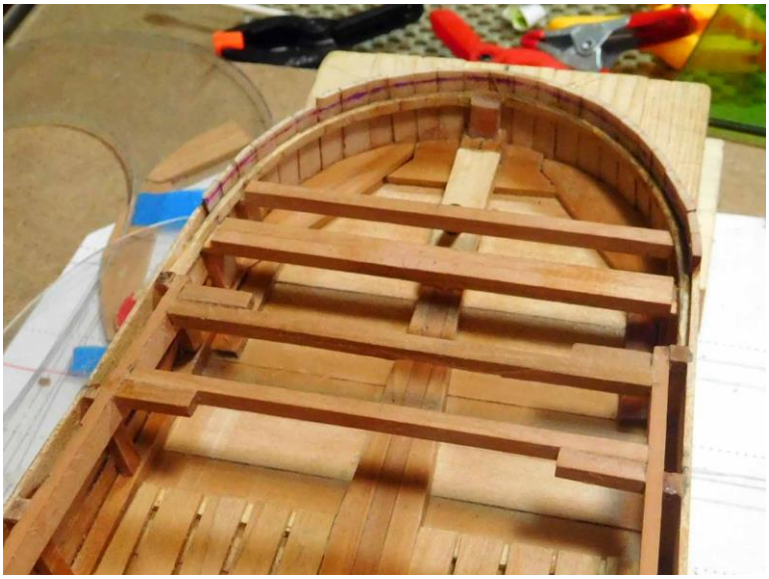


Illustration 234: The aft deck beams

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **253-263**

Partners, Blocking

"If there is a mast, the partners may be heavier and be snugly fitted between the members on which it bears. Around the mast, in a boat having a set of partners, the blockings, or blocking and knees, is through-fastened fore and aft, from deck beam to deck beam."[1]

Deck Beams, Fitting and Fastening to Sheer Clamps:

"If the sheer clamps are properly fastened to the frames, and this is easy to do, the deck beams fastened to the clamps are much stronger than those fastened to the heads of the frames."[2]

We will proceed the build by working bow to stern. There are several methods of setting the deck beams to the sheer clamp. As this sharpie is relatively small, there is no need of a complicated fastening procedure. Actual procedure was simply screwing and/or nails through the deck beam at the receiving notch in the sheer clamp. Some of you may have read ahead and installed the beams just aft of removeable flooring. You are now ahead of the game. Congratulations!

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[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **258.**
[2] Ibid. p, **255**.

The making and installing of the deck beams:

Materials: 1/8” basswood or hardwood of your choice.

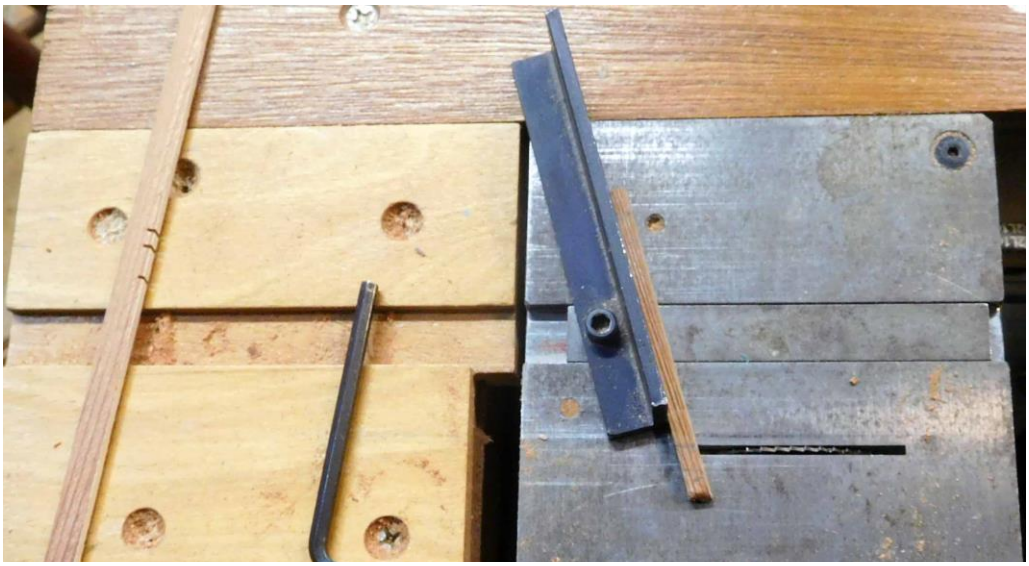


Illustration 235: ready to shape the beam.

1) The first order of business is to cut seven beams to a length sufficient, at each beam location on the plans, to extend the beam blank over both sides of the hull planking. The illustration below is easier to read than you might think. When reading about a specific beam style, come back to this drawing. The view is from above looking straight down except for the drawing indicators: “Frame” and “Sheer clamp notch”. They are in cross-section.

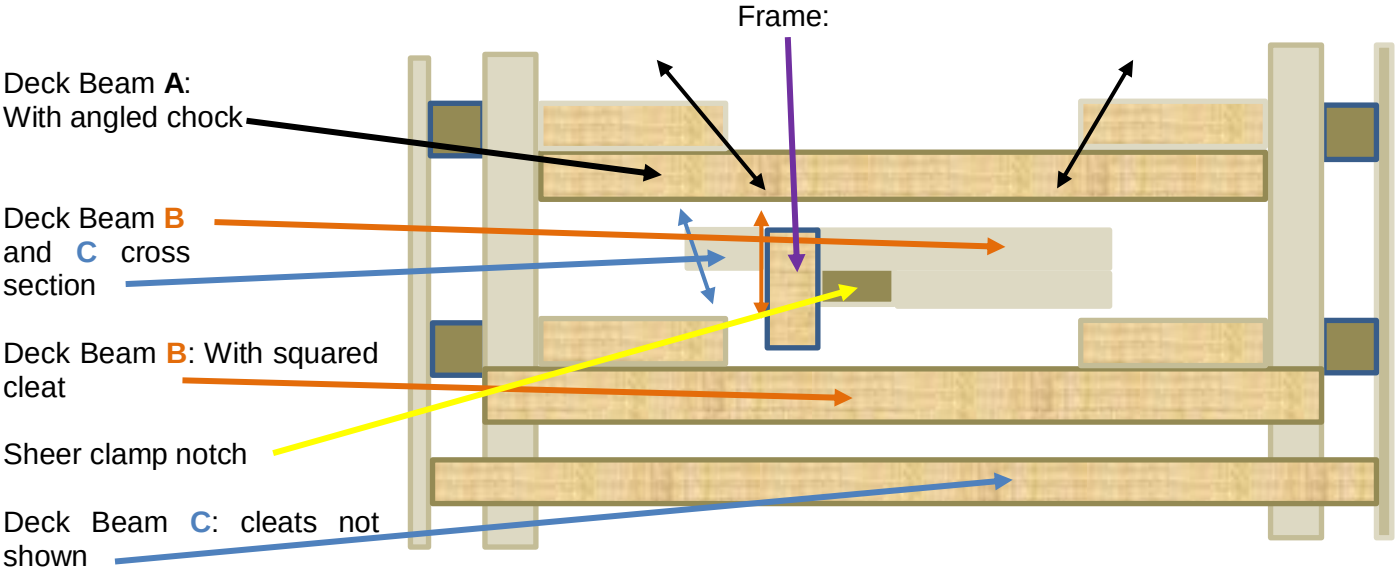


Illustration 236: The 3 Beam options at the sheer clamp

Using Deck Beam, A: inside chine to inside chine, no notch.

1) The first deck beam, working fore to aft, is the shortest beam and will eventually support the bowsprit bitt.

2) The next in line are the two mast partner beams.

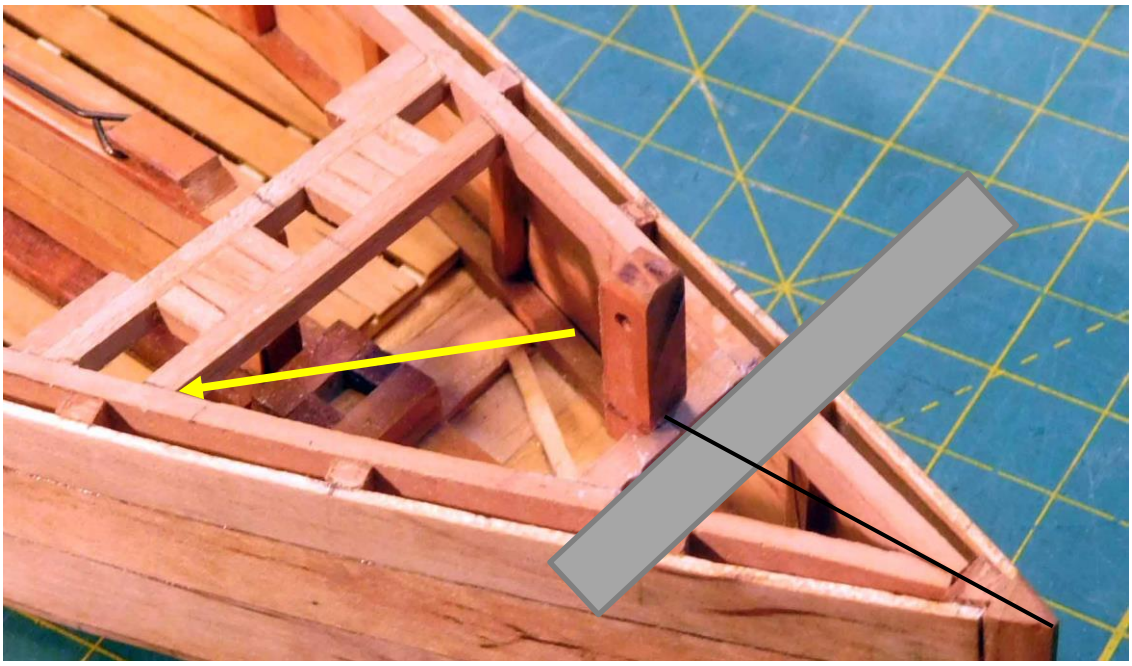


Illustration 237: Deck beam **A** (Used here on the forward 3 beams.)

3) Note above the joinery utilized in Deck Beam **A** (the **yellow arrow**). Because this is a small sharpie, it is a viable option and saves notching the beam and the sheer plank. Set your sharpie onto the **BJ2**, and locate the beam's position. Onto the surface of the sheer plank, pencil in both the fore and aft edges of the beam. Make sure the run of the beam will be 90-degrees to the **C/L** of the hull. Take a 1/8" beam and hold it in place between these lines. When you find out you don't have 3 hands, run a piece of double stick tape across the hull and over the deck beam location. Now reseat the beam back in place.

4) Against the side edges of the beam, position a straight edge; double-stick tape might be a third hand to hold placement. Now look carefully at the straight edge match up to your original position marks. It should lie 90-dgrees to the **C/L**. If not, make the needed adjustment by removing the tape, erasing the mark that appears to be the culprit, and re-pencil on both sides. Pencil the edge onto the side plank and chine surfaces. Before removing the beam from the tape, pencil in the **C/L. Note:** The bowsprit bitt, as shown in the picture above, will not interfere with this task: it is still resting comfortably on plan sheet **2 of 8**.

5) Remember, the side planking angle of rise was 9-dregrees at midships. It is most likely less than that at this location, so estimate what you think it would be. It is this angle, carried to the inside surface of the chine, and then to the ends of the beam, that creates the "wedge" of support.

Using Deck Beam C: side planking to side planking, notched.

1) The marking process for the beam blanks is the same at each location but with two additions: adding the inner face of the chine to pencil in the vertical lines of the notch to be, and the vertical edge, both fore and aft, where the notch and the beam seat.

2) Go back to **Illustration 235:** I set the miter gauge on the Preac saw to the angle penciled in on beam ends. Then I set the table of the disk sander to my estimated angle, let's say in this case 3-degrees, and sanded the bevel to "just off the line". This will assure you don't make the beam too short on the first cut.

3) Dry fit the beam. It should be, if all the lines were accurate, just a bit too long, and need another trimming. That was expected. **HINT:** It is easier to work on only one side at a time so bring your disk sander, or sanding block alongside the **BJ2**, and very carefully sand to fit." Now do the same to the other side of the beam. I hate to say it, but sometimes too much comes off. If so, use the short beam to remark a replacement beam. Slow intervals are the key. If you are thinking of using the disk sander, be careful. Using a sanding stick or small file might be safer. Once the dry fit is satisfactory, check the **C/L."** If the beam fits", just erase and re-mark the **C/L** to the correct location.

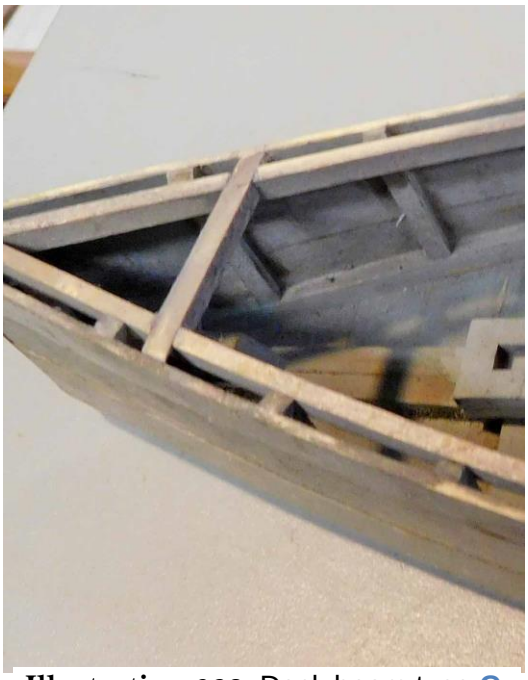


Illustration 238: Deck beam type C.

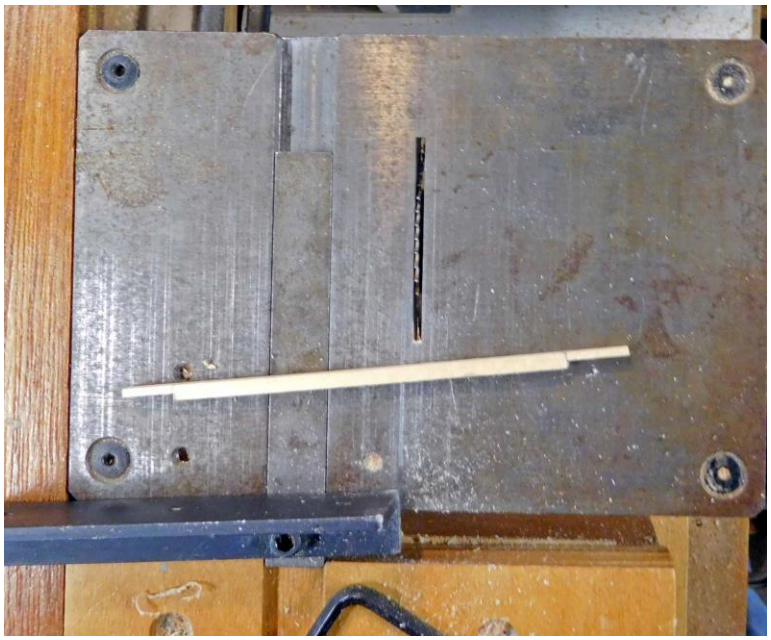


Illustration 239: A C beam ready to be seated.

4) Glue in place to finish the installation.

5) Here, after the location has been penciled in and the inner location of the inner edge of the sheer plank has been sketched onto the surface, the beam goes back to the Preac saw.

6) With the table adjusted to the sheer clamp angle, re-elevate the saw blade to 1/16" above the table. Match the angle to the miter gauge, test with scrap wood, and adjust accordingly.

7) With a series of slow passes from just ahead of the line (you're leaving extra room) to the end of the line, create the angled notch. Test fit as before, and adjust at one end as necessary to dry fit in place.

8) When fit, go back to sheer clamp which will have been scribed with the required shape of the notch, at 90-degrees to the **C/L.**

9) I lay a straight edge into position across the beam. Take a new single edged razor blade to set the blade along the pencil line and slowly press the down to start the notch. Do the same to the other 3 locations. Use another beam blank and proof the width of the opening, making sure it is not too wide. Remember, there will be a deck over the beams, so not to worry if it's with a small error. Leave it.

10) When the "pre-notching is done, mark a centerline onto the side of the sheer clamp under the notch to be created, at mid-point. Now make sure the blade reaches the **C/L** at the notch ends.

11) Using a small chisel or a #11 bland, "slice" the notch "clean".

12) To finish, dry seat the beam and adjust the fit of the beam if necessary. Now, you have ends of the beam that are out over the side planking. Mark the inside edge of the side planking onto the top of the beam, and repeat any "tweaking" needed to seat properly. When seated, adjust the beam notch to the sheer clamp, if necessary.

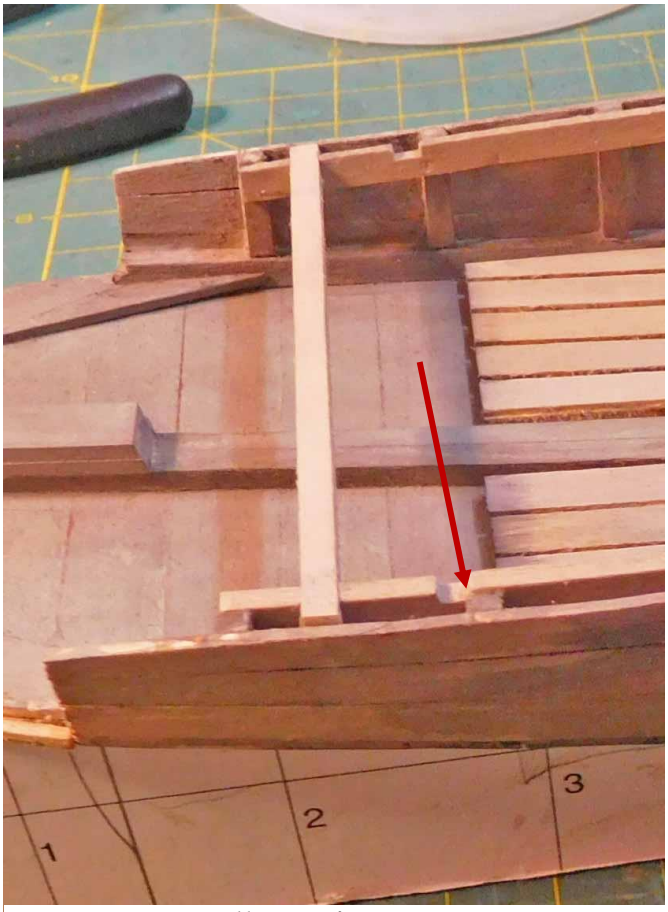


Illustration 240:

The B deck beam: chine to chine with notch.

Note: This is the C deck beam construction, but finalize the outside ends at the inside edge of the sheer clamp and you just made it a **B.**

Chocks:

Note: Chocks are made from deck beam stock and the outside end seating will possess the same end angles as the beam they will be fastened to.

An alternative:

You can make the **C** deck beam another way: just laminate two 1/16" x 1/8" pieces of stock together. Use the techniques described to get the length and angles of the lower plank and then do the same with the top plank and glue them up. Sand the edges and no one will ever know.

In Illustration 240, please note the port notch is severely close to port side frame. If you find yourself up against a frame, don't worry about the frame, just use the **B** deck beam technique (the **red arrow**).

The beams of the round transom:

The aft 3 deck beams are unique from the forward beams:

1) These beams will be supporting the 1/16" transom upper flooring, and as such, the upper surface of the beams will rise 1/16" short of the top of the vertical transom planking.

2) First step is to pencil a line around the inside of the vertical planking marking the 1/16" beam surface location.

3) As done previously, mark the location of beams onto the top edge of vertical planks affected.

4) Lay a 1/8" square beam blank across the span and shape as before, erasing the shaping of the end.

5) **Illustration 242:** This show the 3 beams dry fit into position. Note: the doubling up at the forward. This is where a boat owner will stand working the tiller under way.

6) Remove the beams and set aside. At the 3 positions pencil a line 1/8" below the line of beams surface.

7) **Caution: Illustration 241:** Note the keelson hole for the rudder tube, a 1/8" brass tubing connection of the rudder to the tiller. It is close to the last beam. Make sure the beam location is not blocking its rise through the deck planks.

Illustration 241: Don't block the rudder hole.

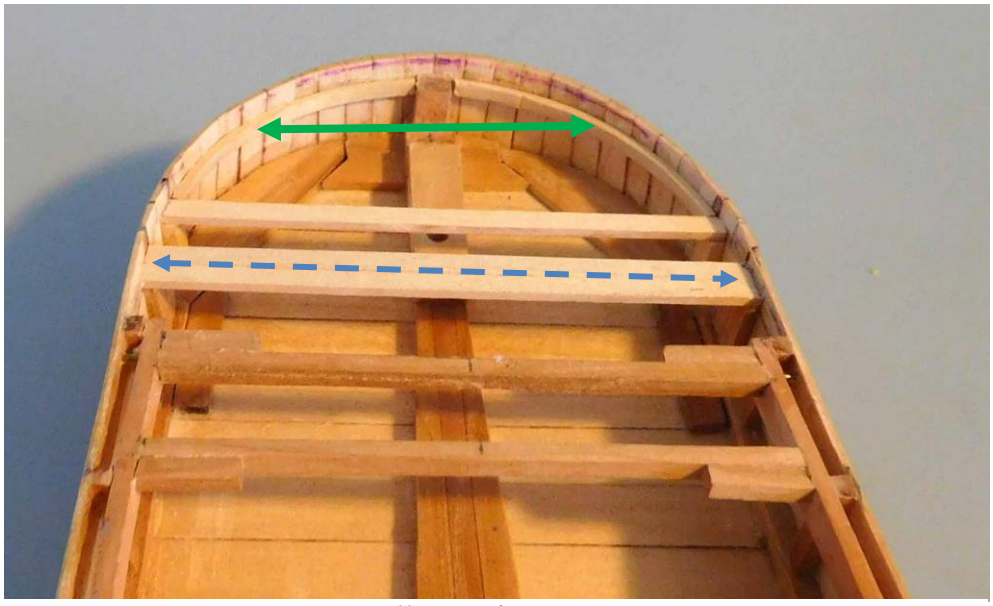


Illustration 242:

8) You now can make and fit the beam vertical support logs. I used 3/32” x 1/8” stock to fit them to the distance required from the lower stern logs to bottom of the beam (the 1/8” marker). There are some angles involved, at both ends of the logs, to allow for the angular rise of the vertical transom planking. The pieces are small and you can probably estimate and sand or cut the seat without much of a hassle. When satisfied with the dry fit, glue in place.

9) Dry fit the beams one more time, and when satisfied, glue them in place.

The mast partners:

Where there are openings required in the deck framing to accommodate a mast, capstans, etc., partners are a framework designed and constructed to support and stabilize the component, when under stress. The framing is usually constructed with heavier, or thicker planks that are tightly fitted around the opening, running along the center line from beam to beam. In our case, we have the mast hole, and it is straight forward. Once the partners are in place, the deck planking will further strengthen the support.

Illustration 243: The mast partners ready for installation.

1) As you can see, the assembly is 2 beams sandwiching 8 horizontal support logs. All logs are 1/8” square. The 2 beams are extended so that, after gluing up, the assembly will rest atop the side planking.

2) You can make yourself a small template to construct this assembly “off the boat.”

   Materials: 1/8” square stock, one index card, double stick tape, one straight edge, one mini-square, a piece of wax paper, and glue. Cut 8 logs at 1/2” and 2 deck beams to the size required of the beams.

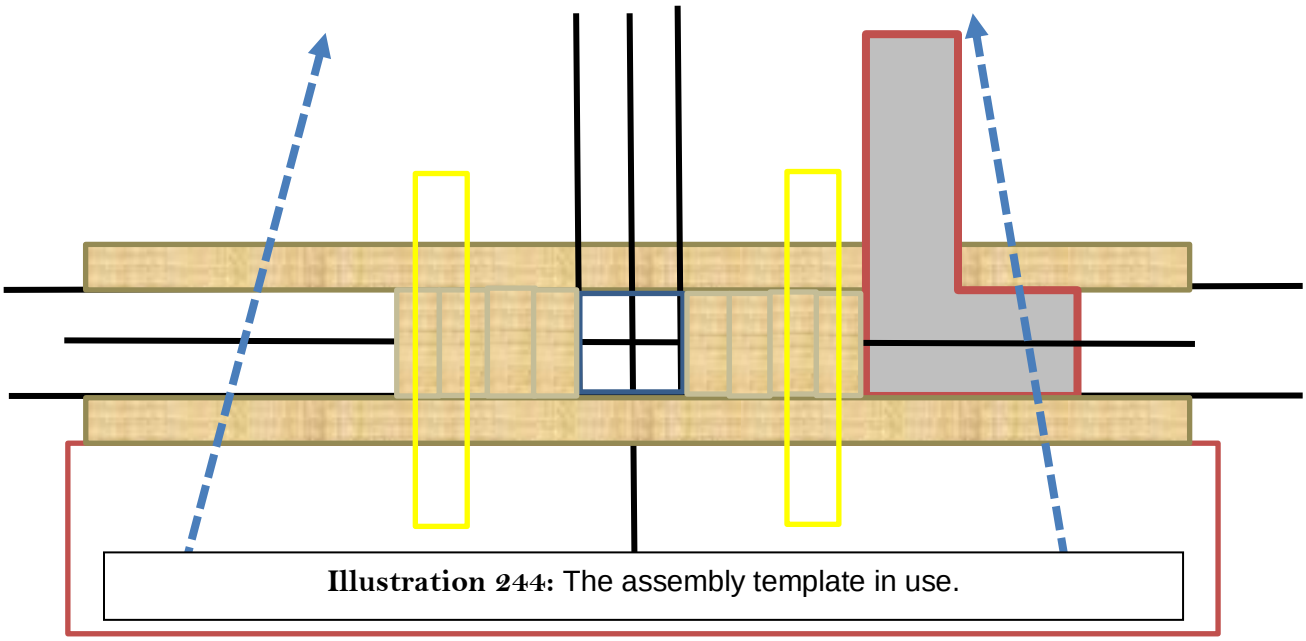


Illustration 244: The assembly template in use.

The process:

1) On a flat surface (I use glass), tape the index card down. Run the tape on the backside about an inch longer than the card. Draw a horizontal **C/L** and a vertical **C/L**. Now draw a horizontal line 1/8" above and below the **C/L** and repeat for the vertical **C/L.** Anderson couldn't make a better 4-pane window. This is the mast hole, the gateway to the mast box. It is square and not round because the stock for the mast is 1/4" square from the mast box up through the deck before tapering to round

2) Cover the drawing with the wax paper, held in place by tape overage.

3) Using the drawing above, run 2 vertical strips (outlined in **yellow**) of tape. Press the deck beam in place under the **C/L** Take the straight edge (outlined in **red)** and place it into position. Use the mini square (**red** and **gray**) to assure 90-degrees and, working out from the window, glue each log to the lower beam. As each log is in place, one side should have a light bead of glue. **Note:** Take a 1/4" piece of basswood or pine, et all, and place it over the vertical **C/L** as you position to glue the two logs in the center. This will assure you that your mast will go through at a good fit.

4) Now you can place a dab of glue atop the logs and set the upper deck beam in place. Make sure your satisfied with 90-degrees all around the "rectangle," and cover the assembly with wax paper and weight it down to dry (no pun intended). When dry, remove and sand, a you are ready to fit and finish.

The final additions:

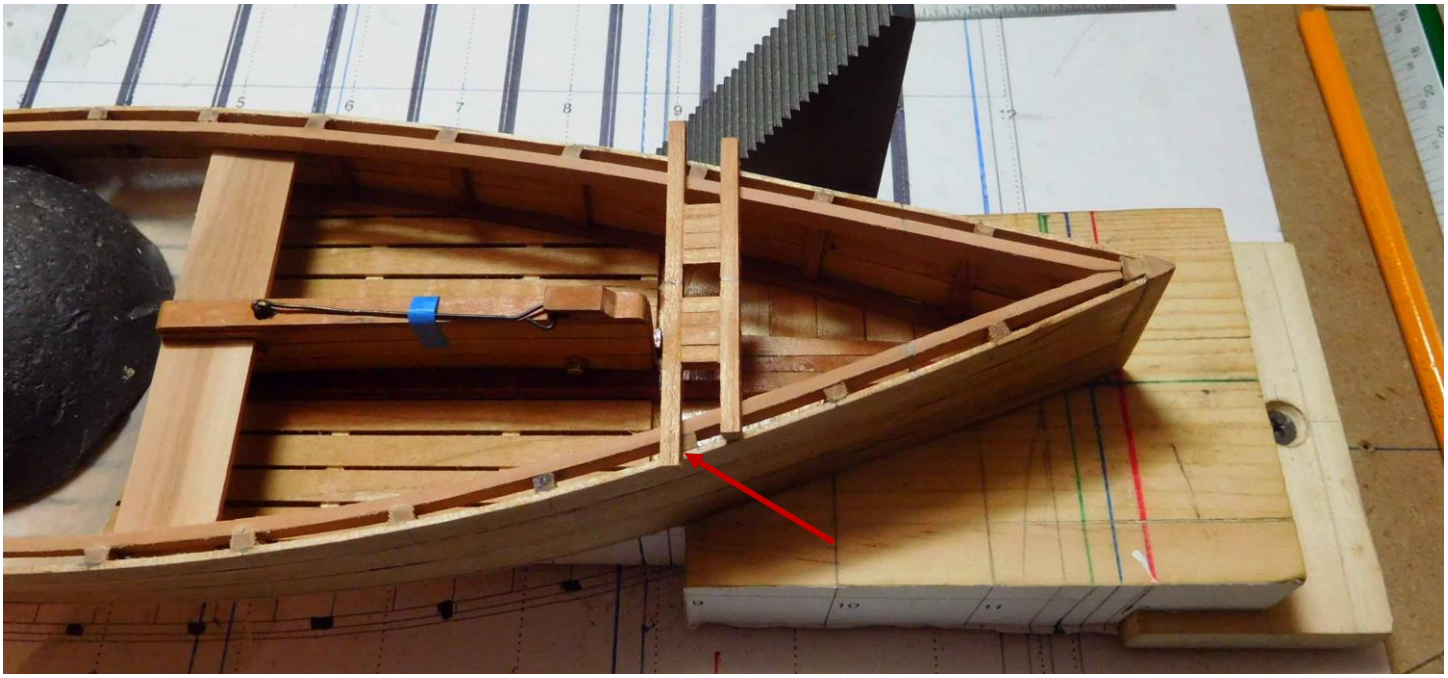


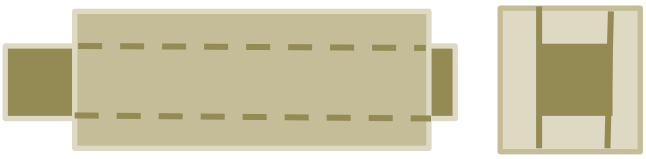
Illustration 245: This mast pendant assembly ready to be scribed. Note that all three beam installation options are still open. **One just barely**.

1) Here is what is important: The mast must rise 90-degrees to the **C/L** of the hull and positioning to the rake of the mast from the plans must be achievable. In the case of our sharpie, we are in luck: the sheer rise of hull on the jig, coupled with the sheer rise of side planking and sheer clamp is the rake. So, when setting our assembly, we must have the mast – mast box in perfect alignment.

2) To accomplish this, I made a "plug," a portion of the 1/4" mast through the deck. I cut a small piece of 1/8" square basswood long enough, to rise above deck level. Mine was 2" 1/8" inch in length. The center is 1/8" square, 2 sides are 1/16" x 1/8" x 2", and 2 sides are 1/16" x 1/4" x 2". Test fit the tenon into the mast box and the mast partners.

3) If you haven't already mark the location of the of the two beams. Place the assembly onto the hull and in position. Take the mast-tenon just made and set through the partners and into the mast box and center the assembly to the center line keeping the beams at 90-degrees to the **C/L**.

4) When lined up, carefully mark the beam ends to the inside edge of the sheer clamps. Now work to seat the installation in the same way the single deck beams were done.



Not to scale.

Illustration 246: The "plug".

The bowsprit bitt:

1) The bowsprit bitt is 1/4” square. Take the length off the plan and cut the stock. Drill a 1/16” hole through the bitt (centered). The seating of the bitt to the frame requires a notch of 1/8” in depth and 1/8” deep, as shown here in **red outline**. Make sure the bitt is exactly on center to the beam when glued in place.

2) To finish it off, take a sanding stick and round off the top of the bitt and take off the harsh sides of the bitt, from the deck exposed trunk of the bitt. Center and glue in place at the **C/L.**

3) To finish you will need to fill the “arm” hole with a 1/16” dowel and put the chocks in place on the aft partner beam.

4) Note the mast partner assembly in **Illustration 249.** This is a short cut! No one will ever know, except you!

Not to scale.

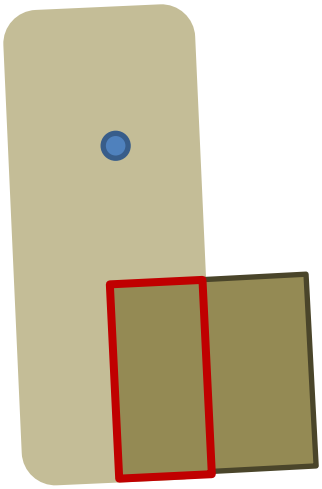


Illustration 247:

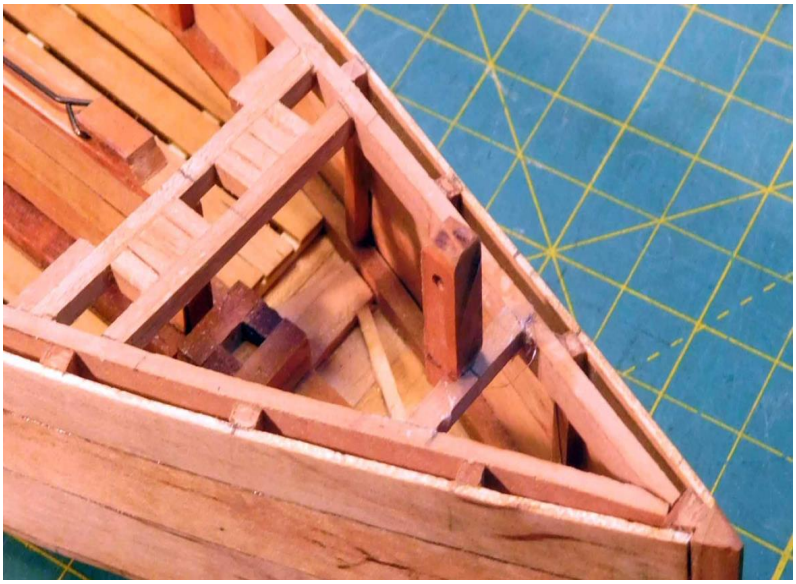


Illustration 248: A beam installation. Note the aft chocks (**red arrow**).

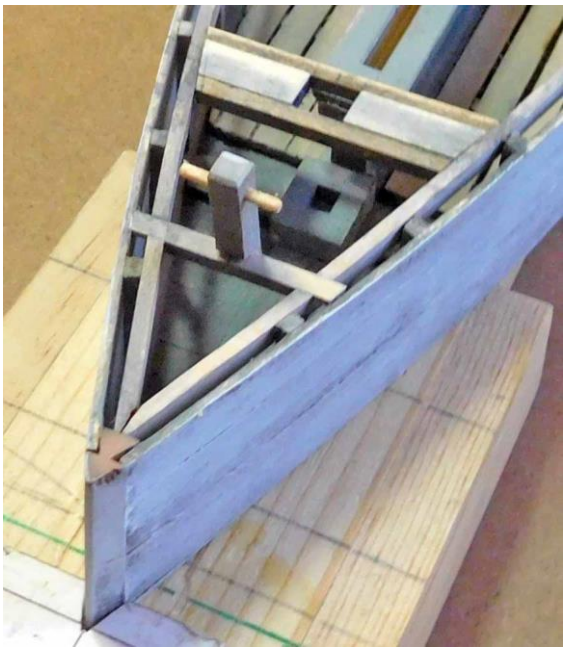


Illustration 249: A beam with single partners).

5) So, there you have it and we have our beams, now to the upper deck flooring.

Illustration 250: Framing is done, upper flooring in next.

4.3 Upper deck flooring and the beams that support them

Research: You might want to review section **3.10**, pp. 64-70 regarding the bottom flooring. The upper flooring is a similar application.

Materials: Same material used in forming the transom bottom planking.

1) The upper deck flooring is constructed in the same manner as transom bottom flooring. The three templates are labeled "Upper Deck Stern Framing"
2) your set of plans.
3) Trim the side templates and affix to the planking material. Now pencil in a 1/8" extension forward (the **blue box**). When you shape the flooring, include the extension.

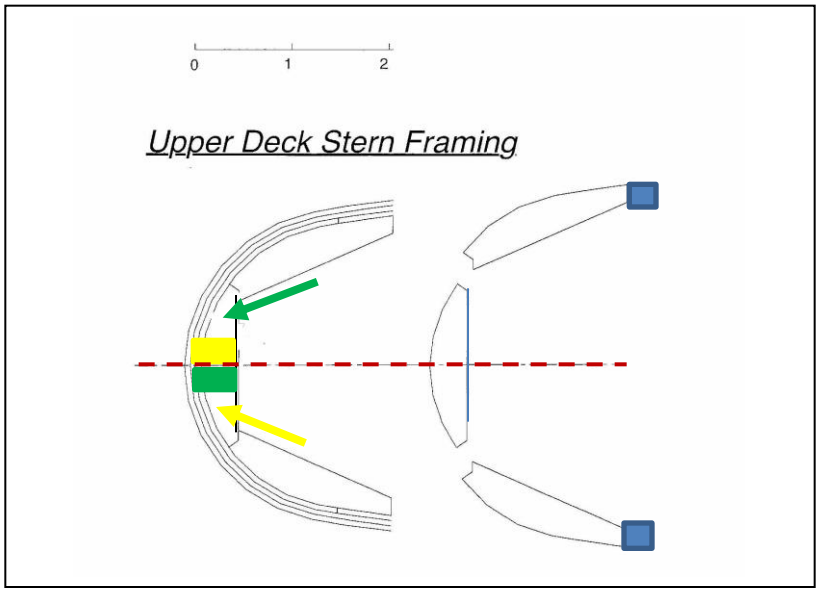


Illustration 251:

4) The aft center floor is affixed next, but separate the template at the centerline. You now have a port and starboard template to be shape separately. Add a 1/8" extension to the centerline of each side, as shown by the **green** and **yellow** arrows in **Illustration 251. Illustration 252** shows the flooring pieces on the port side ready to be fitted.

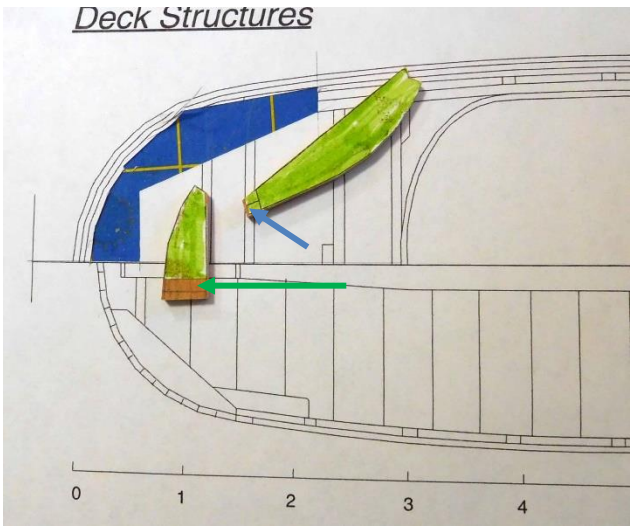


Illustration 252: the extension.

Illustration 253: A dry fit into position.

5) Remember that batten at the end of Section **3.10**? Time to find it! The batten will now be used to create the seating "ledge of the upper flooring. " It also will strengthen the vertical planking when final sanding of round stern planks takes place.

6) Trim the appropriate sections of the batten to fit between the run of the last aft deck frame to the stern support log (**yellow arrow**) at the centerline. Glue in place.

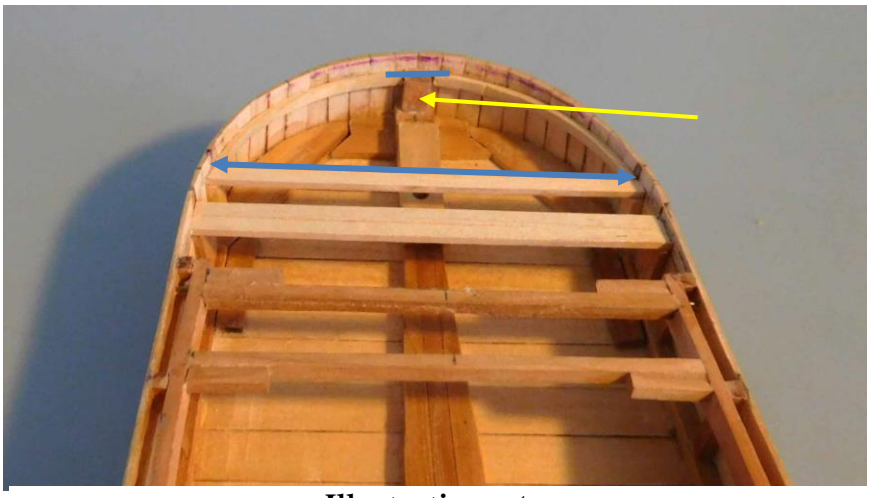


Illustration 254:

Illustration 255:

7) Once shaped, test fit the two side flooring pieces. The extra 1/8" allows you to position each piece flush with the vertical planking running around the circumference. **NOTE:** In a perfect world, the seat of the flooring needs to lay against the planking at same degree of vertical rise. So, starting at the end run of the side planking, you are going from 9-degrees to 17-degrees. Back at my disc sander I set the table at 13-degrees, splitting the difference, and carefully set the contact edge bevel to each piece. I used an average because the level of change is hardly noticeable. A little sanding a small sanding stick will do the trick if should be needed.

8) When satisfied with the fit of each piece, glue and clamp the flooring.

9) The 2-piece centerline aft flooring seating goes this way: Clearly mark the centerline, if not done already, to the stern transom support log (including the inner face), and the 4 deck beams. See **Illustration 253** as the port side is being marked.

10) Take one piece and lay it place. Test fit and bevel as you did with the side flooring. **NOTE:** You're going to find that the extra length could impede a flush fit at the centerline, but should enable you to transfer the line to the upper surface of the flooring piece. A trip to the disk sander will now finish sand to a "perfect fit."

11) Repeat step 9 for the other piece of flooring.

12) I then test fit one last time and make sure my bevel creates a good fit. See **Illustration 257.**

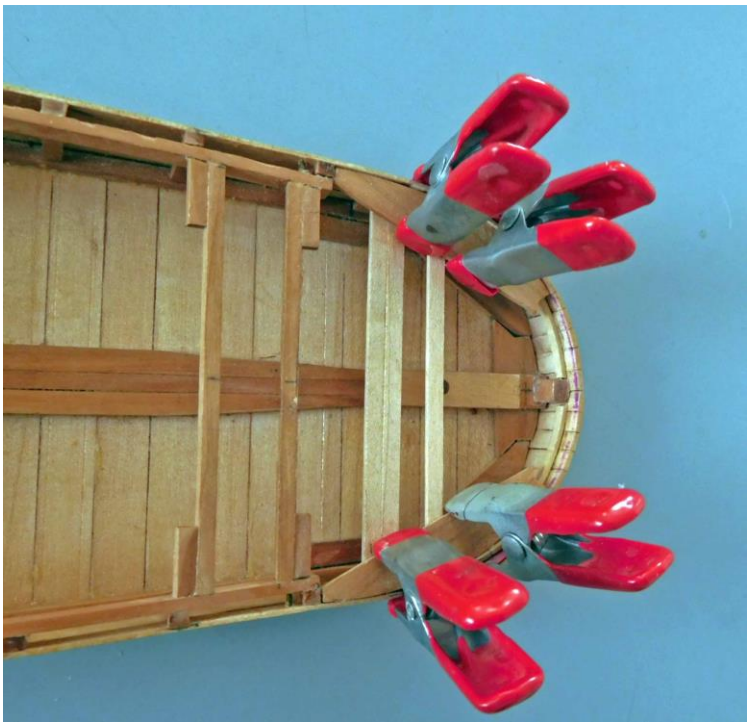


Illustration 256:

13) Last step is to glue both up both pieces. Make sure that upper deck flooring surface is level and ready for the deck planking.

14) To complete the aft deck beams, I brought them to "the surface and topped them off" using 1/16" x 1/8" planking. See the **green arrows** on **Illustration 258.**

15) **Illustration 258:** The bracing support log and "stop" log was made from 1/8" x 1/2" stock. The rise is from the keelson surface to the top surface of the deck beam. To keep perpendicular, you will need to bevel the bottom edges to match the rising keelson. This support is there to support the weight of the "helmsman."

16) The final task is to take the vertical transom planks down to the surface of the deck framing. I used a sanding block with 150 grit paper.

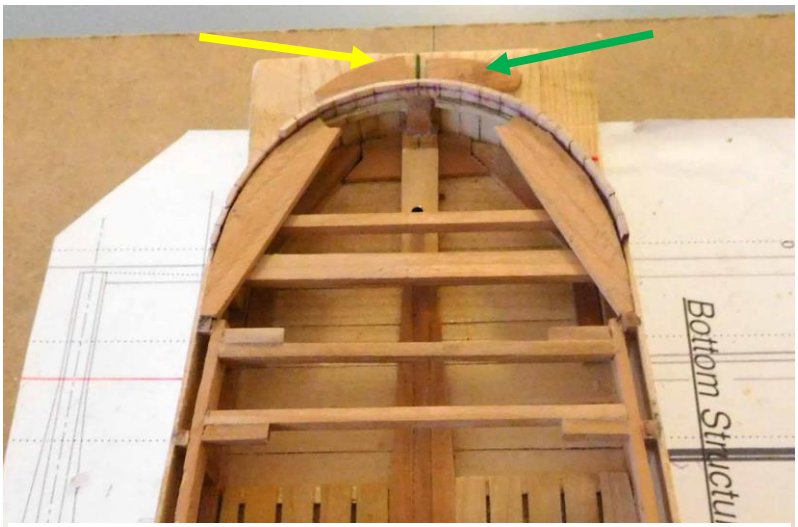


Illustration 257: Note the two finished C/L pieces of flooring all ready for gluing.

17) **NOTE:** The deck planking will run aft to the outer surface of the transom's vertical planking. The ends of the deck planking will be covered with the setting of the wale around the stern.

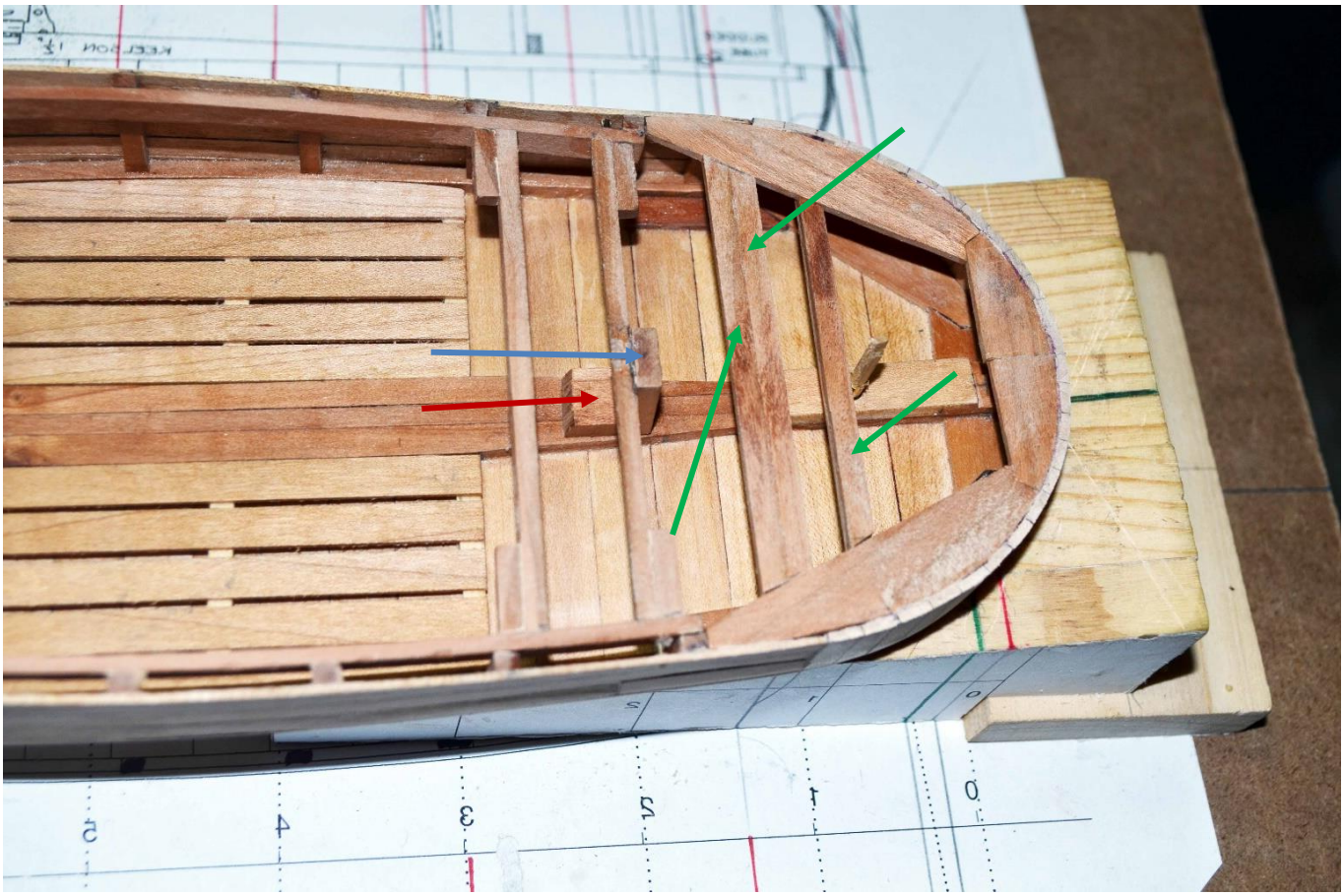


Illustration 258: The completed 2-aft deck beams, **bracing support log**, and **stop log.**

Illustration 259 Ready for the upper deck planking!

A Note on placing a “reveal” in you deck planking:

If you desire to have an interior view of the sharpie deck framing note that the planking is laid up port and starboard as a continuous application. You will start at the stern then move to fore deck and then to the washboard surround of the cockpit. The method I use is an off the boat buildup of “plank blanks”. If you don’t want a reveal, then when the blank is shaped to fit it is ready to be glued in place. With a reveal (I settled on the port side) you shape to fit but no glue. Leave the reveal blank in place but dry fit and proceed with remaining planking.

Illustration 260: The aft deck reveal

Illustration 261: The fore deck reveal

4.4 The deck planking:

Important: After this section was written, I added a third option. Please refer to **page 179. It will direct you to Section 5.3.**

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp**. 258-260.**

"The laying of the deck planks in a flat-bottom hull is usually made as easy and simple as possible... The size of the deck plank is given in the plans; when the deck is canvased there is no particular point in using very narrow stock... If the deck is not canvased, it is usually wise to use plank not exceeding 4 inches in width."[1]

"The usual practice is to cut the washboards out of wide plank in short lengths. Sometimes the butts are scarfed and edge-fastened; this is a strong and workmanlike finish. In may boats the washboards are merely butted, with butt blocks below deck. No directions are necessary for shaping and fitting the washboards; if in one width, they must be wide enough to permit beveling along the sheer to meet the flare of the sides, and along the carlins and sheer clamp or strake... The washboard is usually fitted when there is a deck laid; then it is called the "plank sheer" or "covering board."[2]

Materials:

I used 1/16" x 1/4" maple for deck planking (which is 4" in 3/4" scale). Basswood was used on the weathered sharpie.

Illustration 262: Ever the optimist, Chapelle is sticking to this build as "easy and simple"! Enjoy!

Note: So as there is no confusion in terminology:

When I use the term "blank(s)" I am referring to an assembly of individual strakes or merely a piece of wood on which a template will be defined and formed to the required shape. An artist's canvas, so to speak. The finished "Blank" becomes a piece(s)" or an "assembly" or "assemblies: if there are more than one. A description may include a location, as in "Deck plank assemblies."

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[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp **260-261**.
[2] Ibid. p. **260**.

The “plank blank assembly” #1

Step 1:

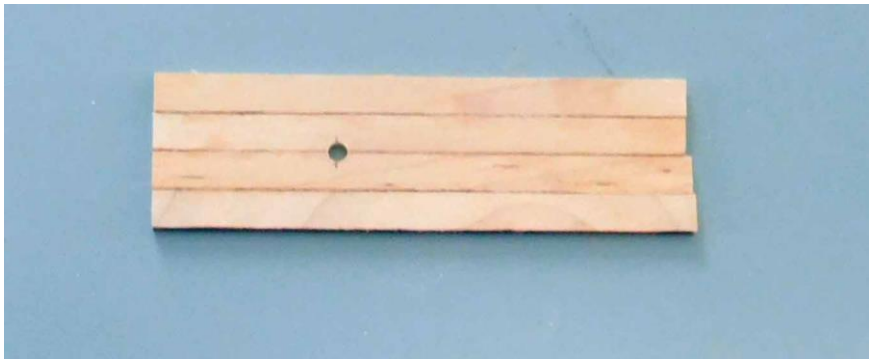

Illustration 263: The “plank blank assembly.”

1) I’m starting aft, at the centerline, with, what I call a “plank blank.” This one consists of 4 maple planks cut to a length that will run from just aft of the stern to just about 4-inches over the coaming’s location. You need to measure your hull so that the overrun is sufficient to allow for the “oval” of the coaming.

2) The maple planks were “caulked” and glued together over a piece of wax paper taped to a flat surface. When placed onto the paper’s surface, I located the planks to one-half of the paper. Elmer’s (carpenter) glue was applied to the plank edges using my index finger to run, run a bead the length of 3 planks, and thus form the “blank.” Asserting pressure, I made sure the bond was “tight.” I know from experience the underside “squeeze out” is minimal against the wax paper, and any surface glue topside was cleaned up with a water dipped Q-tip. I then folded the other half of the wax paper over the top of the blank assembly, placing a small cover of scrap wood over the paper, and literally “weighted” for the glue to set.

3) When the blank assembly was ready, I peeled away the paper and used a single edge razor blade to scrape both the surfaces to remove any residue glue.

Step 2:

Illustration 264: The iron pipe now in its dual role.

1) I made a template up from the plans by spray gluing it onto a cardboard backing, and then separating it into port and starboard. **Note**: there is enough overhang without wasting a lot of timber, and with the aid of the template and **BJ2**, I located the center of the opening for the rudder pipe

2) At my drill press, using a 1/8” drill bit, I could get the plank assembly perfectly on **C/L**. (because I drilled the rudder hole through the rudder logs and cut the 1/8” brass longer that I needed, the iron pipe goes down into the hole in the jig, and acts to steady the hull on the jig and keep it easier to position the hull on or off the jig.

3) To size the blank to fit the stern, turn it upside down and place it back into position. Using the plank blank’s centerline and the centerline created by the vertical planking, lift the hull off the jig, use hand pressure to hold the centerline, and scribe the transom outline onto the assembly. Place the hull back on the jig; lift off the blank, turn it over and place it back in place. Now place the template over the surface of the blank aligning the centerline.

Step 3:

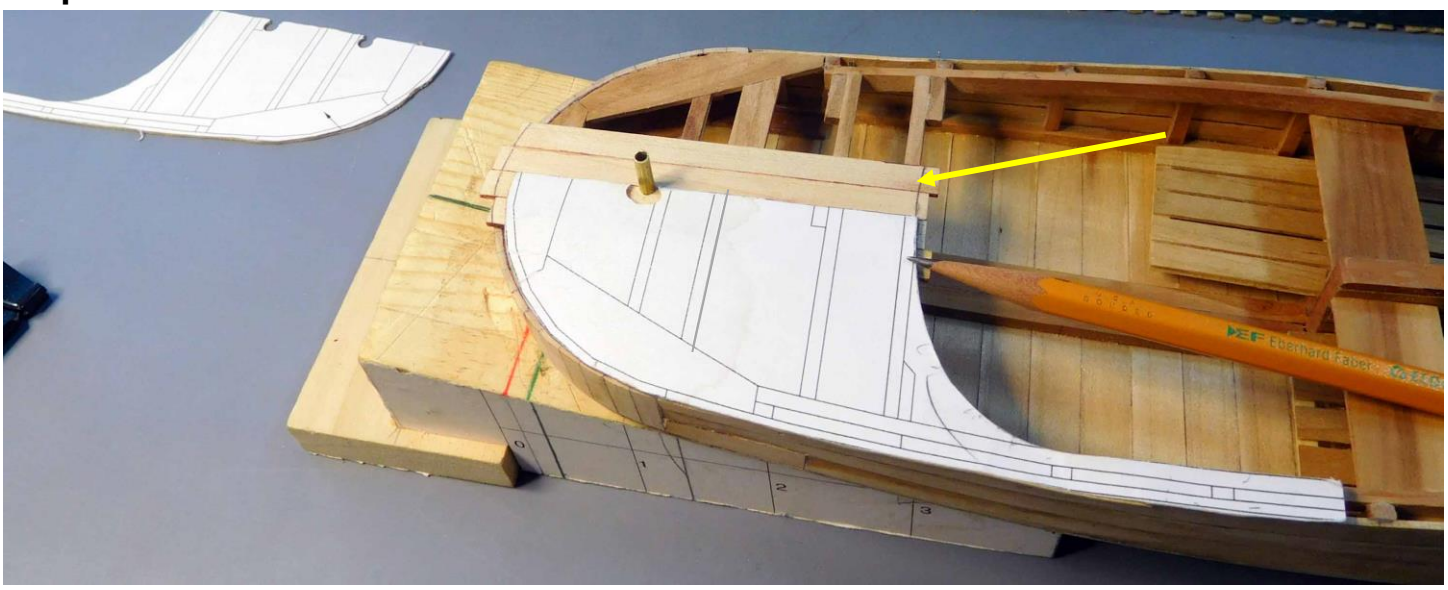

Illustration 265: Personalizing your ship’s curves.

1) See **Illustration 265** above: I used a paper punch to enable the template to sit on the centerline at the area of the iron pipe. Note: The paper template is a drawing; here it is used as a “ship’s curve.” Surprise – your hull to this point is a build, not a CAD drawing, so don’t be surprised if there is some deviation. So, line up the centerline, and if you are short on the template of reaching the stern scribe just made, move the template back to the scribed line, and test that the curves match up. If they do not, don’t worry. Use your own model’s transom and forget about the paper template.

2) The plans tell you that the oval coaming, at the centerline, abuts the deck beam, so position the template at that point, and use the template to pencil in the outline.

Illustration 266: Ready to be shaped.

3) Do the port side the same way. Then take the blank and shape "to the line." I used the oscillating sander forward and the 5" disk sander aft. You now have a completed plank assembly.

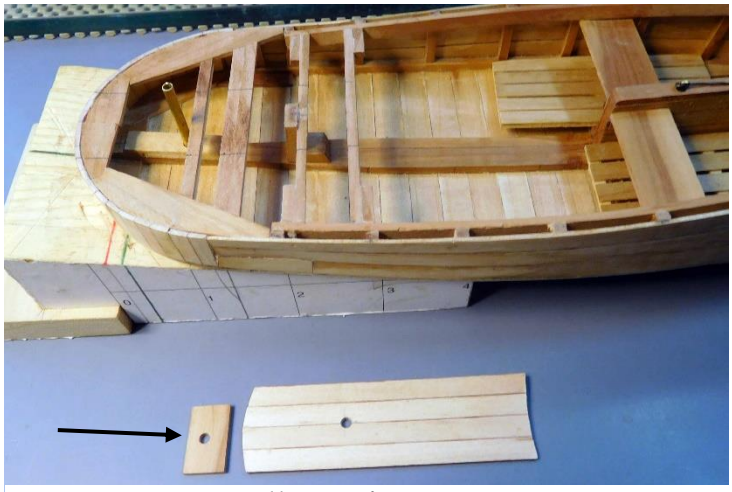

Illustration 267:

Step 4:

1) The rudder "deck plate" is 13/16" x 1/2" x 1/16" with a 1/8" hole centered. Mine was a piece of apple (The **black** arrow).

2) After a test fit of the 4-plank assembly you are ready to glue in place. There should still be a slight overhand from cutting "to the line" that will be finish sanded later. While in position and centered, scribe the outer edges across the beams and upper flooring. When applying the glue, stay within the boundaries.

Illustration 268: The glue boundaries scribed (**orange** lines). The drudder deck plate has been installed.

3) Slip the deck assembly back on the hull, center, and clamp. You might even want to "weight" the far stern or at least give some pressure with your hands for a minute or so. You always want to wipe off any squeeze out or misplaced glue before it sets.

The "plank assemblies"

1) The two adjoining plank assemblies consist of 3 maple planks. The build process is the same for both.

Illustration 269:

2) Laying in the planks length wise, make sure you leave enough overhang to the assemblies by working out from the centerline. The goal is to get enough overhang but to minimize sanding later.

3) Remember, you must make a port and starboard blank. I lift off the planks of one side one at a time, and number them 1P, 2P, and 3P, onto the underside. I do the same with the S side.

4) Once the glue has set, I scraped both assemblies with a razor blade.

Illustration 270:

5) When the assemblies are "cleaned up," I place them into position. I do one at a time. Pressure at the transom must be equally applied or the pressure may "lift" the assembly and your pencil lines may not run true. **Note:** I set the port plank into position, held there by a piece of tape and the set the starboard piece in the same manner.

6) Use your templates to mark the "swing around" the coaming.

7) Sand each plank assembly to shape and dry fit.

8) When satisfied, scribe the next glue boundary.

Illustration 271: The next glue boundaries.

9) I glued the starboard deck plank assembly in place, however, **I dry fitted the port side only – I wanted to be able to have some of the interior deck viewable.** I suggest you read ahead in this section and see if you wish to do the same. If you want to pass on this one, glue the starboard assembly now.

Illustration 272:

Completing the aft decking:

1) To "turn the corner" the size of the deck planking changes. After five, 1/4" inch planks, I went to one 5/16" plank.

2) Position deck plank assembly #2 and scribe the outer edge onto the aft flooring. Leave it there to position the wider plank in place during shaping. Do both sides.

Illustration 273: Note the clamp.

3) If you want a reveal of the "inner workings," use the scribed line to glue the wider plank in place. Let it set for a minute, then remove the deck plank assembly #2 and clean up any glue squeeze.

4) The outer plank will start the run of the "washboard." The width is measured, by the length of your **yellow arrow**, as shown in **Illustration 274.** The length is taken from the deck plan. I call this plank the "fudge factor."

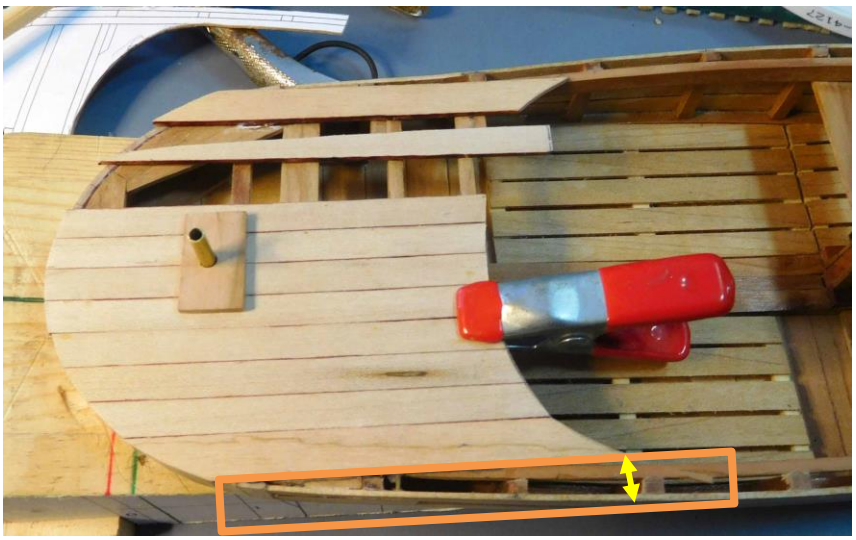

Illustration 274: It is possible that the two sides are slightly different in width, so make and fit one at a time.

5) **Illustration 274:** Give yourself a little overhang. Shape as before. Use you template to scribe the "intersection" of wide plank and the washboard.

6) To finish, use a sanding block to sand the outer rim flush with the side and vertical planking.

7) I recommend hand sanding the coaming edge.

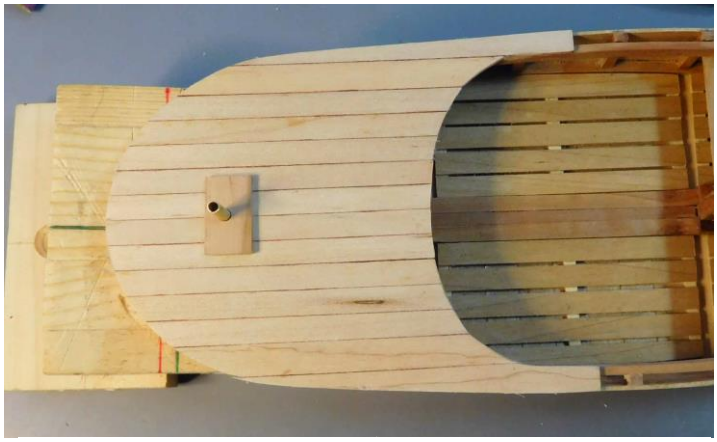

Illustration 275:

The "plank assemblies" #3: the starboard side.

1) **Illustration 276:** shows the upper deck foreward planking in place. This construction is accomplished by a third set of plank assemblies.

Note: The third set of assemblies will cover the bow. You will have the option having on these assemblies removeable Note the **port blank** is slightly longer and wider that the **starboard**. You can strive for perfection and be disappointed, or you can get the best symmetry you can and feel good about it!

If this is happening to your build know that you will not be alone. Make your adjustment to cover the space required. My adjustment was to work for the **C/L** with the 1/4" planking, and made the adjustment with a **3" plank** shape to seat the last open space. And to quote James Brown, "I feel good! And I know that I should now!"

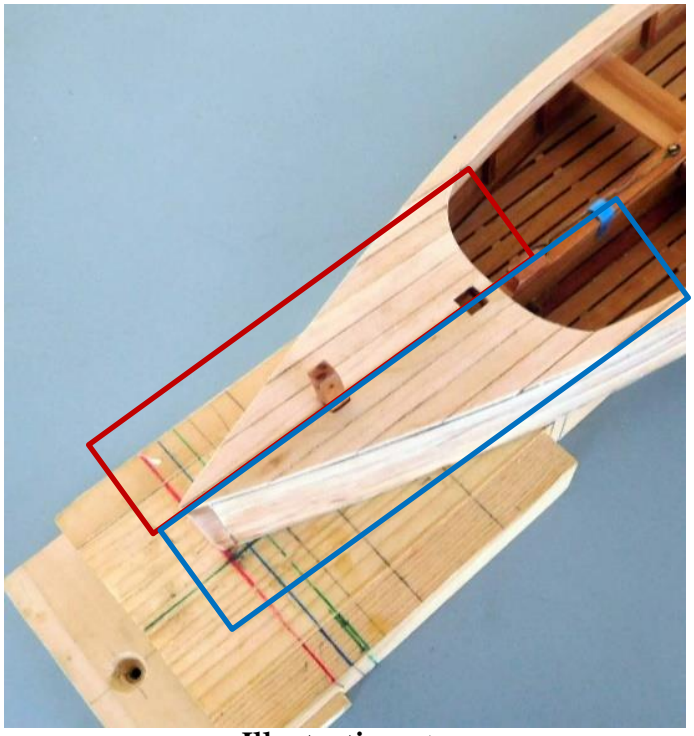

Illustration 276:

Here we go:

1) We go back to the 1/4" deck planks and start from the centerline. The first plank deals with two openings: the mast partner and the bowsprit bitt.

2) The bowsprit requirement is 3/16." The mast requirement is 1/4." Take two deck planks, port and starboard, and scribe the openings for each location. I used my Preac saw to "open" the plank locations. I set the blade height and test it with a piece of scrap wood. The first two passes are to the "inside of the lines," and then take out the center. Test fit the opening to the model, and adjust (it should be minimal), if necessary, with a sanding stick or file.

Illustration 277: Note the overhang required.

3) I do one opening at a time just to make sure I can make a small adjustment to the final location of the second opening if necessary.

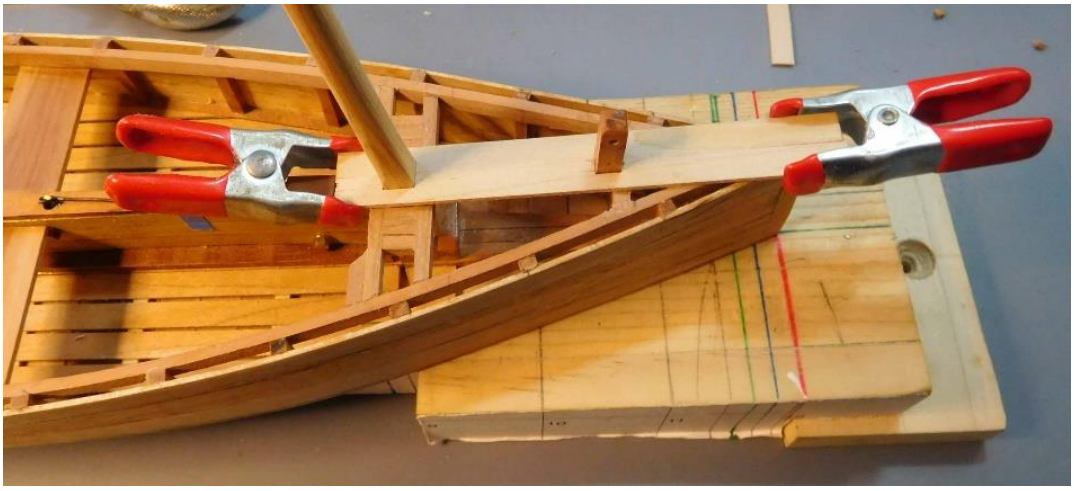

Illustration 278: The dry fit is completed. Use your test mast at the partners..

4) Once the **C/L** planks are ready to surround the mast and bitt, the rest of the plank blank is put together.

5) Four planks are needed to add to the centerline plank. Each plank needs to overhang the side planking and the position of the forward coaming.

6) **Illustration 279:** The preparation of getting a finished blank in place is the same as at the stern. I made up a template with the pattern spray glued onto a piece of 1/32" basswood

Illustration 279: The finished blank ready for fitting.

7) At the side planking, you can scribe from the pattern, but I prefer to scribe the underside of the plank blank assembly, is more accurate.

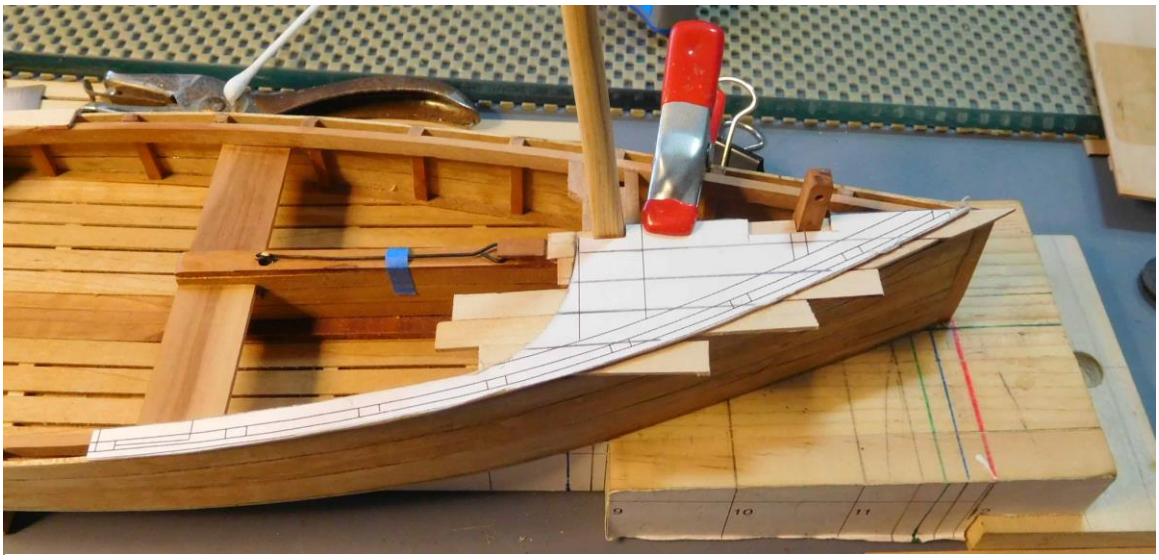

Illustration 280: The cutouts allow the template to reach the **C/L.**

8) I used my scroll saw to shape the blank. I allowed a slight overhang to be finish sanded later at the side planking. I hand sanded, to the line, at the coaming, to be sure I got the proper joinery at the turn. Note the slight over hang at the bow. It will be shaped later. It is now glued in place.

Illustration 281: Ready for the washboard plank.

The "washboard" planking:

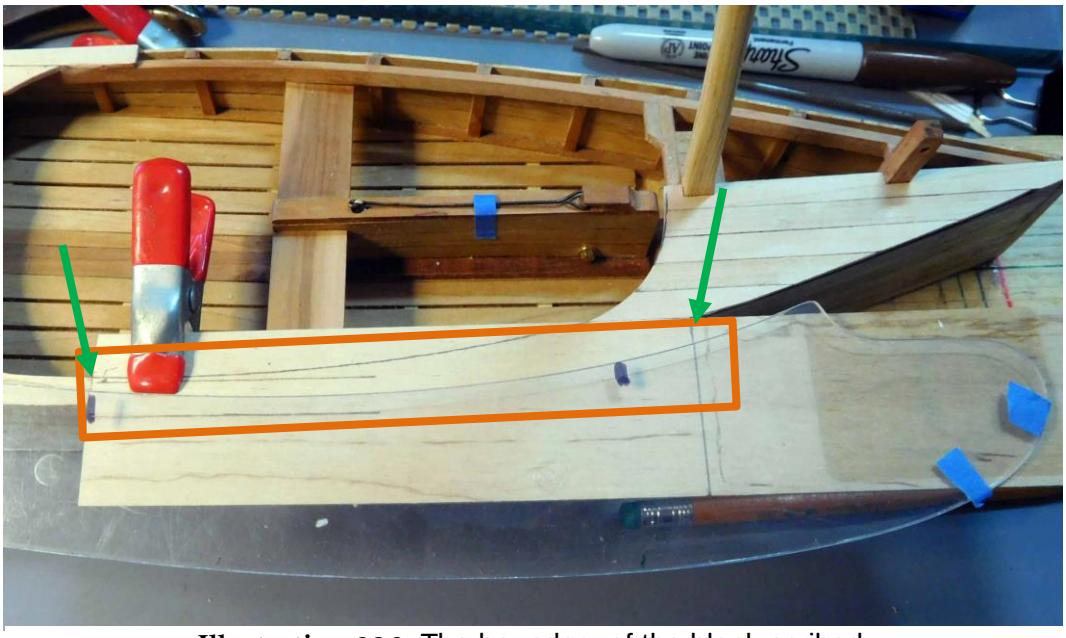

Illustration 282: The boundary of the blank scribed.

1) The "defining" of the washboard plank should be made to fit your model. The first line scribed is the inside edge of the plank that will butt against the coaming. I took a ship's curve and laid it over the plans, to find the exact curvature needed. Setting the curve in place on the model, I highlight the ends of the blank onto the surface of the curve, then aligned it with the two points of intersection (**green arrows**). With the oscillating sander, I took the curve "to the line." I checked the fit, and if it needed a little "tweaking," I hand sanded. It's called out-tweaking."

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2) Clamping it in place I scribe the outer edge of the side planking onto the bottom of the remaining blank.

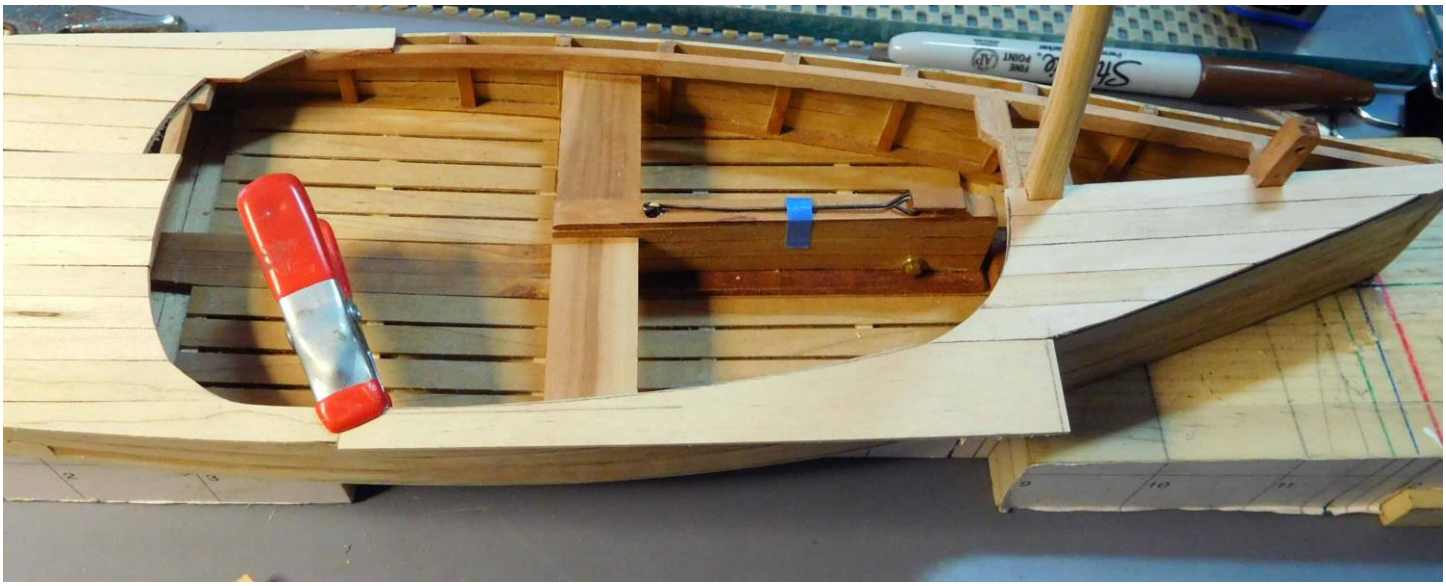


Illustration 283: The boundary of the washboard plank being scribed.

3) The outer edge was sanded with the oscillating sander to the line.

Illustration 284: The "flip side."

4) With the plank shaped, I glued it in place. When dry the overhang was sanded off using a sanding block to the outside and hand sanding to the inside

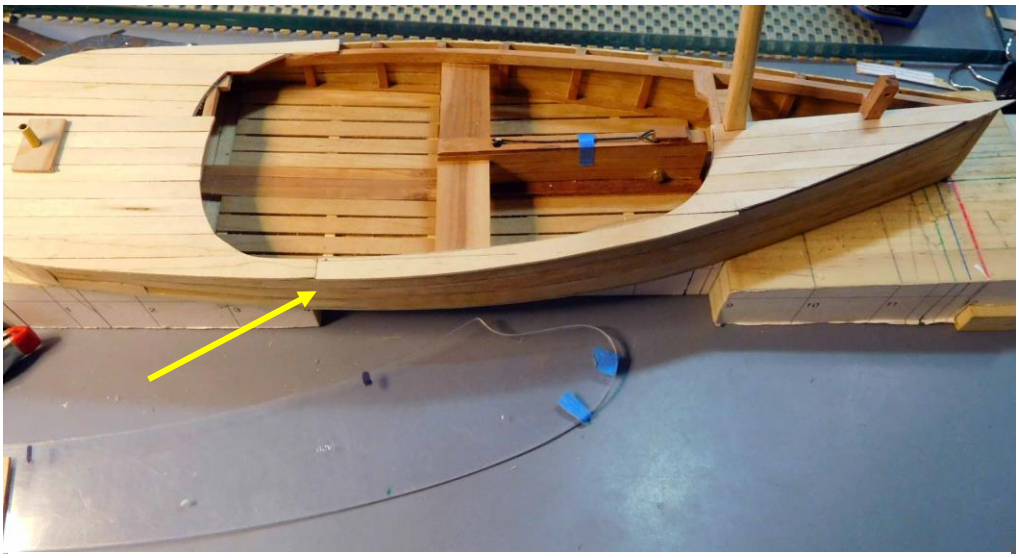


Illustration 285: Ready for sanding the overhang.

The "plank assemblies: #3: The port side.

Note: Completing the port side is the same procedure as the starboard side, but it can be very revealing**!**

The upper deck planking reveals:

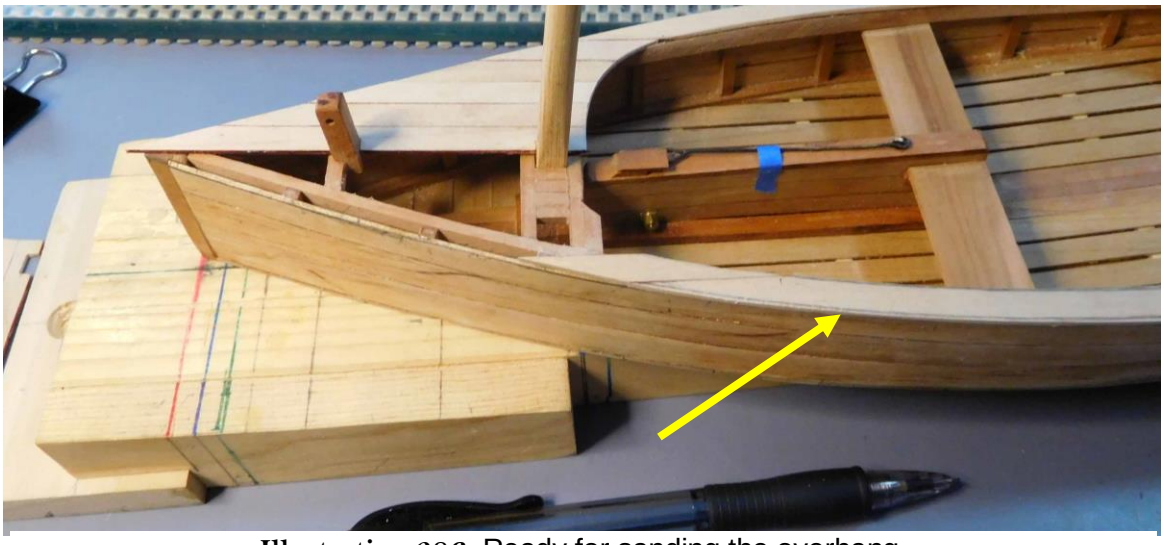


Illustration 286: Ready for sanding the overhang.

1) As the starboard washboards were installed after permanent installation of the fore deck blank, the port blank is merely laid in place and will be removed after the washboard plank has been seated.

Illustration 287: **Note:** That is the main mast in place. (a bit early).

Note: The two reveal plank assemblies can be set aside. The finishing of the assemblies will be covered in **section 4.6**

Something to Consider

When I finished the porotype installation of the upper deck planking with a small reveal forward and aft on the starboard side, it does show the inner hull construction. It was always my intention to build a final prototype from using my written word – can I follow my own directions? I wanted it to be another option of modelling a more extensive upper deck reveal, showing more of interior framing and construction.

This section showed you how to make a removeable access to the framing. I wanted to get a little more viewing that would be on permanent display. Time writing, and getting the new sharpie to the start of the upper deck planking, adding it in this section would be too time consuming.

This will not change anything that has been completed, it just changes the location of fitted deck planks, you could design your own pattern of the planking to enable the viewer to see what you want them to see.

NOTE: If this type of upper deck installation appeals to you, I added Phase 5, section 5.3 to help you in considering your options. Jump forward to page 253.

If you want to continue with the third option, if will change nothing moving ahead – except you can skip Phase 5, section 3, when you reach it.

4.5 The bowsprit

Research Locator:

Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **557-558**.

"The practice of bowsprits varies with the type of hull: in many all the taper is on the top and sides. The bottom being straight; in others, the taper is on the sides and bottom or on all four sides. If the bowsprit is to appear bent, or "hogged" down, the taper is always on to and the bottom is either straight or is shaped to curve downward at the outer end."[1]

Material:

Maple or pine: 1 piece 3/16" x 1/8" x 5" (extra length to make shaping easier.)

Illustration 288: This....

Illustration 289: Needs this!

1) **Illustration 290:** The actual length of the finished bowsprit is 3". I take the 5" blank and scribed the following lines across the top surface: The aft end to **red** line is 1". The **red** line to green line is 1/4". The **green** line to **green** line is 1-1/2". The **green** line to **purple** line is 1-1/4". The **purple** line to brown line is 1/4", and the **brown** line to the end of the blank is 1".

[1] Chapelle, Howard I., **Boat Building, A Complete Handbook of Wooden Boat Construction,** W. W. Norton & Company, New York*London, 1941 (renewed 1969), pp. **558**.

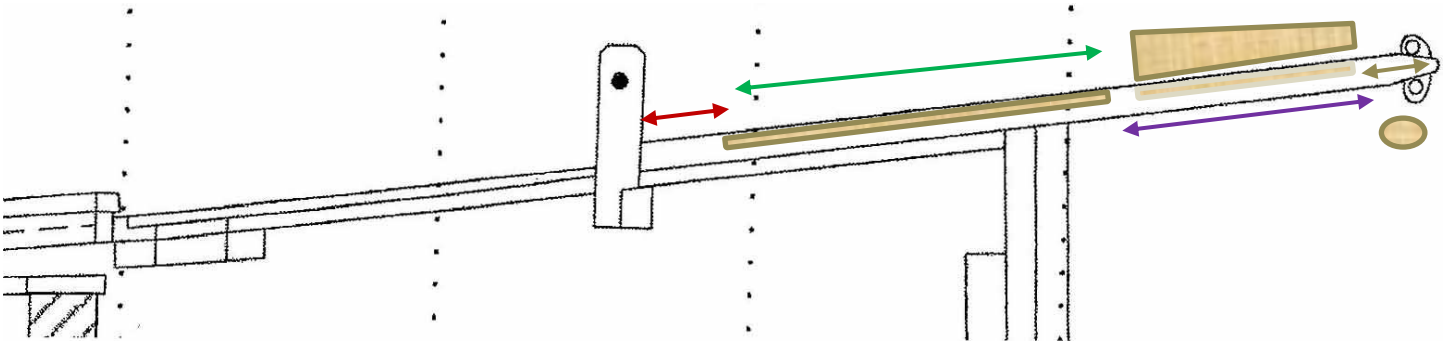


Illustration 290: Work from dimensions given above. This drawing has been enlarged.

Illustration 291: The bowsprit in place. Note the sanded areas.

Not to scale:

Illustration 292: The scribed bowsprit blank. The **red arrows** outline the taper.

2) With the blank defined, I work from forward to aft, wishing to keep the blank rectangular, letting it be set securely in a vice, to be shaped. The first 1/4" of the tip of the bowsprit is oval, hence it goes first. The **blue dotted line** marks my first cut, leaving the about a 1/8" wiggle room. If you cut it to the finished length you will have a lot more difficulty in maintaining the oval shape at the end.

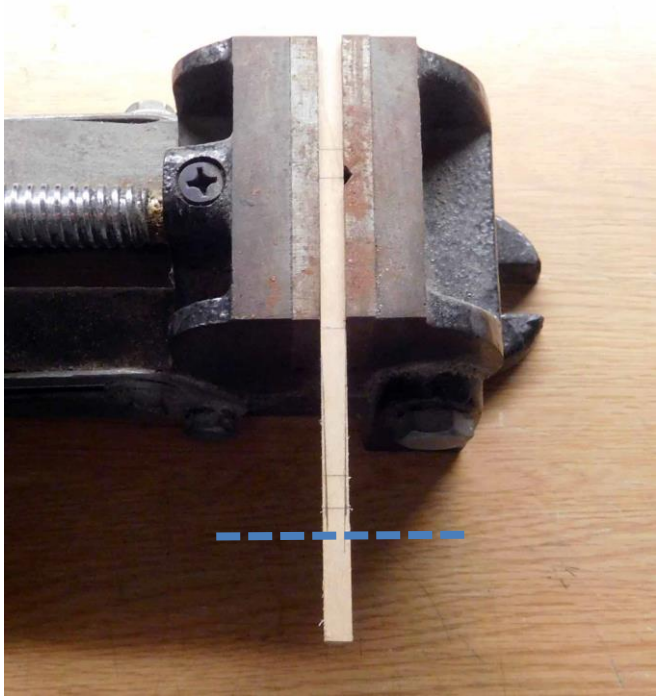


Illustration 293

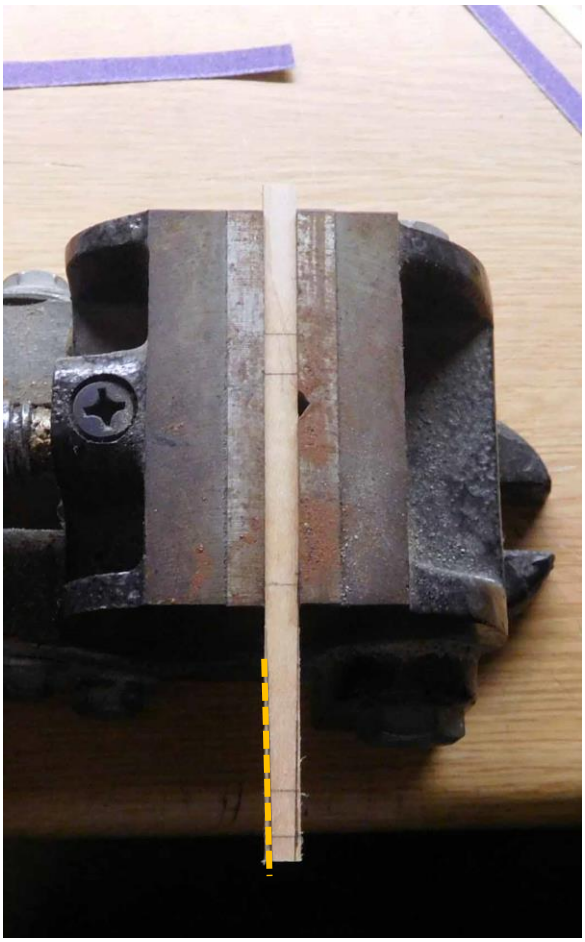


Illustration 294

3) The first cut is at the **blue dotted** line. Once done, I used my disk sander to define the taper. If you feel you need more control, a sanding stick or small file will do just fine. In fact, sanded slightly "off the line" knowing that the taper would be brought "to the line" as the sanding proceeds aft.

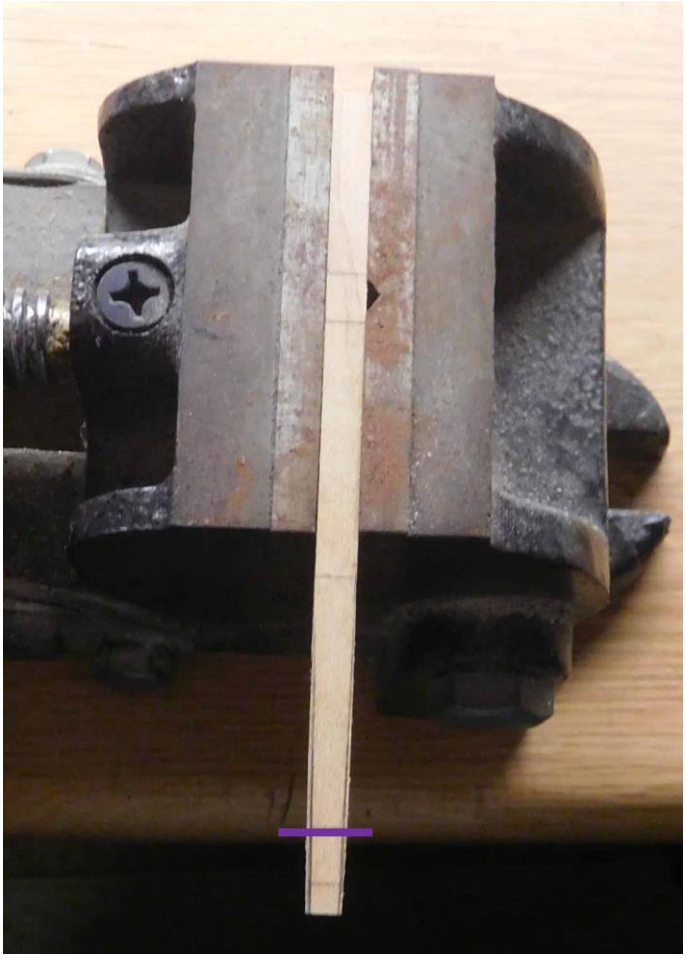


Illustration 295

Illustration 296

4) I placed the blank back into the vice leaving the area to be tapered exposed. I then took a small piece of sandpaper (150 grit) and cut three strips 1/4" wide by 3 to 5 inches long. The "nose" of the bowsprit in oval to the **purple** line in **Illustration 295.**

5) **Illustration 296** shows the first phase of sanding. Take a strip of sand paper with both hands and "shoe shine the old fashion way" from the extension to the **purple** line. I count passes, moving up and down the run until the "V" is created (the **red arrow**).

6) Now turn the blank upside down and repeat the process to the same count as above.

7) Turn to one side, repeat but start the count at 1. Likewise, shape the other side.

8) Your nose should now look like **Illustration 297** on the next page.

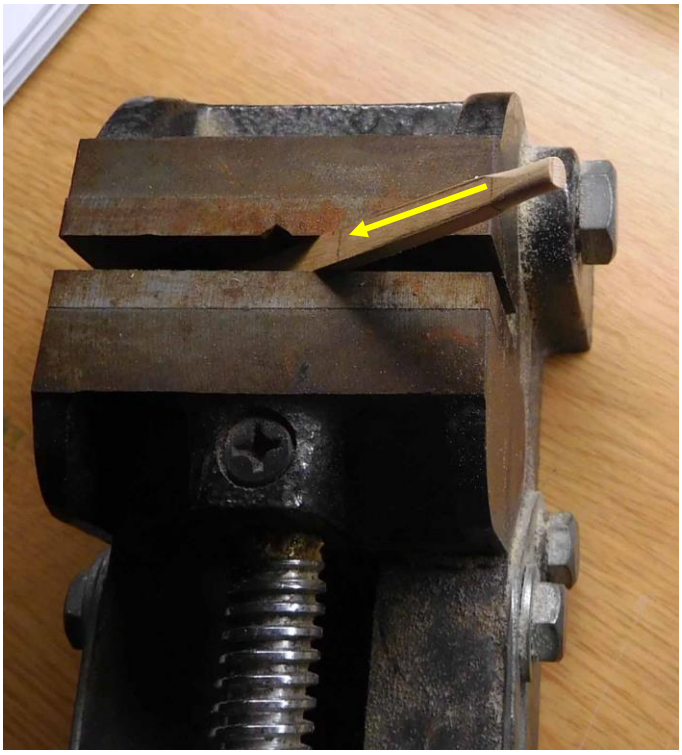


Illustration 297

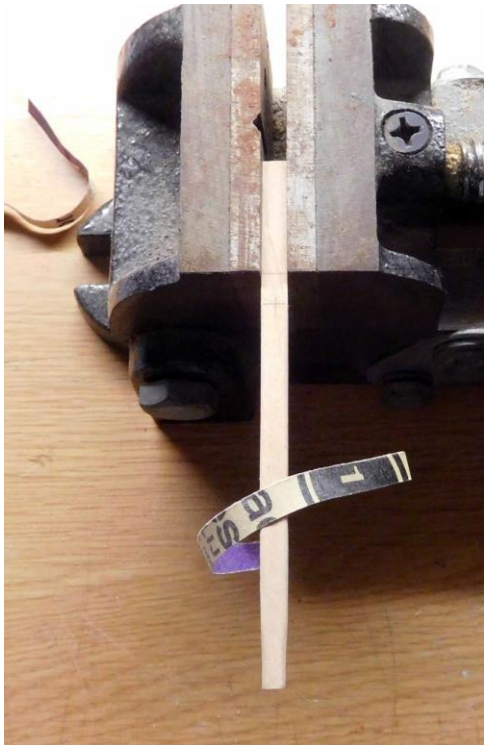


Illustration 298

9) The yellow arrow shows step 2, the run of the taper. The transition for the oval leaves the bottom of the bowsprit flat. Only the top edges will be gently sanded down. Go back to **Illustration 290** to see what I mean by gentle. Here, I used the sand paper strip on the first 1/4" of transition, to smooth out the "V". From then on, I found a manicure file best to finish. What you are trying to avoid is a "wavy" line. Keep using the count method; I always draw down and repeat. Stop and check every stoke or two.

10) Re-position the blank in the vice as shown in **Illustration 298**. The final area (**green** to **green** in **Illustration 290**) is done in the same manner as the taper, but strictly with the sanding stick.

11) Again, to the same illustration (**290**), note the **yellow dotted** line. This is a 10-degree angle needed to seat the aft end of the bowsprit from the deck to the rise of the bitt.

Illustration 299

12) You can now remove the bowsprit and cut off the remaining aft overhang. I then set the disk sander table to 10-degrees, Using the miter gauge, I place the bowsprit upside down on the table and gently sanded to the upper edge of the end at the bottom.

Of Note: If you have made the reveal at the bow, do not glue the bowsprit in place now. Just dry fit it in place. You know the reveal fits in place, but with a bowsprit about to cover a 1/16" of the inner edge, you will not be able to get it in place and out again.

I will go through the installation in the next section.

Illustration 300:

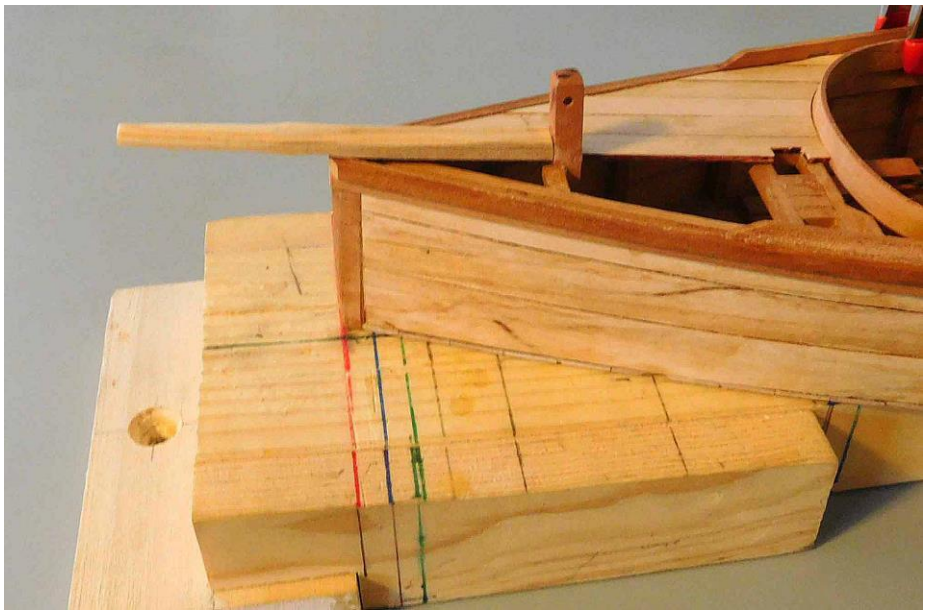


Illustration 301:

4.6 The false wale, rub rail, toe rail with scuppers, cockpit coaming, cockpit molding, and bowsprit installation:

A note on the systematic procedure of these six items...

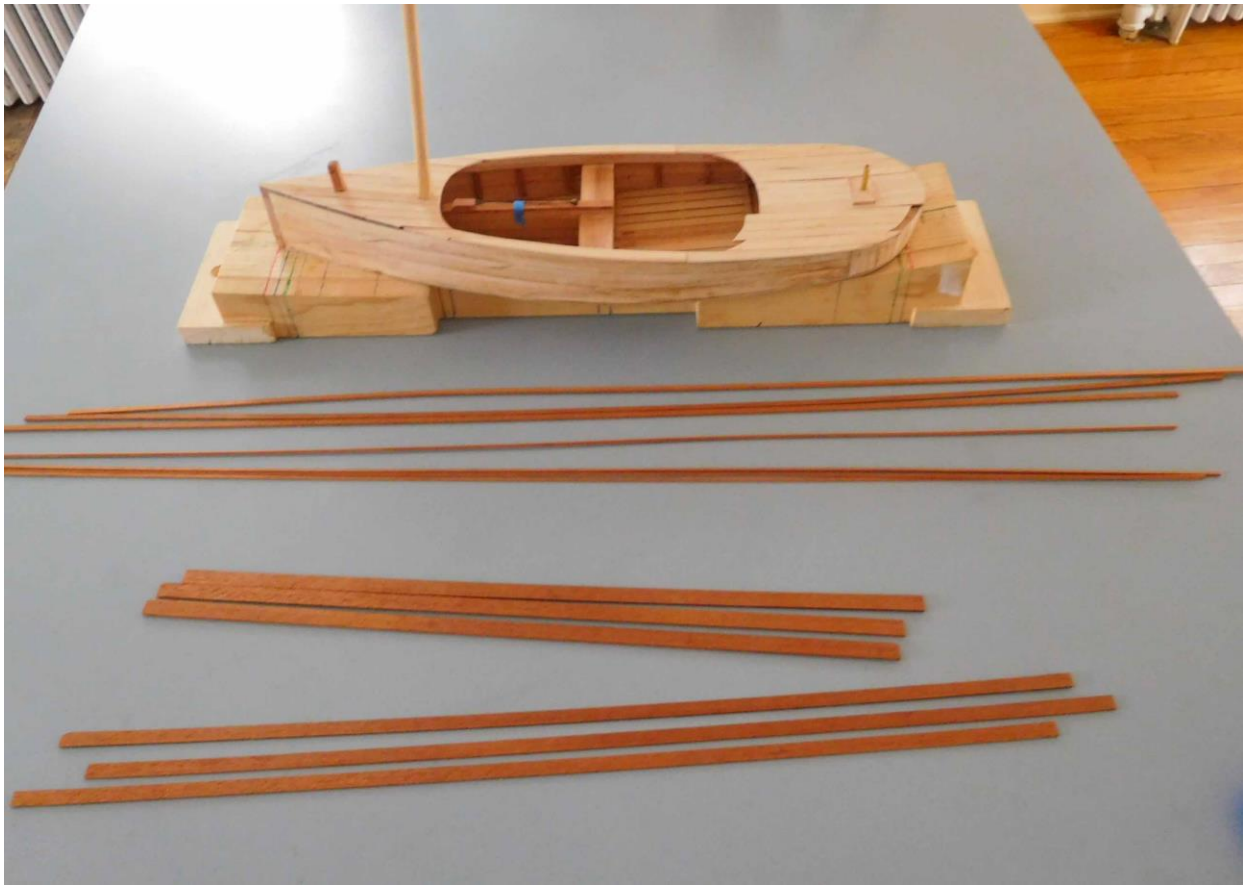


Illustration 302: Ready to begin.

This section proceeds as described in the title: false wale, rub rail, toe rail, cockpit coaming, cockpit molding and the installation of the bowsprit. In building the two models. I proceeded, as written here, on one, but altered the procedure for the other. I started both with the false wale, but from there I went to the cockpit coaming and then added the cockpit molding. This was followed by the rub rail, and finished with the toe rail and scuppers.

I recommend the latter procedure to those who are not building the reveals. It makes the clamping of these components easier, and if you are painting your model, better access to the coaming areas.

If you are using the reveal on a painted model, I recommend you finish the cockpit coaming but please read ahead so you understand how the molding and the reveal planking are finished off to allow removal.

If you proceed as written, the molding is the last section, so no adjustments need to be made.

4.6 – 1 The false wale – This a thin strake running from the stem around the transom and back to the stem. It acts as a strengthener. Our wale scales to 1" x 4-1/2." I milled my own strake at the scale dimension, but a thin strake of 1/16" x 1/4" strip wood works perfectly. I used cherry. (Remember, all the wood on the weathered sharpie was basswood.)

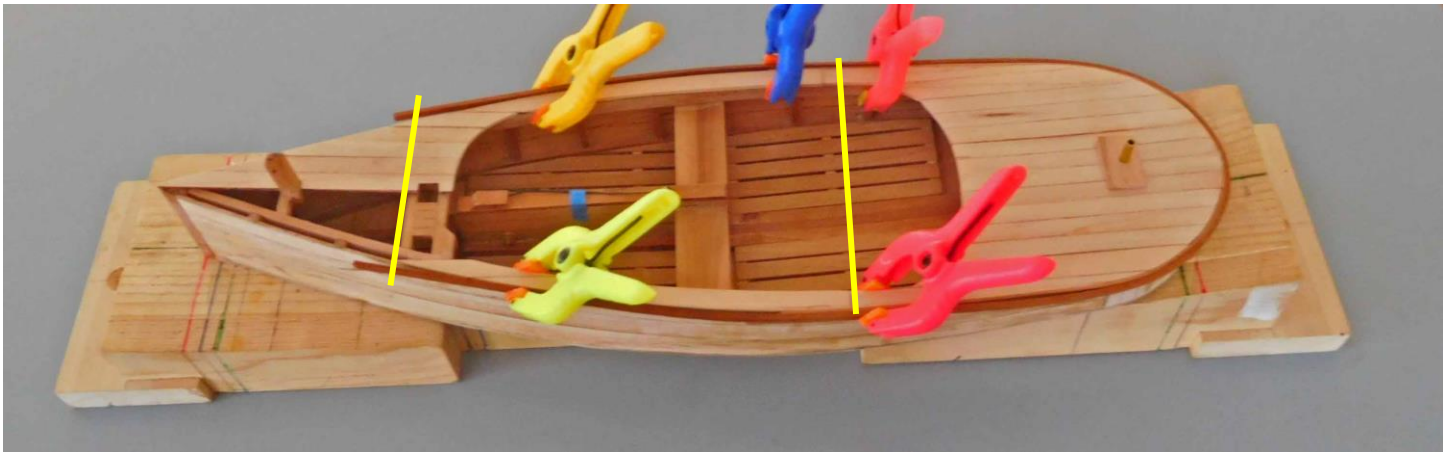


Illustration 303: One 1/16" false wale plank clamped and drying.

1) I do two things at this stage. The first is take the strakes and place them in my PVC watering hole and let them soak for at least 24 hours. The second is to use the model's stern as a jig.

2) Next, I place the soaked, plank centered on the stern. The plank is then pulled slowly around the curvature, port and starboard, and clamped. Let it dry. It will not reach the bow, but for now that is a good thing.

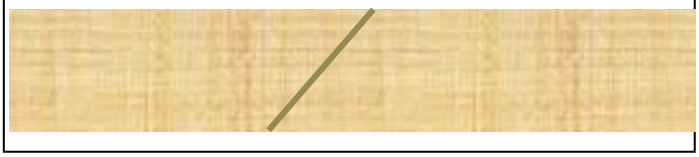
3) When dried, mark the **C/L** at the stern, but leave the clamps in place.

4) At this point examine the seat of the wale. You are looking for surface contact all the way around, especially at the stern. The angled rise of the stern vertical planking should be in contact with the false wale – from top to bottom. If you see the false wale not adhering to the rise of the vertical transom planks, that needs to be corrected.

5) The first step is re-soak the plank and see if you can get more flexibility. If that doesn't seem to work, then I suggest you go to a 1/32" plank, and start over. When clamped and dried and the problem is solved, set the new plank aside and make a second plank. You can leave just the one smaller wale, or you can overlay with the second wale strake.

6) Now even the run port and starboard and scarf at both ends. Mark the forward extent of the wale to the same point port and starboard (the **yellow line**).

Simple scarf used:



7) Going back to **Illustration 303** and note the two **yellow lines** and their location to the false wale, Gluing a long strake has the possibility of creating a mess when you are halfway through the process and the remaining glue has set up. So recommend using shorter strake components. These lines would allow a one piece transom wale with out scarfing, and then the run up to the mast partners. When that has been glued up, we will add the last run forward in conjunction with the stem and bowsprit.

8) The first section to be glued in place is around the transom. Still clamped but now dry, transfer the aft **yellow line** separation locations making sure the two sides are 90-degrees to the **C/L**. Then mark the **C/L** of the hull onto the false wale. Remove the strake and at the separate points, mark a simple scarf joint on each side. I then take a single edge razor blade and small brad hammer and position the razor blade along the scribe scarf, and give a tap to set it free. I have now created the second wale aft scarf joint, with a single blow.

9) As above, now extend the run of the false wale to the mast pendants. I did "caulk" both ends of this run at the scarf angles.

10) Now, cut another length of false wale that will get you just past the outer stem post. Transfer the necessary scarf lines to the aft ends of these pieces and clamp in place. Work one side at a time. Remember these pieces follow the sheer of the deck. As a result, you may have to adjust the scarf angle appropriately.

11) If you are having trouble with the sheer to the stem, take another section of wale, that would run from midships, to just beyond the stem. Soak it overnight and clamp it in place until dry. Now repeat #10.

12) When one side is done, take down the wale as shown above. Now finish the other side. **Illustration 307** shows you how to make a simple rubber band clamp. Once dry, the over hang of extra length can be trimmed (**Illustration 305:** the **red arrow**).

Illustration 304: A simple rubber band clamp to complete the run.

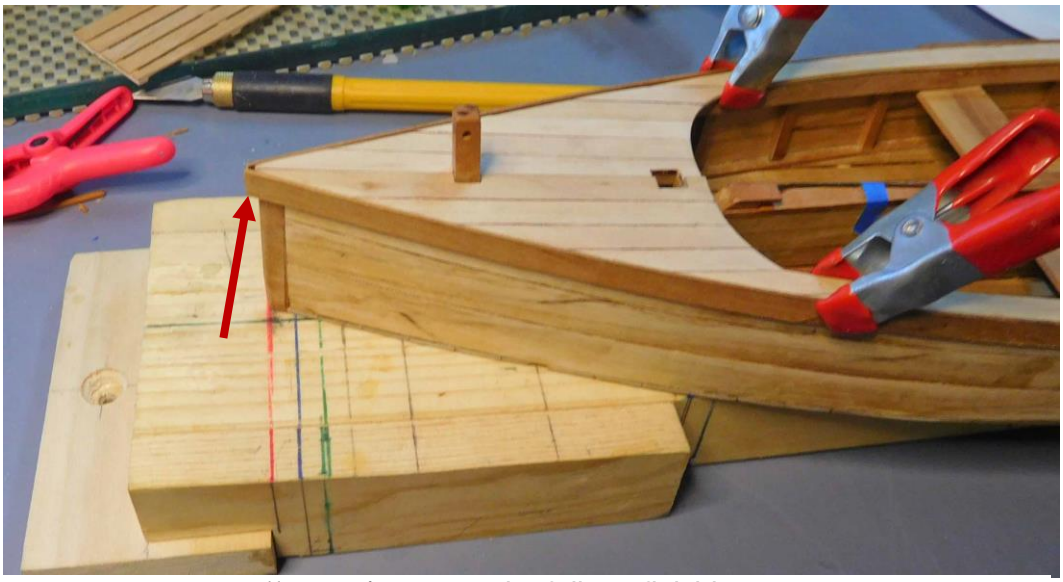


Illustration 305: The full run finishing up.

4.6 – 2 The rub rail – sometimes referred to as the guard rail:

1) I elected to use 1/16" x 1/8" mahogany for the rub rail. (In 1972, I helped my father in-law dismantle a 110' motor cruiser built in 1910, and was fortunate enough to get a few pieces of the mahogany paneling in the main cabin. (So, even though my model is new, it already has a piece of history on it.)

Illustration 306: Forming the rub rail.

2) The rub-rail went through the same steps as the false wale. The **Illustration 306** shows the soaked rail being clamped in place. The scarf joints are the same, but do not place them right over the joints of the false rail.

3) **Illustration 307** shows the transom surround. Note that I came a little farther to mid ships. The illustration also shows you how to clamp the longer strake of the toe rail.

4) For more gluing time, glue only around to the **red arrow** and let it set up. When tacky enough to hold, then apply glue to the remaining length of the rail and clamp in place.

5) It's the "spring effect" after the rail has dried and the advantage it gives to get the entire rail glued into position.

Illustration 307: Clamping to go around the transom.

Illustration 308: Ready for the run to the stem post.

6) The rail is completed from the existing scarph to the outer stem in the same manner as the wale. Let the front ends go slightly beyond the wale ends. To clamp the bow, I ran a rubber band back to a clamp at amidships. When the assembly is dry, sand down the overhang to that of the false wale.

Illustration 309: Both rub rails done.

7) With the rail section set up, finish sand the rail to the false keel and deck planking.

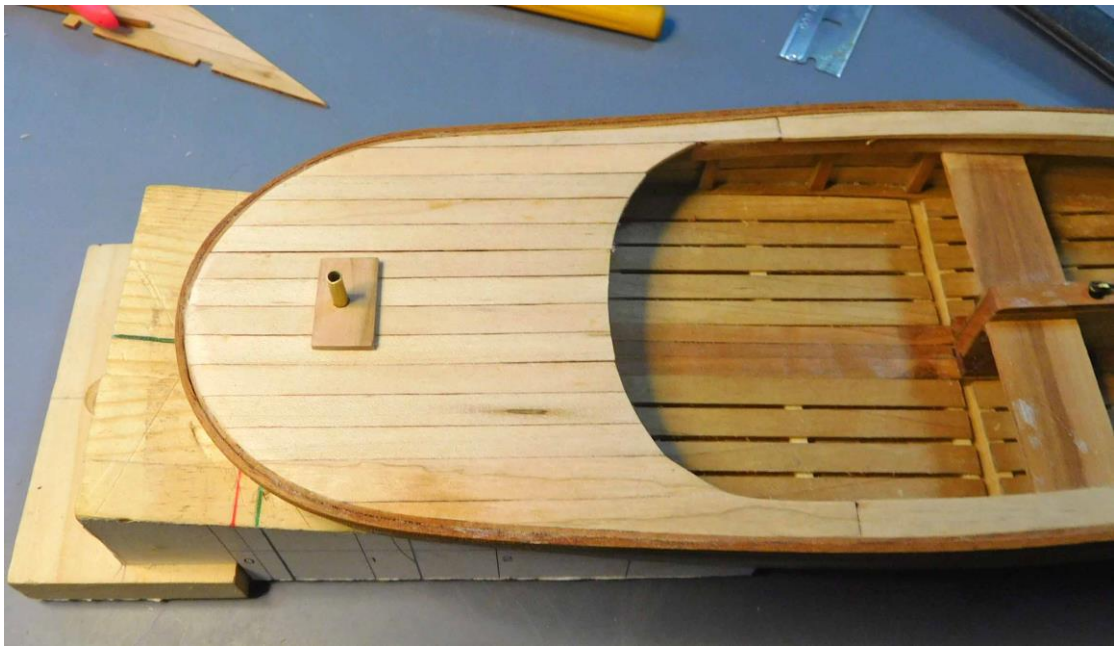


Illustration 310: the finish sanding completed.

4.6 – 3 The toe rail and scuppers:

1) The toe rail is 1/16” x 1/8” cherry. It was soaked and shaped around the stern using the underside of the wale as a shaping jig. The first section goes around the transom and seats to the inside edge of the rub rail.

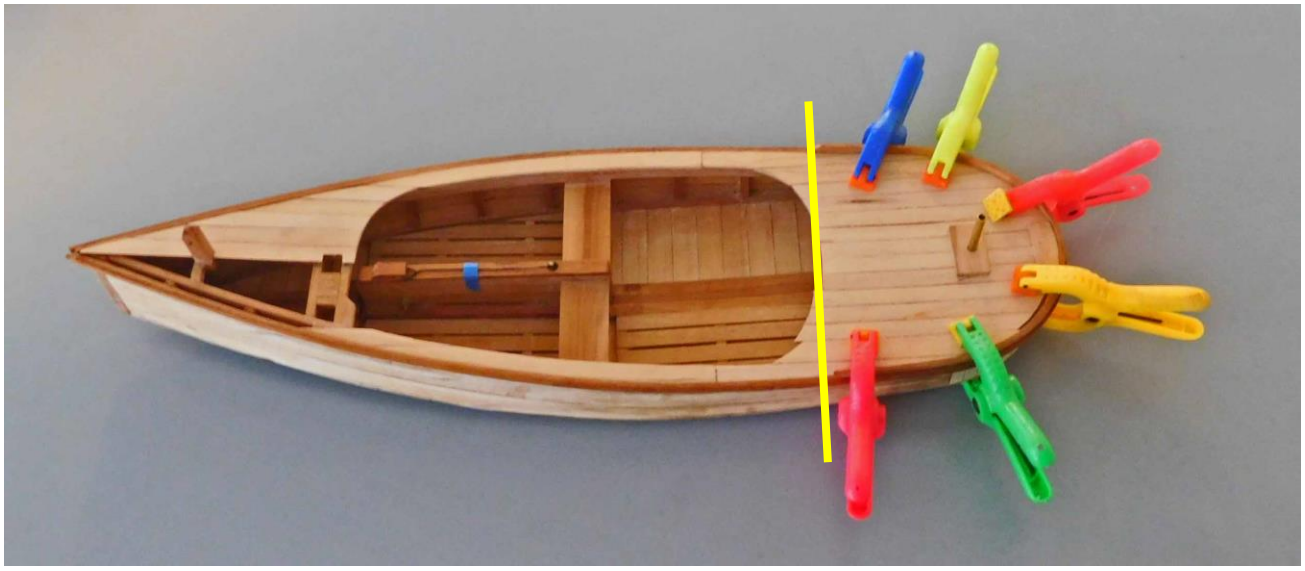


Illustration 311: Gluing up the transom toe rail surround.

2) If you have trouble holding the toe rail in place at the stern centerline, you can use my patented “cheater log.” Shape and glue the log in place as a stop. When dry, proceed with the gluing. When we get to hardware, you can position an oar lock on the port side of the log.

3) The next piece of toe rail will run the length of the scupper locations (**Illustration 314**).

4) From the plans, take the location of the scupper openings and transfer them to flexible plank. Don’t glue the plank in place. First, dry fit the toe rail and clamp in place along with location plank, then scribe. I used a strip 1/32” x 1/4”,

5) **Illustration 311:** The **yellow line** shows the extent of the toe rail stock used to get around the transom. It also marks the start of the scupper locations, and it needs both ends scarfed.

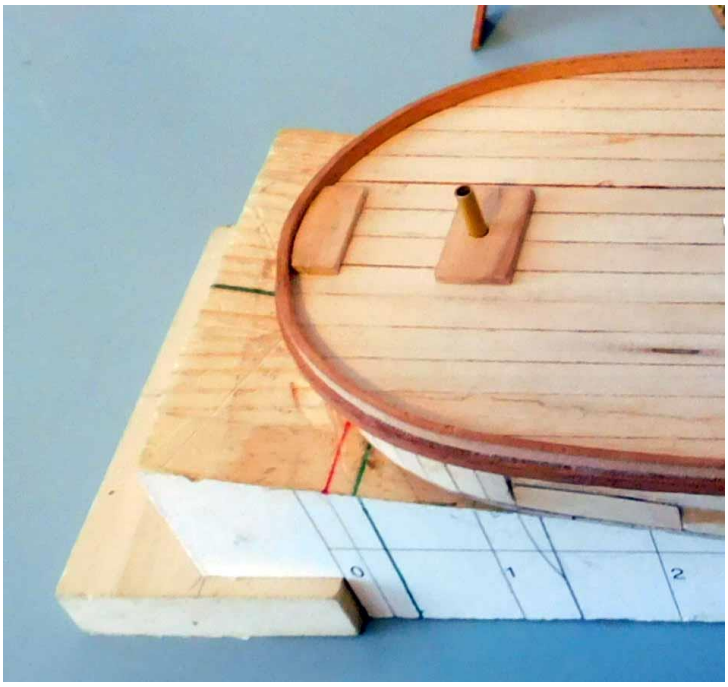


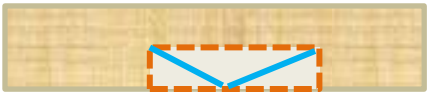
Illustration 312: Cheater log.

The scupper row:

1) Once you've gone around the transom, take a piece of toe rail an inch longer than needed aft and an inch longer than need forward. Do not soak it. It can be soaked later if needed. I then clamp the rail in place. I then took a piece of 1/32" basswood and took the location of the scuppers and scribed them onto the plank. Just flip the location mark upside down against the other side to kill two scupper rows with one marker.

Illustration 313:

2) I used my Preac saw to open the scuppers in the same way I notched the deck beams. An alternative is to take a single edged razor blade, or a razor saw and **cut the end lines of the scupper**. The **middle of the scupper** can then be removed by using a carefully guided #11 X-acto blade and gently shaving down from the center to the two corners then cleaned up with a good file.



3) You have a choice here: you can scarf and glue in place the run forward of these sections of toe rail or go to the cockpit coaming and molding first. To finish the toe rail involves having the bowsprit in position, and allowances for the reveal. In any event, at this point, the toe rail to the stem, will be put on hold. We'll go to the cockpit coaming and molding first. This is because completing the toe rail involves having the bowsprit in position, and allowances made for the reveal. Holding off on the scupper row will also leave the area of the cockpit and molding free from obstruction.

Illustration 314: The length of the toe rail through scupper row.

Phase 4.6 (continued)

4.6 – 4 The cockpit coaming

Illustration 315: The cockpit coaming.

The cockpit coaming jig:

1) The coaming "surrounds" the cockpit and the first thing to do is to make a building jig. To do this you will need a pattern of the outline of your model's cockpit opening on the deck of your sharpie. This will assure the jig being made will be a "custom fit".

2) For the pattern transfer I took an appropriately sized piece of 1/4" graph paper and laid it over the cockpit, making sure that one horizontal line of paper grid matches up with deck centerline. of the deck. Use enough tape hold the paper sheet taut on the surface of the deck.

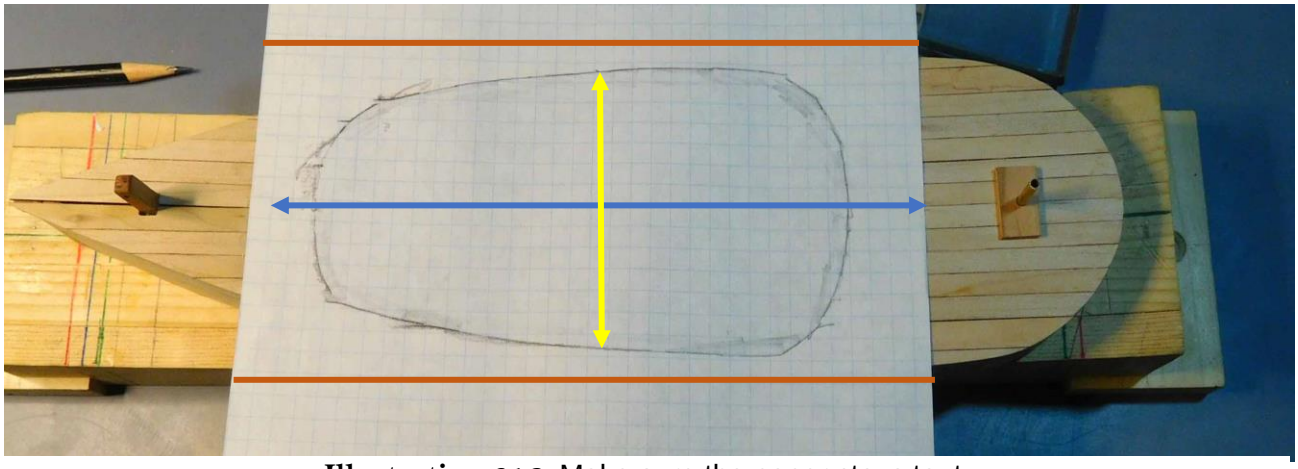


Illustration 316: Make sure the paper stays taut.

3) **Illustration 316:** When the paper is secured, mark the **blue arrow** points of the **C/L**, this will allow you to use a straight edge to scribe the centerline across the pattern when removed. When the paper is removed, and you can see the actual **C/L** of the thwarts, adjust the location of the **yellow arrow** points, if necessary. (I chose the mid-point of the thwarts to position the scarf joints).

4) Now, with a very light touch to keep the pattern taut, I use the "cone" edge of a pencil lead and, with side to side movement at the edge of the of the deck outline. If you have a piece of colored chalk, you can just lay the chalk onto the surface of the paper, and slide the chalk back and forth putting just a little pressure along the edge of the deck surround, to make the transfer. When done, remove the paper and place it on a flat cutting surface.

5) With at straight edge and pencil connect the blue and yellow arrow points. Now take your straight edge and scribe the **orange** lines 2" above and below the **C/L**. Use your #11 blade and trim the patterns along the 2" border. Now locate the straight edge at the deck and cut along the **C/L** to separate. Now you have a port and starboard pattern. Set these aside for the moment.

Materials: I made a base board from a piece of MDF board 3/4" x 11" x 7". I then cut two 1/4" plywood pieces 2" x 7".

The Jig assembly:

1) Once the base board is cut, draw in the horizontal **C/L** at 3 1/2" and the vertical **C/L** at 5 1/2".

2) Next affix the two cockpit patterns to the 2" x 7" x 1/4" ply pieces. I used 3M spray glue. It is important to keep the **C/L** of the pattern flush with the outer edge of the strip each strip. Let the adhesive set up for a few minutes.

3) I cut the patterns on my scroll saw, "just off the line". The oscillating sander was used to finish the outer edge of the cockpit plywood. These fit the port and starboard fit, and adjust, if required. Set the patterns aside.

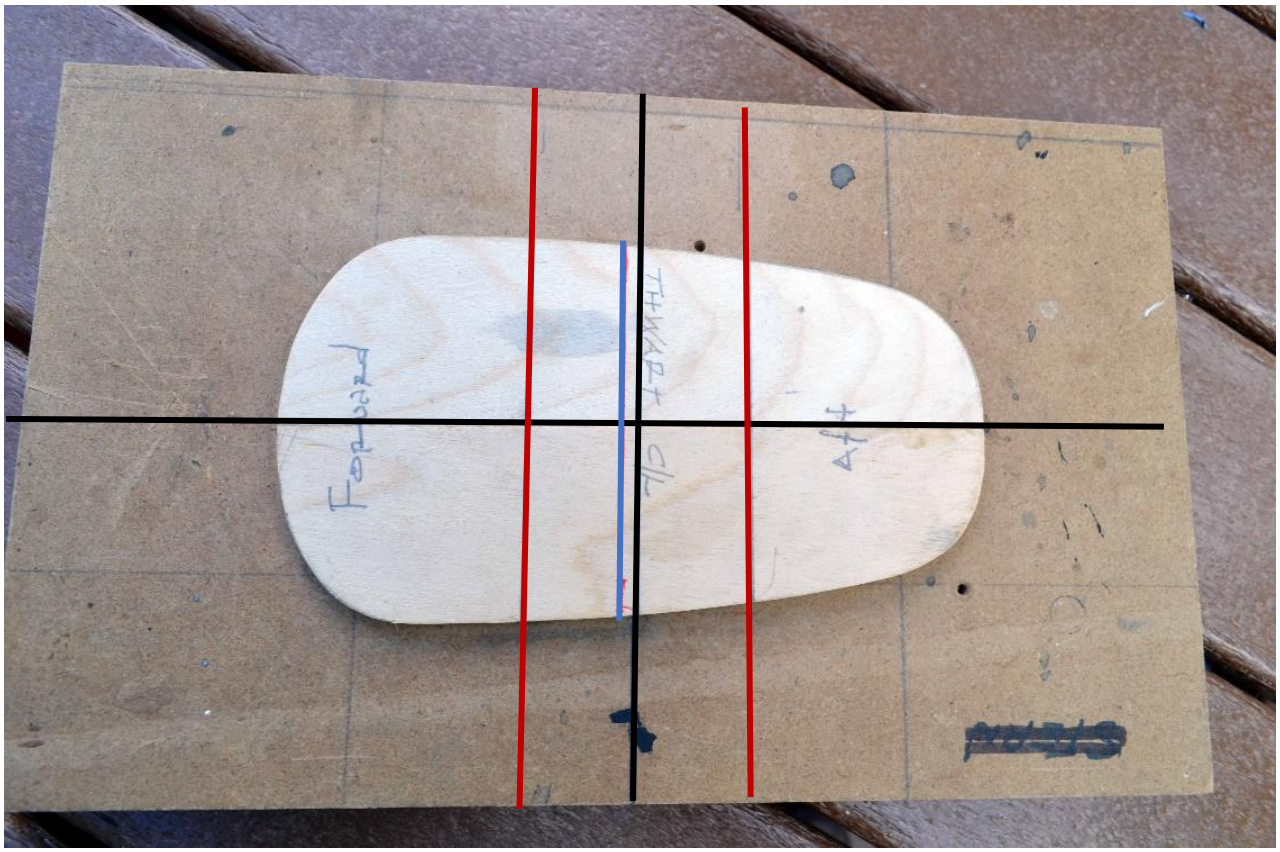


Illustration 317: Reference lines for the coaming jig.

4) **Illustration 317:** Now transfer the location of the **C/L** of the thwarts (the **yellow arrow** points on **Illustration 316**) to the to each pattern. This will enable you to accurately center the patterns onto the MDF board. I used an adjustable square against the edge of the base board to draw the **red** lines. They are 1" from the thwart line and will be used a reference point in forming the coaming. The **blue** line will be use complete the scarf joints.

5) To make the **C/L** stand out, you can "caulk" the edges to be joined together with sharpie marker.

6) I then put a thin coat of Elmer's carpenter glue on the bottom of each pattern and set them on the base board aligned with the horizontal and vertical centerlines. I put a piece of wax paper over the assembly making one last check to be sure of the **C/L** positions. A piece of plywood was placed over the wax paper with my weights making sure the assembly would dry flat to the surface of the base board.

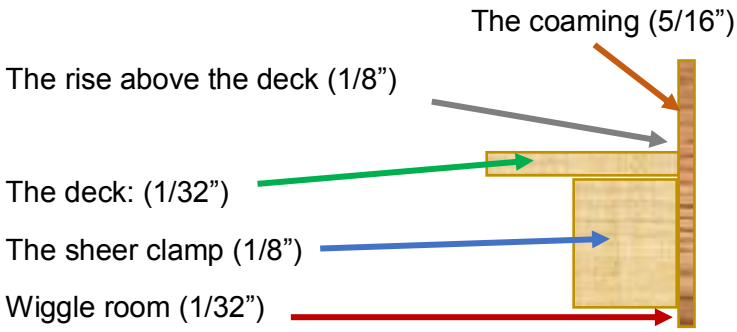
Building the cockpit coaming with the jig off the boat:

Materials List:

1) I used two 1/32” x 5/16” x 14” strips of basswood (the painted model) and cherry (the unpainted model). I cut the strips from 1/32" x 3" x 24" Midwest sheets. You can scribe a 5/16” line with a straight edge onto the sheet, and keeping the straight edge in place, take a sharp #11 blade, and with 3 or 4 gentle passes get the same results.

2) The cockpit coaming needs to deal with two issues: the aft to stem sheer of the deck, and the fitting of port and starboard scarf joints. So, I wanted to create a little “wiggle room” (1/32”) to aid in that transition at installation.

Not to Scale: Illustration 318:



Step 1:

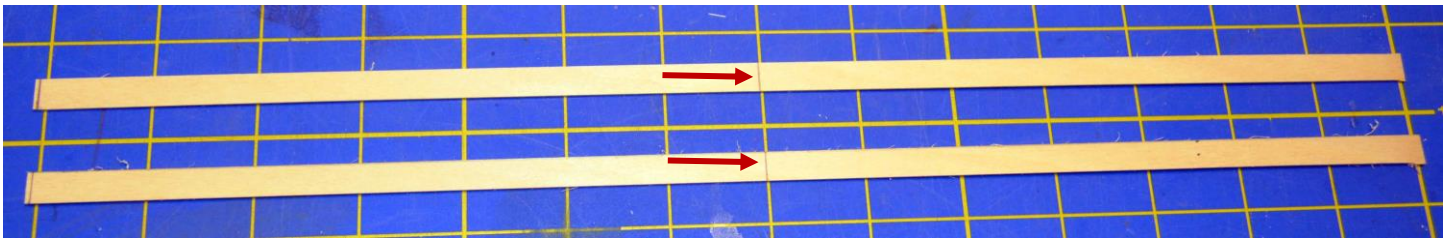


Illustration 319: Ready to soak.

3) **Illustration 319:** With this done, mark the **C/L** to each plank (the **red** arrows).

4) Time to soak the two coaming planks. It doesn’t matter which end you start with. You will go one direction with the first plank, and when that has set up and dried, you will go in the other direction with the second plank. So, take one plank from the water at a time.

5) **Illustration 320:** Place the **C/L** of the plank into position and draw the plank, carefully, tight to the jig and clamp. To prevent compression of the coaming piece, I use a small “buffer” plank at the clamp (the **blue** arrow).

NOTE: Illustration 320: Another aid is to extend the **red** lines location and the **black C/L's** from **Illustration 317** to the top surface of the pattern jig.

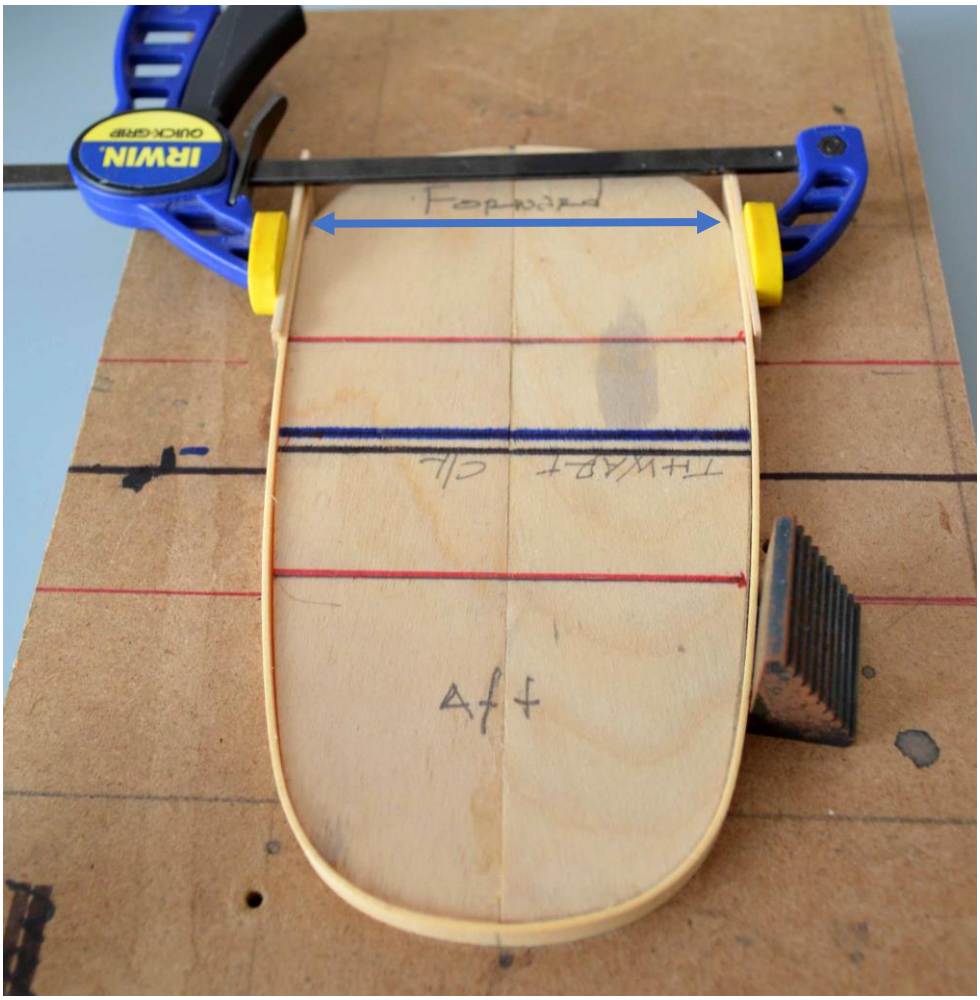


Illustration 320: Step 1. The aft coaming plank. The black C/L down the patterns center was not needed. The glue joint showed up just fine.

6) When the plank dries out, I took a small 5/16" plank (about 2") with a 90-degree angle at both ends, or a small angle block, and scribed in all the **red** and **black** line positions to the outer side of the coaming plank.

7) **Illustration 321**: With the aft coaming plank, the **green** arrow represents the first cut line to trim the forward coaming plank when released from the jig.Likewise, the **orange** arrow represents the first cut line to trim the forward coaming plank when released from the jig. The **black** arrow will receive the scarf joints.

8) You will also note the side lines have been scribe with the 2" plank note above (the **blue** arrow).

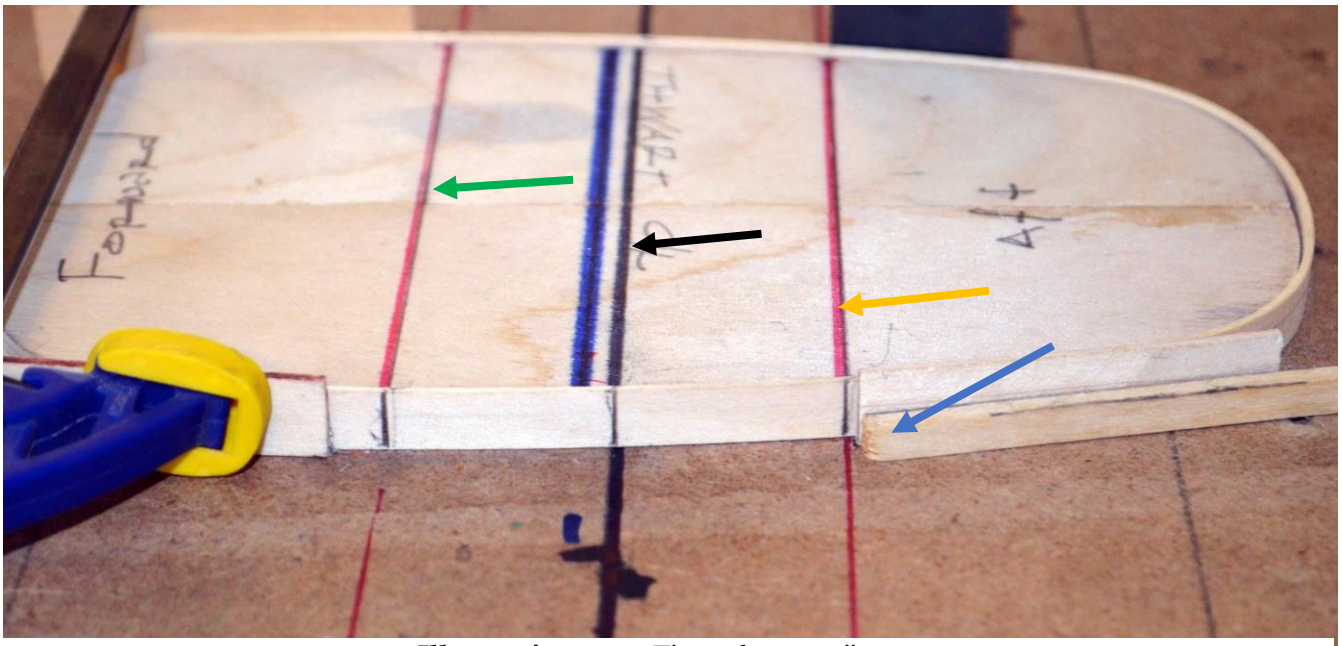


Illustration 321: The reference lines..

9) **Illustration 322:** The scribing of the exposed deck line is completed with a pencil and a piece of 1/8" x 3/16" strip of basswood. You want to be able to see this line when the gluing starts. Don't worry about it be cause the molding will cover any trace of the line.

Illustration 322: Above deck exposure.

10) Now release the coaming segment from the jig. The last step is to trim off the excess used to clamp the coaming to the jig (**Illustration 323:** the **red** arrow).

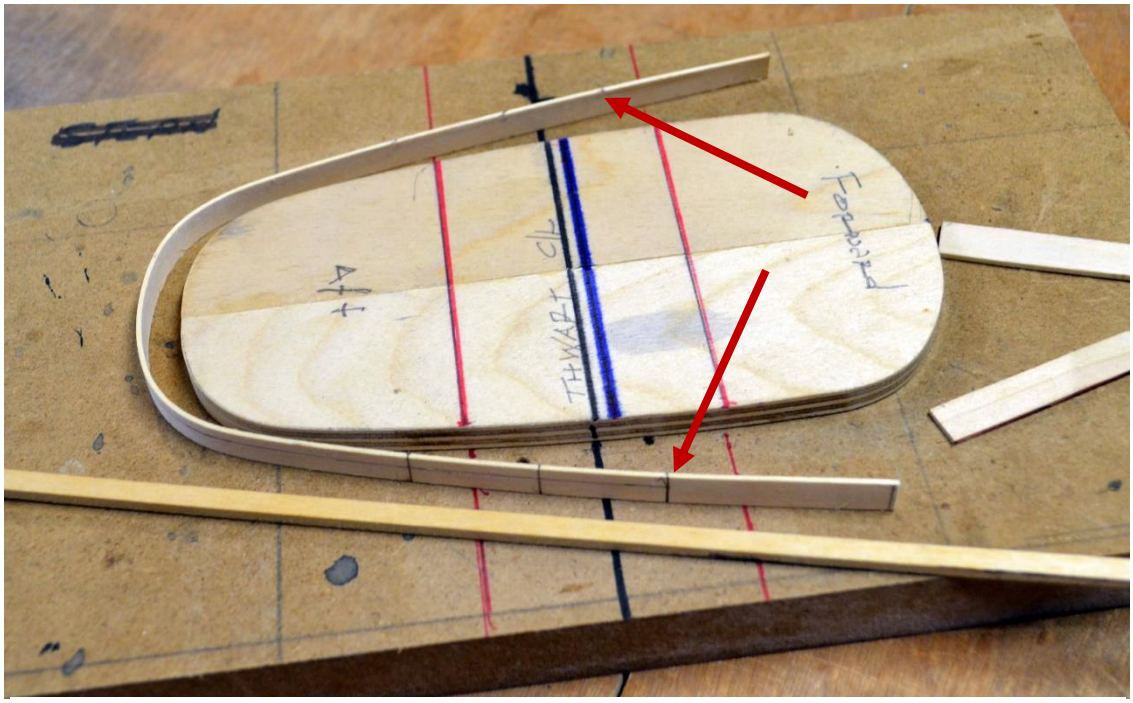


Illustration 323: Releasing the aft coaming.

11) The **yellow** arrow below shows a small rubber band used to hold the coaming to shape.

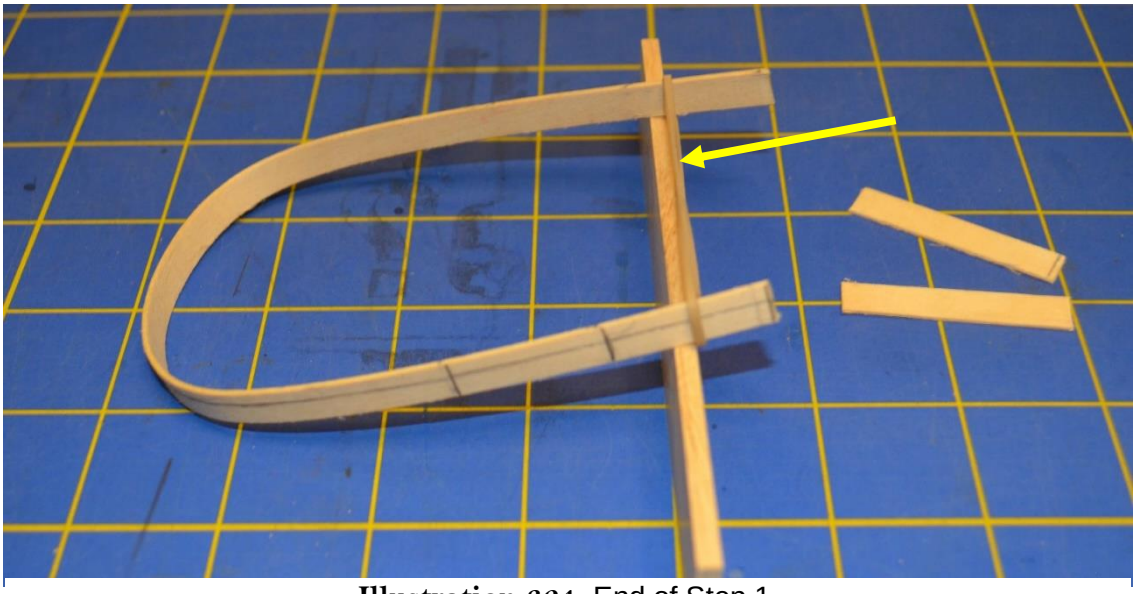


Illustration 324: End of Step 1.

12) **Step 2:** Remove the soaking forward coaming plank and repeat Step 1 using the aft end of the jig to create the aft coaming plank.

The installation of the aft coaming: Step 1...

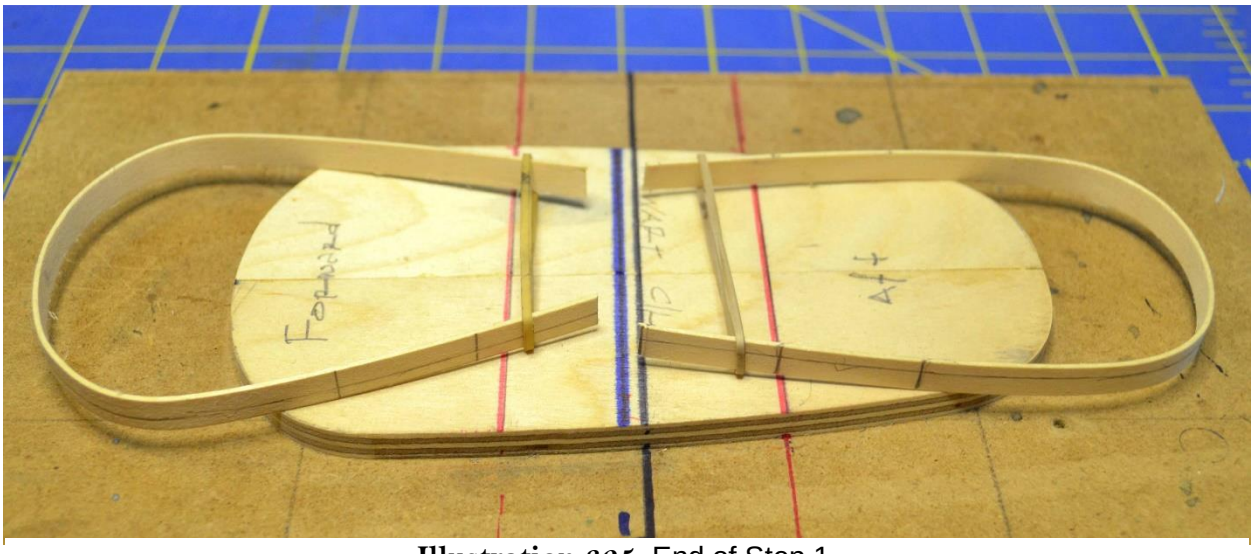


Illustration 325: End of Step 1.

1) I worked aft to forward, so the first step is to go back to the jig and clamp the coaming. At the thwart centerline, we need to scribe the scarf joint. I took a piece of scrap wood and set my disk sander to 30-degrees and sanded one end. I then positioned angle template to rise from the thwart reference line aft, and scribed with a pencil. Remove the coaming from the jig and dry fit to your model. Check your accuracy to the thwart **C/L**. To get a true location you need to clamp the coaming piece in place and dry fit it in place and check the exposure line seating. I "caulked" the end of the scarf joints.

Illustration 326: Note that the scarf joint location was scribed while still on the jig.

2) As to the reference line, you want a true 1/8” depth so have a ruler or piece of 1/8” scrap wood handy to check. Remember, the line was scribed with pencil seated atop the 3/16” wood. So, you want to keep the line visible when setting in position.

3) To glue in place, I grab all my clamps and place them within easy access. Now a fair dab of Elmer’s glue is squeezed into a cottage cheese lid, and then, taking three deep breaths and a Q-tip, I swabbed a bead of glue to the exposed sheer clamp surfaces, then, with my index finger, ran a bead around the edge of the decking. Clamp the coaming piece at the thwart location using the scribed guide line on the sheer plank.

4) Now you work as fast but carefully as you can. First clamp the scarf joints in place. Your guide is two-fold” The joint line and 1/8” deck exposure line.

5) Now go to the **C/L** and make sure you are on-line and at 1/8”. **NOTE:** I found the Elmer’s got tacky enough to hold in position in a few minutes. Since the centerline area is hard to clamp, hand pressure and a few minutes of patience did the trick.

6) The clamps go on as close as you can get to hold the C/L contact. Checking the 1/8” line position as you go, clamp back to the first clamps. While gluing, make sure you have a wet cloth or Q-tip to deal with any “squeeze” out both at the deck and the sheer clamp. When dry, unclamp – one down.

The installation of the coaming piece: Step 2...

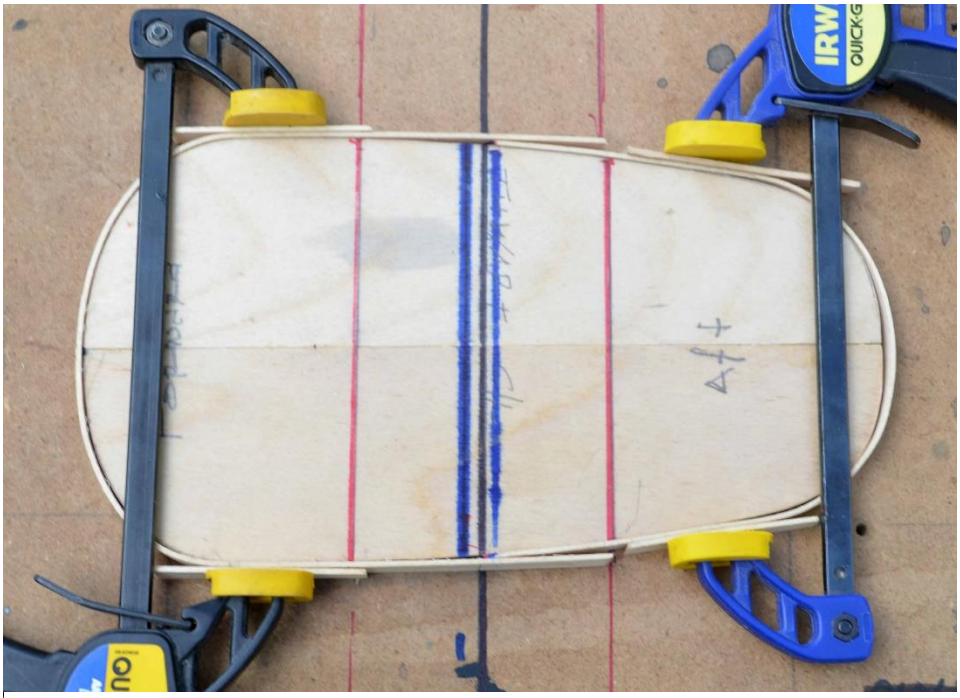


Illustration 326: Step 2.

1) Coaming the forward surround starts with repeating the steps used for marking the reference lines to the aft surround, as seen in **Illustration 324.**

2) In **Illustration 326** you can see the two coaming pieces were made at the same time to this point. This completed all the reference lines and ended in the cutting of the aft scarf joint and separation of the pieces from the jig. With the aft coaming glued to the model in Step 1, It is now time to secure the scarf location to the forward coaming. Important to note: this picture shows the relationship of the forward and aft coaming pieces made to this point "off the boat", and is used only to illustrate the method of obtaining the actual scarf angle location.

3) So, position the aft coaming piece to the cockpit and repeat the same procedures and test fitting procedures you performed on piece 1. Always make sure your clamps are holding the piece in place. You will see (**Illustration 326**) that your piece will overlap and extend to the aft **red** line. Setting the scarf location to the coaming requires visibility of the existing scarf location, so remove the fore coaming and take two small strips of blue tape and lay them along the edge of the existing fore aft joint (**Illustration 327**).

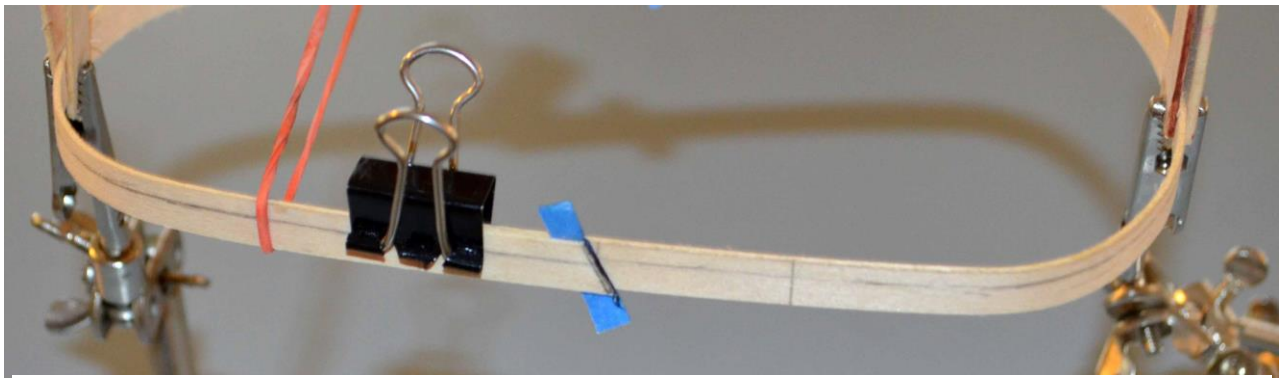


Illustration 326: Step 2. The aft coaming is already glued in place. You are preparing to set the fore coaming to a proper fit when it is glued up.

4) Dry fit the aft coaming one more time and scribe the scarf joint location.

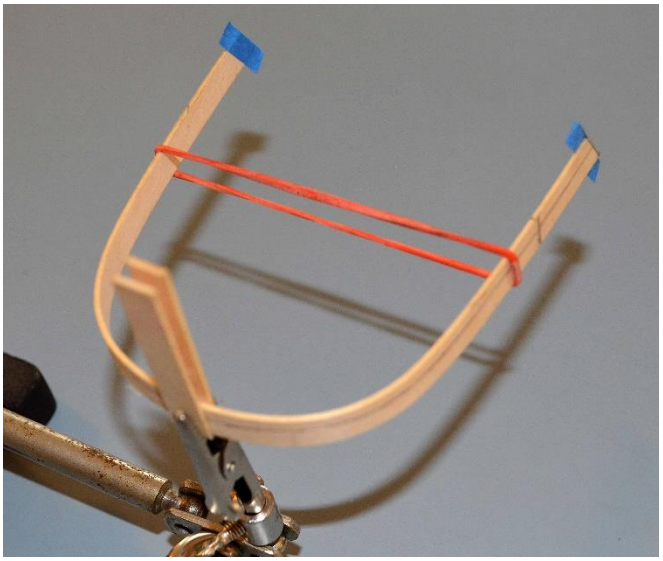
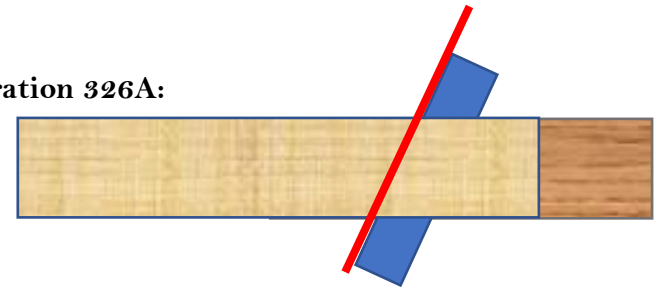


Illustration 327:

Illustration 326A:



5) I would make your first cut to the line, leaving the line and test fit in place. Adjust if too tight a fit.

6) All that remains now to glue in place the fore coaming using the same procedure that you used on the aft coaming.

4.6 – 5 The cockpit molding:

Alert: If you are building the reveal(s), do not glue the molding in place until you read ahead - **Section 4.6 – 6!**

Research:

The sharpie research I have done is on the work boat history, and not the recreational use in history of this design. The oyster fisherman of this era, as has been noted, were in no way affluent. Most built their own boats, and were extremely conscience of the cost, the labor, and "time loss" if this was a replacement build. I doubt very seriously that their cockpit molding was complex (i.e. quarter round). I elected to just use a 1/16" square, simple strip molding, taking a small rounding off the exposed outer edge for general "wear and tear".

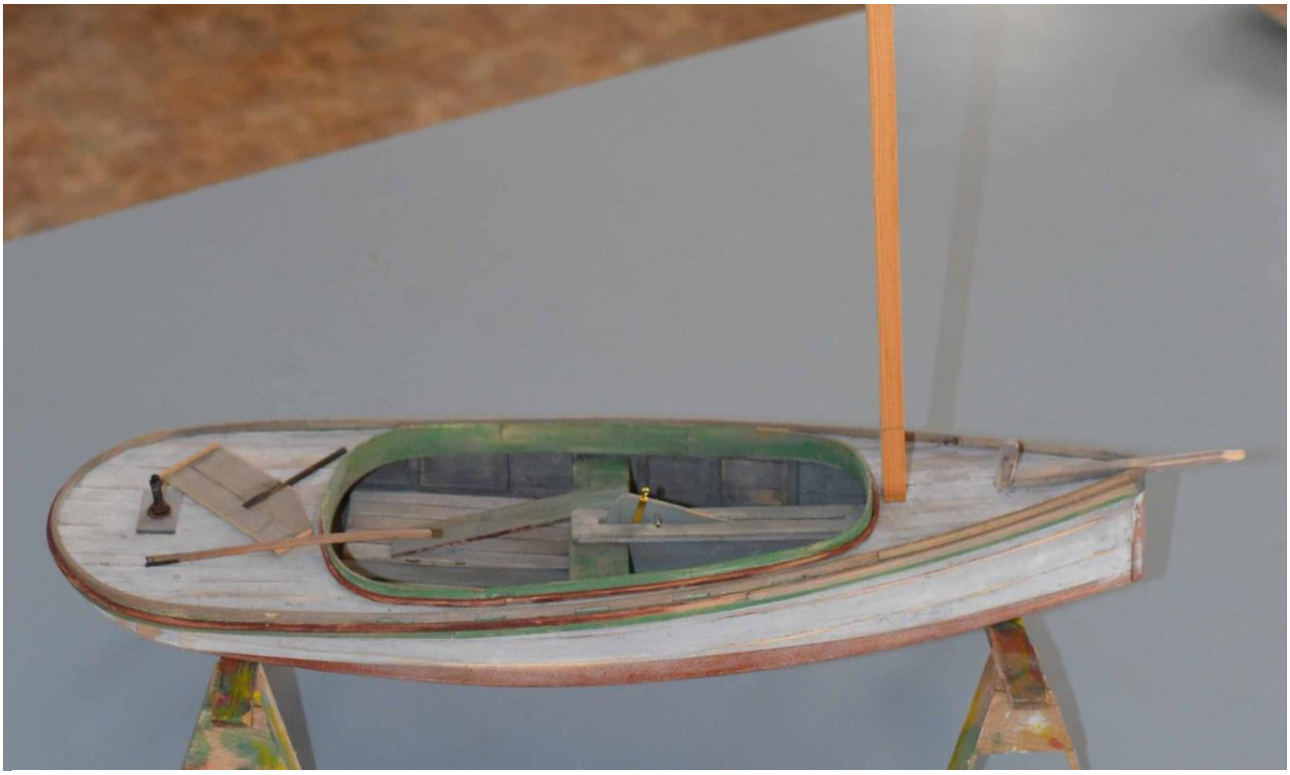


Illustration 328:

1) Take strip of 1/16" x 1/16", in this case, basswood long enough to surround the cockpit opening, with a 3 or 4" of overhang. Now cut the strip in half, place both strips in your "soaker". When the have soaked enough, you have two choices: you can use the jig to create a fore and aft section of molding, or you use the coaming itself as the "jig". In either case, use the same procedures used to seat the coaming.

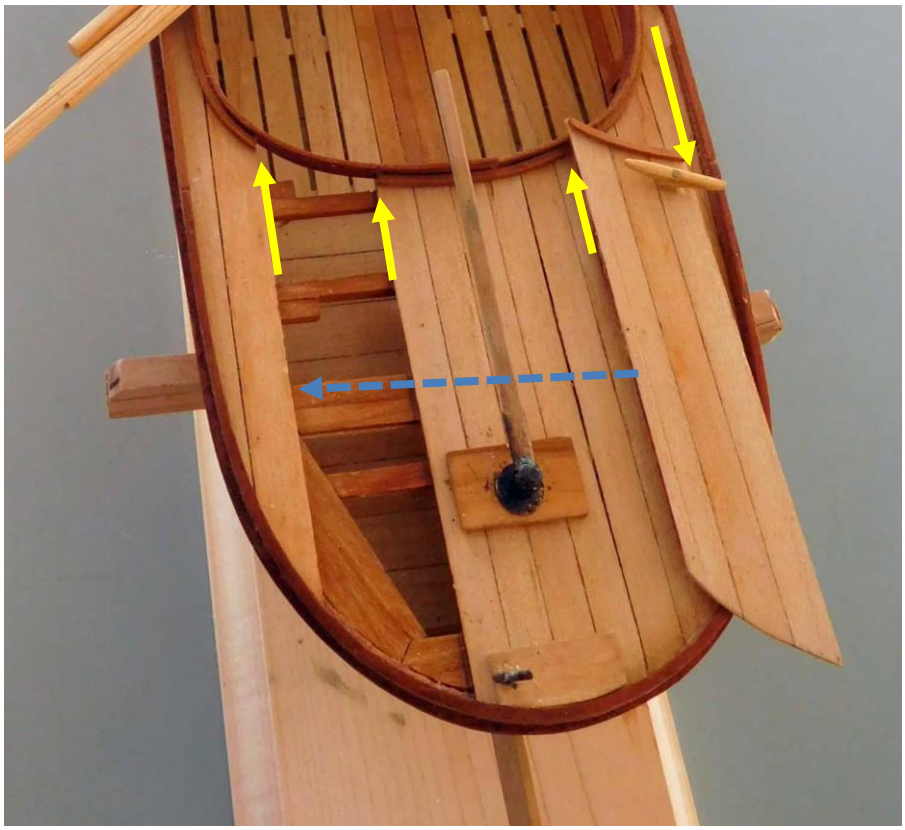
2) If you are painting your model, paint only the top and outside of the molding, once shaped, and if you are weathering your sharpie, use a manicure file to scrape the exposed edge of the molding with some "wear and tear".

3) **Illustration 329** shows some clamping techniques if you use the coaming for a “jig”.

Illustration 329: “molding” shaping.

Illustration 330: After jig shaping.

4.6 – 6 The cockpit molding, the reveal, and the bowsprit installation:



llustration 331: Ready to slide in place.

1) The first thing to remember here is that the two reveals are already shaped to fit perfectly in place. Aft, the reveal fits snugly forward against the coaming and against the false wale. I found the easiest way to get the fit needed was to shape the cockpit molding and let dry as it goes around and over the reveal seating. When dry, keep the molding clamped in place. Then run a ruler along the two sides of the reveal and etch that line onto the molding locations at the coaming (the **yellow arrows**).

2) Now we use the overhang allowance. Release the molding and clamp it on the coaming jig to maintain the actual curvature at the reveal. When clamping, position the molding about a 1/16" from being tight against the jig to get a "clean" separation. I used a single edged razor blade leaving an extra 1/32" on each side of marked location of the reveal. Now you can glue the reveal molding section to reveal planking and sand each end of the overhang to a flush 90-degrees.

3) Now take the two-separated sections and sand the reveal cuts to 90-dgrees, then set the sections to the coaming and mark scarf joint locations. Trim any overhang and glue in place. This same process is used to complete the fore reveal. Note: Every time you glue, especially if you are clamping, be prepared to deal with glue "squeeze" before it sets up.

4) The temporary cleat on the reveal above, is to give you something to grab hold of to remove and replace the reveal. It will later be repositioned to where appropriate on the reveal to the needs of the deck components.

"llustration 332: "To reveal or not to reveal, that is the ?"

5) Forward installation is little more complicated. However, the reveal molding forward is the same procedure as was applied to the aft reveal. Once the molding is dry, set the reveal in place, absent the bowsprit.

6) **Illustration 327:** Here is the key to a removable reveal – the 1/16" outlined in **red**. It extends from the **C/L** to the outside of bitt. It has got to go. If you go back to **Illustration 328,** you will notice that when the bowsprit is set in place, it sits atop the red rectangle planking. Glue the bowsprint in place, and the removable becomes impossible.

7) Now set the reveal in place and place the bowsprit into position. Take a sharp pencil and draw a line from the bitt to the stem, placing the pencil point tightly against the union of deck and the bowsprit. Remove the bowsprit and the reveal.

8) On a flat surface, using a straight edge and new #11 blade, remove the red rectangle from the reveal. Steady hand, slow passes. Keep the etched line in place, go just outside the line with your first cut. The idea here to cover the area of the cut so as not be seen under the bowsprit when set in place. Tweak if necessary.

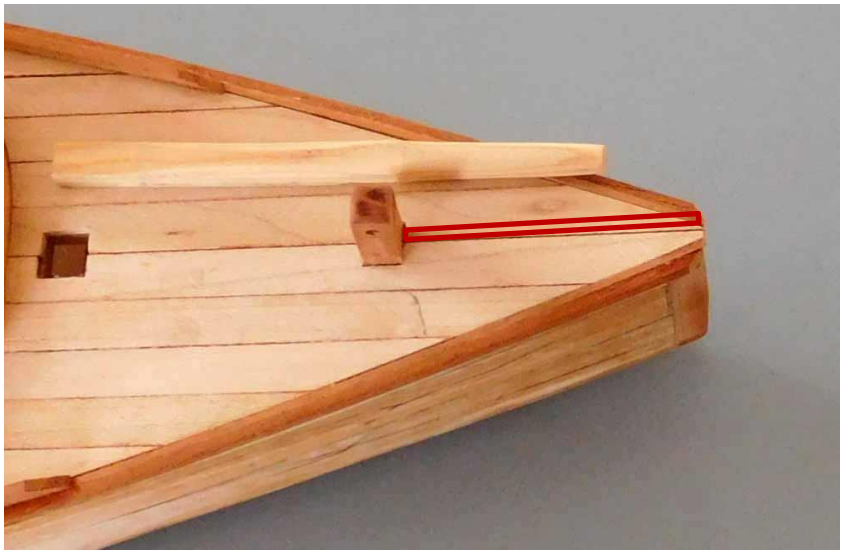


Illustration 333: It should look like this.

9) Set the bowsprit and the reveal in place. Putting pressure on the bowsprit to hold its position, remove the reveal. Keep the pressure on, replace the reveal by sliding it up against the bowsprit until the reveal drops into place.

Illustration 334: We are getting there! Next up – the rudder assembly. You may need to use a temporary cleat, as done aft, to remove the reveal.

4.7 The rudder and rudder assembly:

Research Locator:

Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, pp. 100-133.

"**The long balance rudder** is another typical feature of these boats; it was often over 6 feet and sometimes as wide as 15 inches, but 12 inches would be more the common width. The rudder blade was 'balanced' by having it extended 12 to 18 inches forward of center line of the rudder stock; the fore end of the blade was rounded up from below, sled fashion, and the top edge, ahead of the stock, was cut down to parallel the bottom of the boat…. Even in the smallest sharpies, the blade originally was 4 feet or more in length."[1]

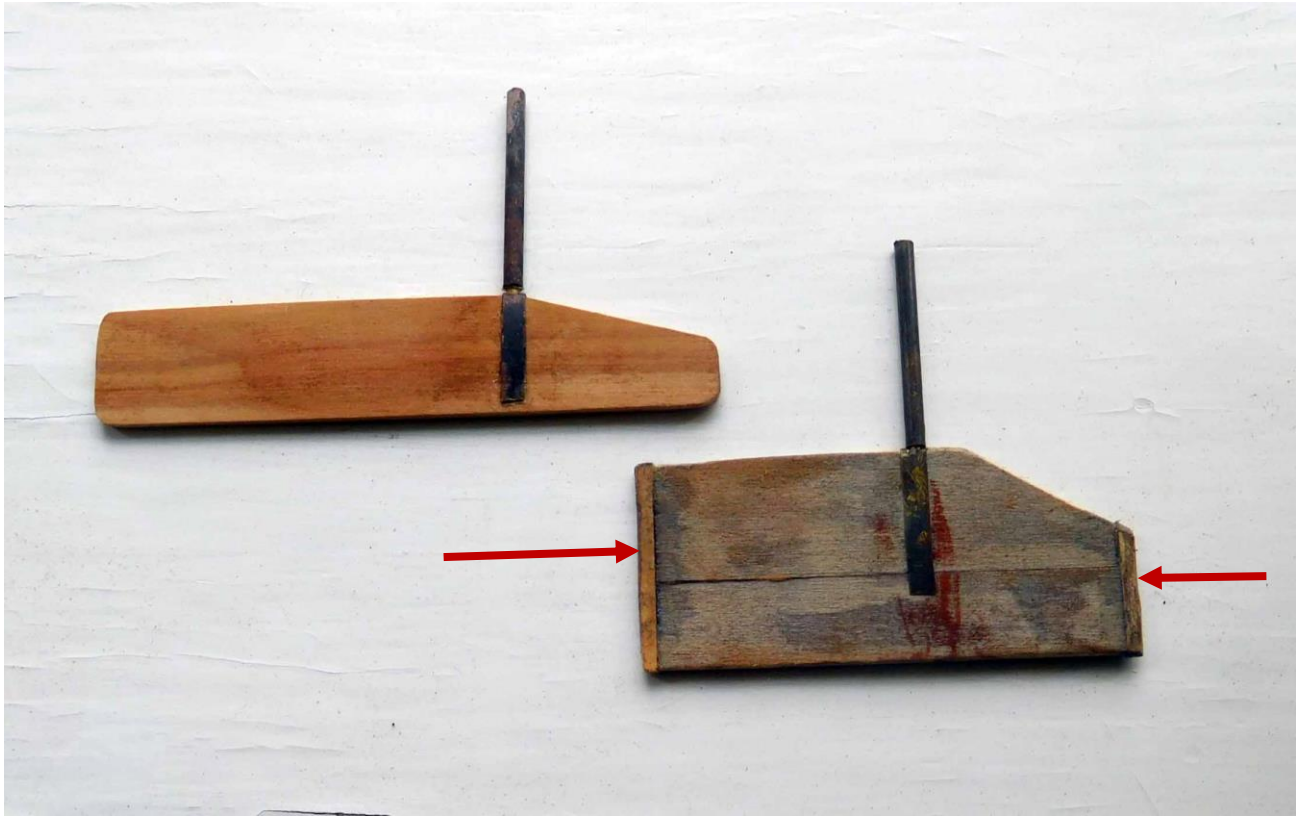


Illustration 331: The long balance rudder and a "smaller" sharpie rudder (note the end logs to shield the end grain (the **red** arrows).

NOTE: I sought a way to fabricate a moveable rudder on both sharpies that didn't include soldering nor did it require special tooling. I found that telescoping pieces of brass tubing made the assembling easy.

[1] Chapelle, Howard I., **American Small Sailing Craft, Their Design, Development, and Construction**, W.W. Norton & Company, New York, 1951, p. 113.

The moveable rudder assembly

The order of construction and installation of the rudder assembly:
Step 1:

1) The rudder itself, notched for a 1/16” rudder tube iron rod insertion.

2) The rudder clevis or pair of “straps” to complete the union.

Materials:

Rudder blank	1/16” basswood/maple	
Rudder clevis	Very thin brass sheet brass tape	
Rudder straps	Very thin basswood strips	optional
Rudder straps	Very thin strips of wood	Much simpler
Rudder tube	1/8” brass tubing	
Iron rod insert	1/16” brass tubing	
Rudder end logs	1/16” basswood	**Illustration 331**

1) Both rudder templates come right off the plans with the long balance, single plank, rudder. The earlier, smaller rudder has two planks. (Sheets **3 of 8** and **A3 of 3).**

2) I cut the planks required to the width per the drawings. I added to the length of the planks a little wiggle room. With the smaller rudder, final shaping is required to receive the end logs.

3) Glue the end logs in place.

4) Cut or sand to shape. Round the corners with a sanding stick.

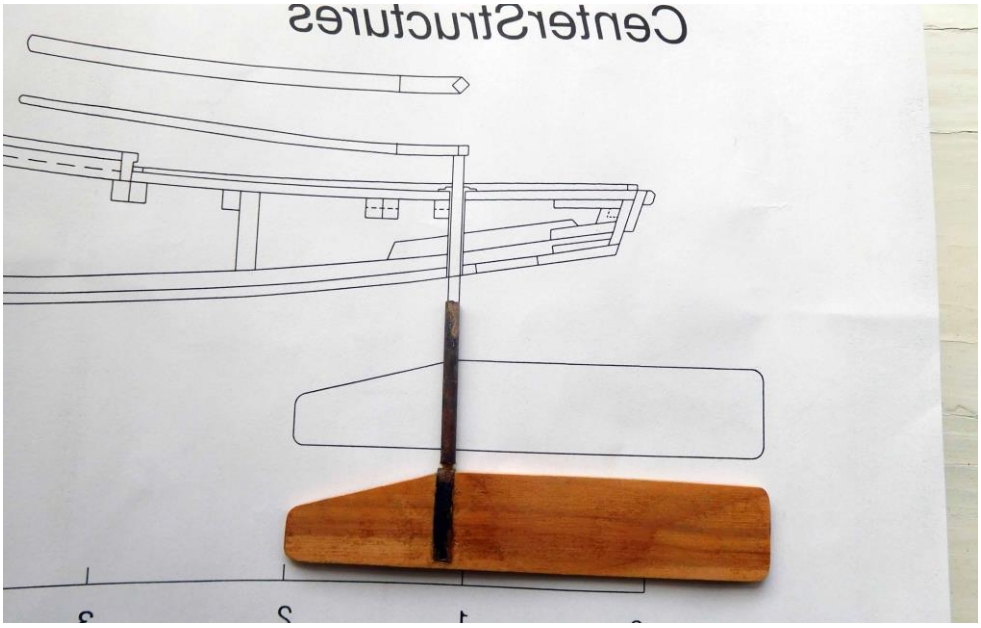


Illustration 332: The long balance rudder.

5) The first of the brass tubing is the 1/16” iron rod insert. The brass rod will “seat” into a 1/16” slot cut into the rudder at the position marked on the template. See **Illustration 330.**

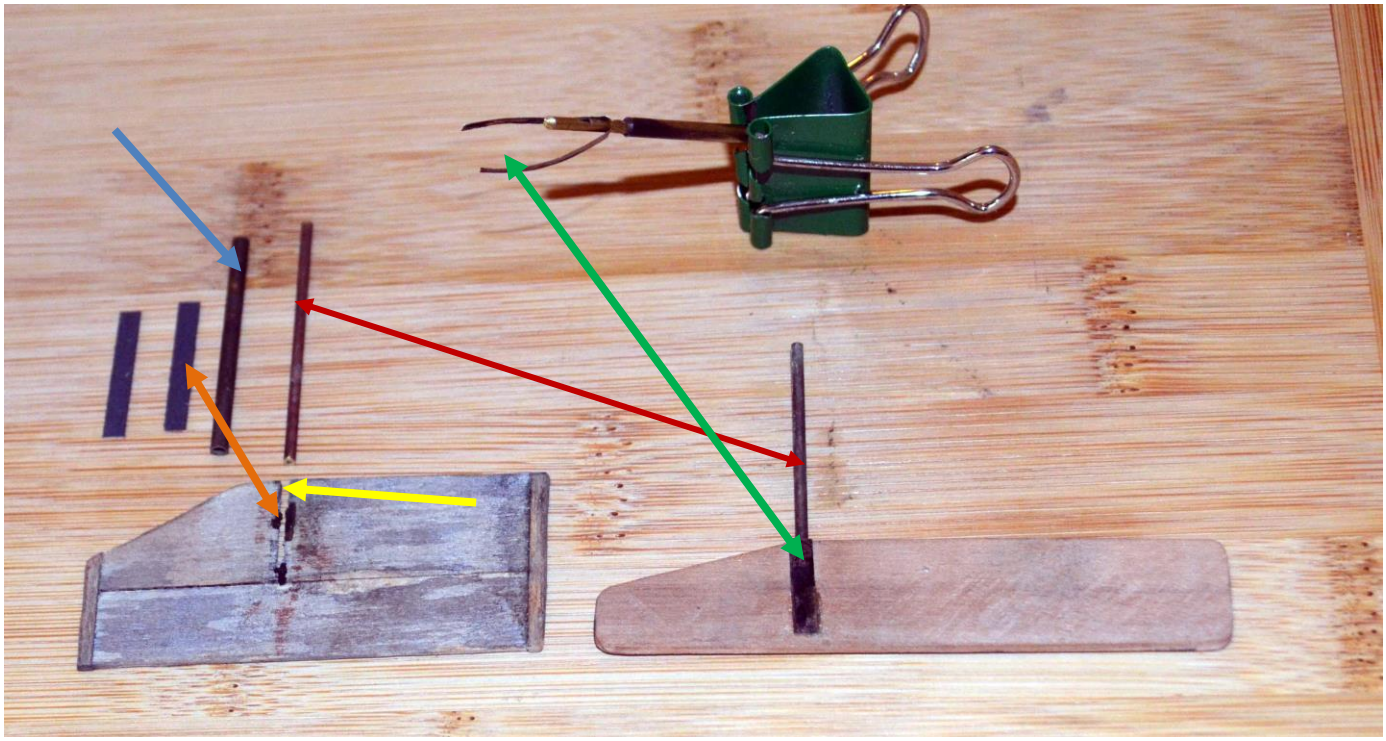


Illustration 333:

6) The **yellow line** is the rudder slot; The **red line** is the iron rod insert; the **green line** indicates the clevis straps (brass); the **orange line** is the clevis straps in wood; the **blue line** is the rudder tube itself.

7) The rudder tube will telescope with iron rod insert.

8) **Note:** If you elect to go with the brass clevis strap, it is one piece at 1/8” with a 1/16” hole center drilled, in the middle, with the hole aligned with rudder slot to allow the iron support log to seat atop the rudder. A small tipped sharpie black marker, carefully dabbed at the insertion point will, when the rudder tube is inserted, disguise what you have done (told you it was easier). As a nice touch, you can drill a couple of small holes in the clevis straps to simulate nails with small brass rod. Re-insert the rudder tube to the sharpie, and set the rudder aside.

Step 2:

The tiller arm construction:

Materials:

Tiller arm blank	1/8” basswood/pear	
Tiller arm clevis	Very thin brass sheet, paper, or brass tape	
Clevis fasteners	4 brass brads thin brass wire	
	1-0056 Hex head brass screw	
	4-0072 flat washers	

1) I made my tiller arm blank from 1/8” x 3/4” x 4” giving you an additional 1/2” of vising surface. Spray gluing the template, centered on the blank, I used my scroll saw to cut the arm free of the blank. The cut line stayed slightly “off the line”. Mark the fore and aft ends of the template on to the top surface for reference and remove the paper.

2) The first step in the shaping process happens at the oscillating sander: the top and bottom of the tiller arm taking the blank “to the line.” The extra length will help you hold the arm while drawing back and forth to the spin of the sander. Leave the aft end of the arm as is: with rectangular sides. Note the clevis of the arm’s position on the plan. Work forward from that position tapering from rectangular to a semi-oval rounding.

.

Illustration 334: The “old shoe-shine to shape” trick.

3) With the arm now snake-like, vise the blank extending half the arm to the midpoint. Make sure the vise is clamped and the exposed arm extends out over the edge of work bench. My “sander” is now the 1/2” strips of sandpaper you see in **Illustration 334.** I’m going to “shoe shine” to shape.

4) Continue repositioning the arm in the vise until the edges have been “rounded off”. At the “shoulder” of the tiller arm (the **yellow arrow**) I used the 5” disk sander to flatten the seating area at the arm’s end. This area is to be center drilled to accept the hex head brass screw. Do not round the corners at this area of the tiller. The tiller arm clevis will surround the edges.

Illustration 335:

5) **Illustration 283:** Remove from the vise and check out for smoothness. Hand sand any rough areas you find. Your tiller arm is now 1/2” longer that you actually require. Scribe the ends, cut, and round off. Locate and drill the 1/16” hole and set aside 2 washers and the hex screw for installation.

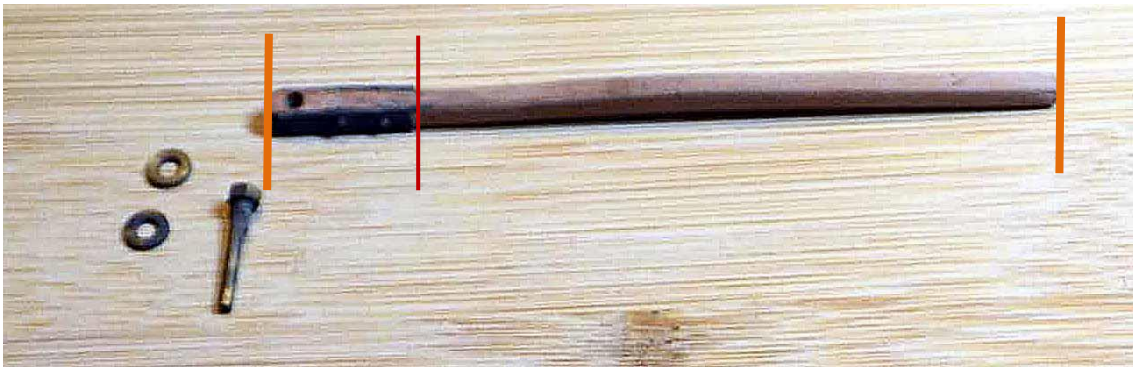


Illustration 336: Ready for installation.

Step 3:

The tiller to rudder connection

Materials:

Rudder shaft upper coupling	1/8” brass tubing	
Rudder tube	3/32” brass tubing	
Deck plate	1/16” basswood/maple	
Deck plate coupling	5/32” brass tubing	

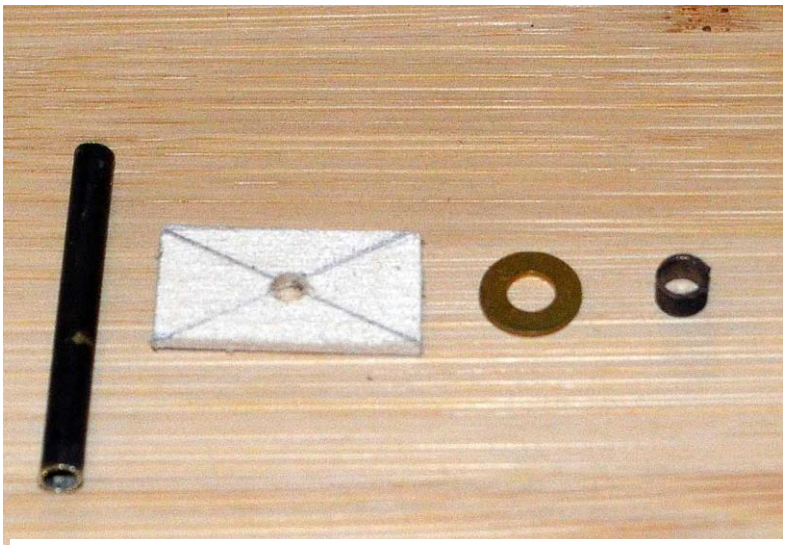


Illustration 337:

1) **Illustration 337:** Drill a center hole in the deck plate (if not already done). Test fit the rudder tube to the hole. Reinsert the rudder tube through the hull. Prep the deck plate (erase the location markings) and slide it onto the rudder tube. If all looks good, remove and dab a little glue onto the bottom surface. You do not want a lot of squeeze out. Now reinsert the deck plate and make sure it sits at 90-degrees to the **C/L**. Again, if it’s not already in place.

2) Note that I blackened the brass ahead of time. The washer goes on first then slip the lower coupling in place. The hole in the washer is 5/32” and it centers the assembly when the couplings seats on the deck plate. I used a tad bit of super glue to hold in place making sure the rudder tube was still removeable.

Illustration 338:

NOTE: All the brass tubing was cut to size with my Harbor Freight Mini Cut-off saw (P/N# 42307) I bought what seems like an eternity ago, for $19.99. It has a 3/8” arbor and churns out 7800 RPM. Replacement blades are still available in a pack of 3. I know that this type of saw’s is currently available. However, I wouldn’t hold my breath on the $19.99.

Now you have 3 components: a rudder, a rudder tube, and a tiller arm. Let’s put them together.

Installation of the moveable rudder:

Illustration 339:

1) The rudder tube was made way back, to be used in the deck planking and holding the position of the hull onto **BJ2**. It was longer, to achieve its usefulness. It now needs to be cut to actual length.

2) The distance required is 1/8" above the deck plate surface to just passing through the bottom planking. You don't have to glue it in place. Position it, scribe it, and cut it. You will have to file to rid the opening of burrs, then test fit the telescoping fit with the inner tube.

3) Take the tiller arm hex head screw and a file. It needs to telescope into the inner rude tube and it won't fit unless filing removes some of the screw thread depth. When the two items mesh, put a washer on the hex head, slide it through the tiller arm, and super glue the assembly into the inner rudder tube (**Illustration 339**).
.
4) Now comes the tricky part: Take the inner rudder tube tiller assembly and insert it into the rudder tube down through the deck and out the bottom. Push it down so the tiller is in position on top of the deck. The bottom of the inner tube sits on the rudder clevises. Measure the distance of the top of the rudder to the bottom planking. Scribe the location. Remove the assembly and cut and file the entry of the iron rod insert.

5) After cutting to length, take the upper rudder shaft coupling and slide it up to union with the lower tiller arm washer. Secure with a dab of super glue and reinsert.

6) Now we mount the rudder: take the rudder assembly and set it into the inner shaft. As it slides in it will eventually hit the bottom of the hex head screw. This will give you the amount of the rod you will have to cut off to properly seat the rudder into position. Mark, it, pull it out, and cut it.

7) This time, have a dab of super blue ready and, once you have dry fit and check out that all is in place, run a small bead of the glue to the base of the rudder-inner rudder tube and, making sure that the rudder and the tiller arm are at 90-degrees to the **C/L** Then seal the deal!

8) You now have a moveable rudder, side to side. For some of you, you might be able to find a way to have the tiller arm move up and down. But that's a little further up the learning curve for this write-up.

Illustration 340: Tiller – Rudder assembly in place.

4.8 Painting and weathering the open cap sharpie

Illustration 341: Mystic Seaport's 35' 3" New Haven sharpie.

I have always had an appreciation of workboats. Not much "spit and polish," but on the water or just tied up in port, through the "wear and tear" years of a hard-working life, it has a character that continues to shine through. Oh, the stories it might tell.

I took the above picture of Mystic Seaport's 35' 3" New Haven sharpie in July of 2005. It was a trip of recovery – I had just become a cancer survivor. It challenged me to appreciate the little things, as well as the big things, in life. I vowed, to myself, that I would make a 3/8" scale model of this sharpie and then surround it with Thomas Oyster House, and the *Emma C, Berry*, and the *Nellie*, to recreate this moment in time. I would start with the sharpie, and the diorama project went to the top of my "bucket list". I took lots of pictures and even purchased the one sheet of plans available.

I soon found out, however, that ship modelling was one of the little things. I still had to work through the bigger things, so, for the time being, retirement took over first place on the list.

I went to Mystic again in 2010, and took more pictures. She was still there, facing in the other direction, looking "tired", but her character wasn't waning, and I started my build to bring her back to 2005.

In 2015 I went back to Mystic and immediately headed for my friend and this is what I found – and aging sharpie, set up on tiers of logs, between two buildings, near the Thomas Oyster House. To say I was "crushed" would be an understatement.

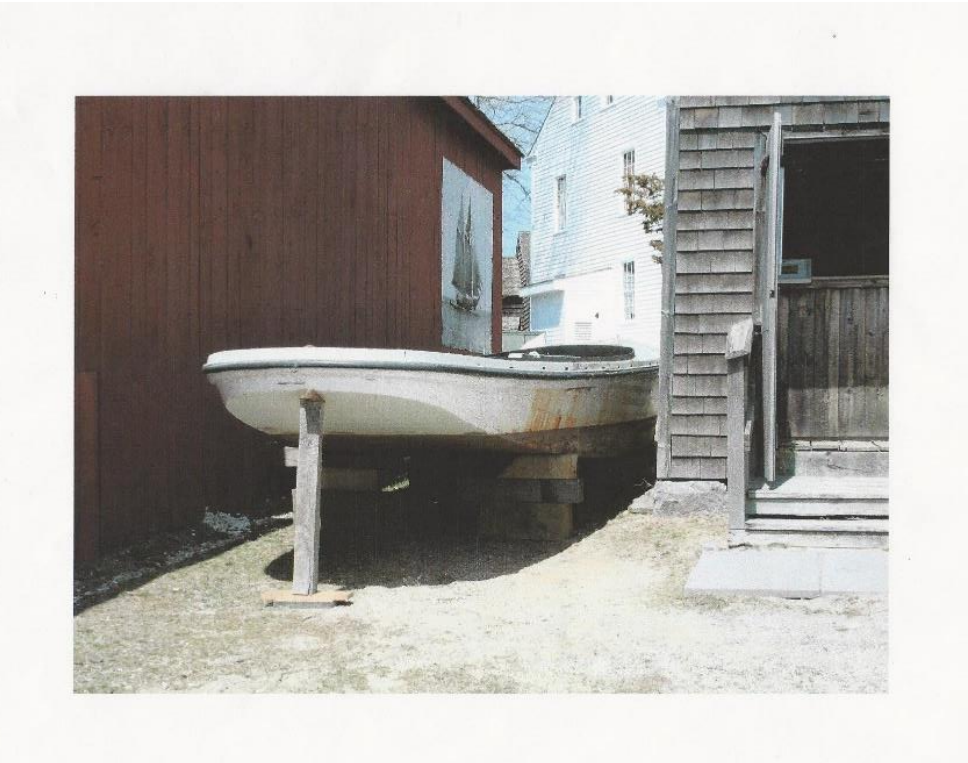


Illustration 342: Ten years later.

On a positive note, I got an up-close photo opportunity to take some pictures that would help me "weather" my model to reflect the "character" of this aging sharpie of another century.

In addition, I now had a picture of the rudder which wasn't visible when in the water.

Now the trick would be to transfer the images to the actual model as it goes into construction.

Illustration 343: The condition of the rudder.

My layer upon layer procedures: The base coat

Weathering is a process that starts as the construction advances. If a hull is to be white, you would build the model, sand the planking, mask off any structures that are not white, and spray or brush on the paint. If your hull planking is to be weathered white, there is a little more to it and a much earlier application. It is important to remember that it is a series of procedures, over the course of the build, that must be laid out at appropriate intervals in the build. So, the first step I take is to mock up a small piece of the hull, study the pictures that I have taken, layout what materials I think I will need, and practice. I'd rather be sure of the result "off the boat" than being disappointed when it's "on the boat".

1) I have tried (and still use) three different mixtures to achieve, what has become my "base coat" to basswood. It is the reason I recommended using basswood if you were going to paint and weather your model. They are:

   Black India ink mixed with tap water

   Black India ink mixed with 91% Isopropyl alcohol

   Blank India ink mixed with ammonia

2) These mixtures can be applied 'off the boat', before the wood is glued in place. For instance, the deck planking, the side planking, and the bottom planking can be "aged" when cut. The benefit of this timing is that both sides are done at one time. If you are "caulking" your planking, it will be applied to an aged dry surface and more visible. I have never experienced an adhesion problem with either of these mixtures, however, one caution: they must be thoroughly dry and if caulked, keep one side of each plank "clean" – join the caulked side with the "clean" side when gluing together. Not completely dry – do not glue up!

3) The other method is to "age" by the stage of the build. The simple rule would be go ahead when the area is accessible. You will see, as we proceed that I did large areas at a time, with a brush large enough to get the area done quickly, but there are drawbacks. I use Elmer's Carpenter's wood glue which is water soluble. **Note**, in the **Illustrations** below, that the glue joints do not absorb the mixture if the glue has set up and the mixture goes on slowly and in small amounts at one time – do not "overload' your brush. You can see by the paper towels that if I feel there is too much mixture, to absorb the excess with a paper towel before continuing to brush the planking. Too much soaking could affect the Elmer's bond.

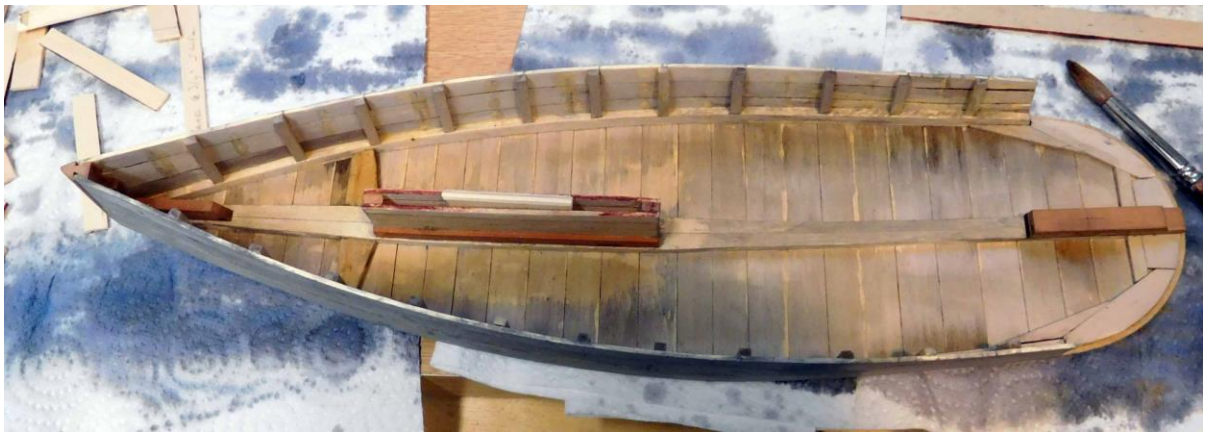


Illustration: 344: The India ink base coat being applied to the interior.

Caution:

4) You have probably heard of all three techniques and the science that goes with these critiques in magazines and on-line. I've read them all, and I refer you to google if you have any concerns. I have uses for all three, and my only concern if with the fumes of the ammonia – use the mixture in open air. Stay with the water mixture if you have any concerns. I have found that both water and ammonia produce almost the same result, depending on the mixture percentage of ink to medium. The isopropyl, on the other hand, produces a more "silvery" gray finish, like the siding on an old cabin in the desert.

5) I save boullion jars, both plastic and glass, to mix in. They hold 4 ounces and I usually fill the medium to a third of the jar. I'm looking for one jar of a "heavy" creosote like tint, one jar of the medium tint, one jar of a light tint, and one jar of a "wash." I wish I could tell you there is a specific recipe for each, but it is trial and error. If you have an eye-dropper, use it, and count the drops, testing on some scrap pieces, until you get the tint you want, then write the drop count down. **NOTE**: If you have a spare hair dryer, you can speed up the drying time to see the results – the change is not immediate but is not set in until dry.

The timing of the base coat:

Illustration 345: The first stage in progress, then to the inside planking...

1) The first aging application on my model was at this stage of construction, the outside of the planks **A, B**, and **C**. **CAUTION:** I apply the ink washes to one side at a time, and let dry. If you do both outside and inside of the planking at the same time, you may end up with a significant problem: the water-soluble glue may loosen the seating of the plank joints or warp the surface of the wood.

2) The second step was the base coating applied to the bottom planking **(Illustration**: 346).

3) With the exterior planking done, I coated the interior planking (See **Illustration: 344**).

Illustration: 346: Looks terrible, doesn't it! Note the unevenness of the application. Perfect! You are right on track!

4) I try to think from the inside to the outside to determine the timing of what and when I will have the best access to the area in question. At this point in the build, I set the washes aside. **TIP:** If you are not going to have a reveal, do you need to do this extensive a base coat? I do it, because I want to. I get satisfaction known the removeable flooring will also cover the bottom planking surface, so you can use that area to hone your skills, it is there, and I get two advantages: the "unaged" components will not be visible from the cockpit, and I can be ready for the second phase of aging, "to test run" in areas that I know won't be seen when the model is finished. In **Illustration 349** you see the removeable flooring will also cover the bottom planking surface, so you can use that area to do some testing.

My layer upon layer procedures: The second layer

1) The second layer begins the weathering of the interior planking, frames, bottom planking, transom flooring, rudder logs, keelson, inner stem, mast box and mast logs.

2) The change here is to "age" the paint that remains on the "base coat" wood. You do not want to simply brush this stage over the first stage.

3) I do this by not using paint brushes, except on very small components, requiring a very fine brush. I use a Q-tip, lots of Q-tips, to get the affect I want.

4) Mystic sharpie's bottom planking shows a medium to dark gray hue, well-worn and having some light gravel or sand scattered around the floor. Note that the caulking between the planking is a "dirty" white. The side planking and the frames are white while the gray reappears on the inside of the coaming.

Illustration: 347: Looking forward for ideas of a color scheme.

5) Since my sharpie is half the length of Mystic's sharpie, and I elected to install a removable flooring, and history has it most likely filled with oysters, I went all the way with gray on the all the elements listed in (1).

6) In the upcoming steps, when you are hesitant, go back to testing your options on a small piece of scrap basswood.

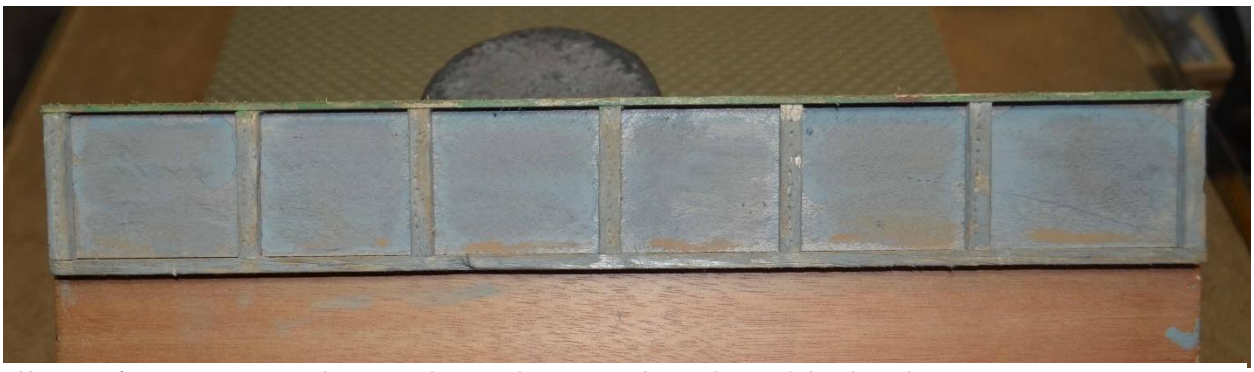


Illustration: 348: A testing session on basswood mockup of the interior gray.

Step 1: **Materials**: I used a medium gray Floquil lacquer paint (110167 UP Harbor Mist Gray). I used it because I had it left over from my railroading days, but you can also use any acrylic craft paint as a substitute and get the same result. I then have on hand the appropriate solvent for the paint selected, in this case lacquer thinner, and an open box of Q-Tips. Again, I do not use a paint brush. The Q-Tips do the job and are easily disposed of. **CAUTION:** Lacquer fumes are not to be dismissed. I use them only in well ventilated areas and my exposure time is limited.

Step 2: Make a 'martini' of the paint shaken and stirred, with a shot of solvent handy.

Step 3: Dip a Q-tip in your paint. Don't flood the tip with paint, be stingy until you get the hang of it. Working in small area (i.e. working between one frame and another) dab a small blotch randomly in the area. Take a second Q-tip and dip it into the solvent in the same manner as the paint, and slide the solvent back and forth across the surface. You are looking to vary the amount of paint left on the interior taking into consideration of sun and sea, distress, dirt and grime, and wood now bare from time. Try and have the stokes of Q-tip solvent follow the grain of the basswood. Touch-up any area that "just doesn't look right." Do not seal the wood or the finish. This will enable to re-touch if the need or desire comes up.

Illustration: 349: Stage two applied. Note removable flooring has been given a **wash** of base coat.

TIP: Step 4: Neither the first or second stage is done. Both layers can see further weathering. There are other issues to be considered, such as are the issue of "wear and tear" from usage, dirt and grime from neglect, broken components, unrepaired hull damage, sand and shell, rust, and the placement of hardware inside the coaming created cockpit area.

As the chines and deck beams are in place, the wash is applied but not the paint. The exposed surface of the beams and chines can be left without wash and paint as the deck planking and the coaming surround will cover them. However, note the center board is under construction, and though it is built off the boat, I went ahead at this point with both the wash and the paint.

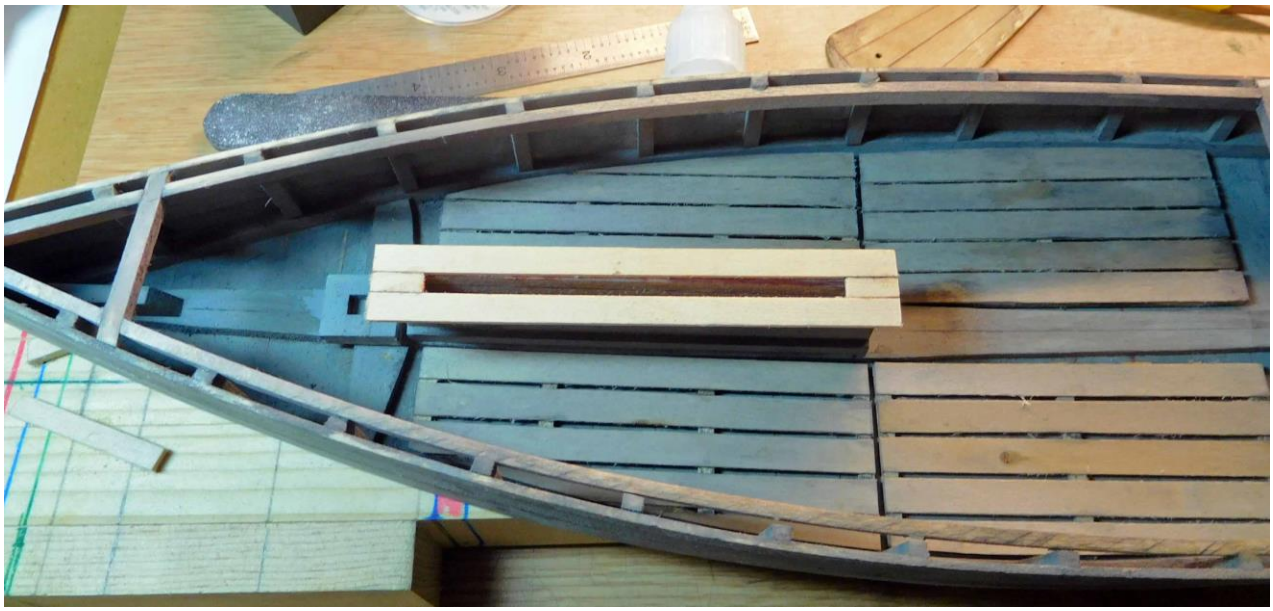


Illustration: 350: The darkness of the removeable flooring is from shadow. The lower right aft flooring reflects the light wash.

Step 5: I built the transom vertical planking with no wash and no paint. I wanted good visibility and good adhesion.

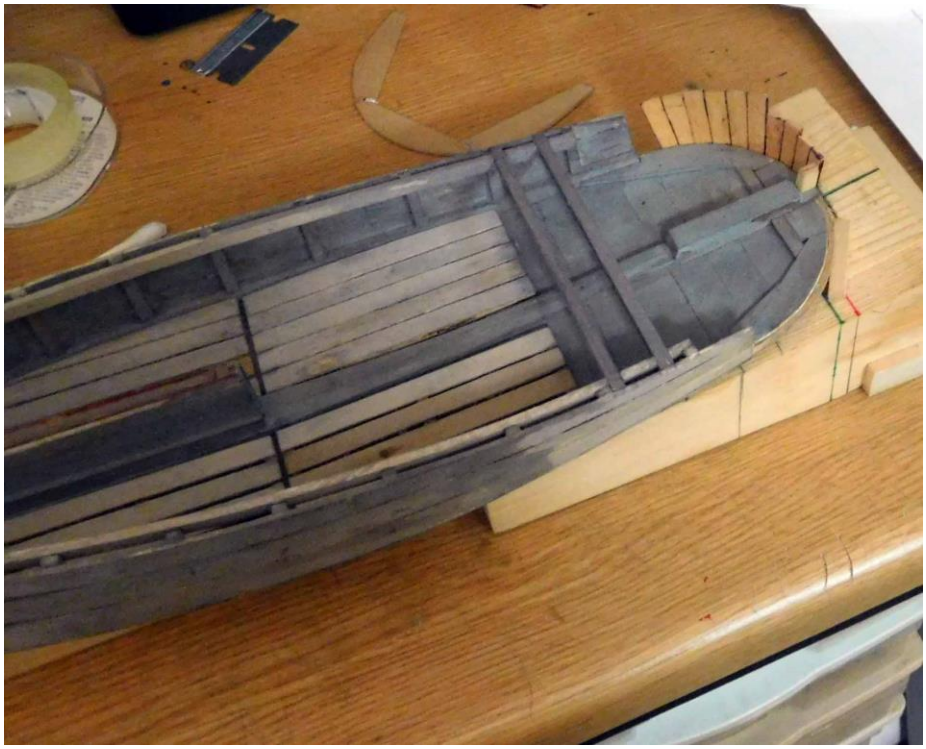


Illustration: 351: As the transom construction proceeds.

Step 6: **Moving ahead**

Illustration: 352: The vertical transom planking completed and wash/paint application proceeding.

You can see three things here that have been weathered: (1) the **C/B** housing, open cap logs, and center board, (2) the application of white paint to the port side planking, and (3) the weathering of the thwart seats.

Item 1: The **C/B** housing is removeable and stage 2 is completed, for now. You can set it aside.

Item 2: I took a 7/8" x 1/16 x 5" basswood strip and gave it a base coat. The, the same procedure of paint application used for gray, I used Floquil's RR light green with the lacquer thinner all around, top and bottom surfaces of the soon to be thwarts. I then took a piece of brown "hop-scotch "chalk and, with a few small streaks at random, used my finger tip to "rub in" the "dirt".

Item 3: The white of the hull planking was probably over stretching at this point, but I was eager to see how well it would work. Being a solvent man, the white here is an inexpensive craft acrylic and the solvent, water. More on that later – but it did work well.

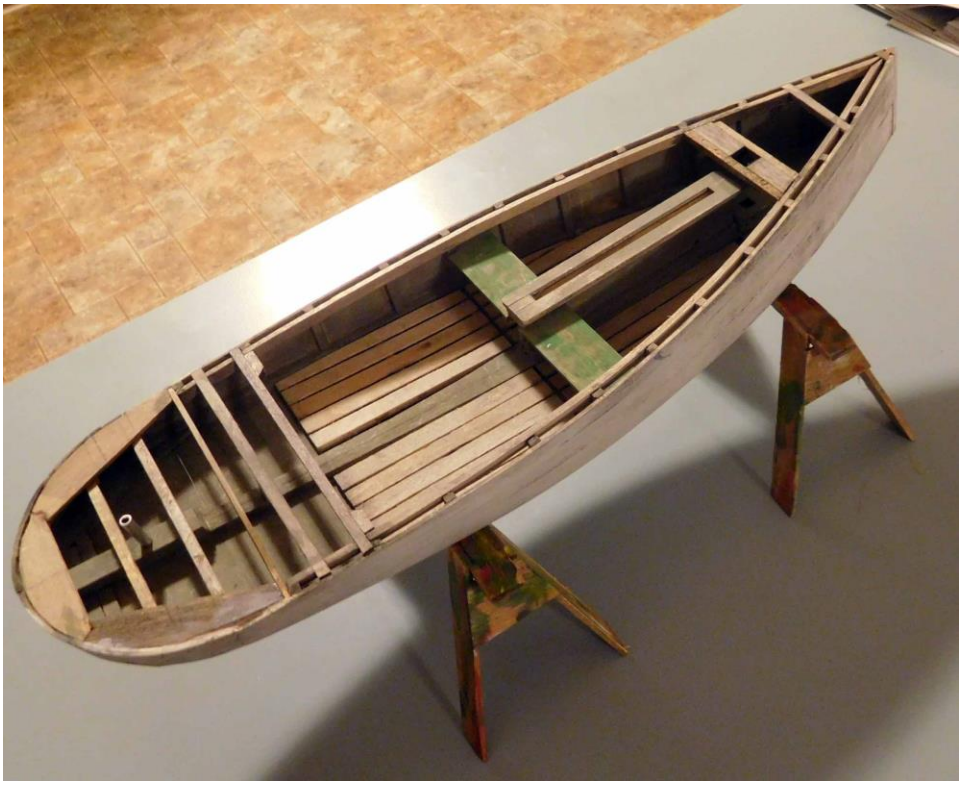


Illustration: 353: the base coat coating of the hull.

Note: All the deck planking was base coated individually and dried thoroughly before glued in place. If you've already completed upper deck planking, you can base coat in the same manner as the bottom planking. With the base coating completed, now is the best time to work on the deck

Illustration 354: Base coating the upper deck planking.

Stage 4 On to the exterior:

1) So where to start? I started at the bottom planking from the waterline down (base color of a "Tuscan type red"). I moved to the side planking and to the upper deck (anything with a base color of white). From there, I tackled the remaining attachments of anything non-white. I also made the decision to keep some of the attachments with just the base coating.

2) **NOTE:** Use any pictures or other information on hand to determine what you want to do. Determine the base color for the area you are working and use the same method you used on the interior gray application.

3) Make a list of the coloration you want to achieve, be it with paints, solvent based or acrylic, chalks or pastels, sharpie markers, and maybe even a colored pencil.

4) **Illustration 355:** shows the side planking (a white area) and the waterline/bottom planking (a red area). Though I weathered each area separately, I assembled all the colors and what I was to use to get that color onto the surface of the area.

Illustration 355: The starting point.

Illustration 356: The completed starboard profile.

1) A solvent base Tuscan red applied with a Q-tip, horizontally, going about 3” at a time. I dip the tip into the paint, and as the Q-tip moves the intensity of the color fades. I then take a Q-tip dipped in lacquer thinner to “smooth out” the area. I keep going around the hull to get the Tuscan color applied. (The bottom planking can be done with a brush, but continue to use the lacquer thinner to vary the intensity. Keep looking at the picture to keep on the right track. I use the same technique to base color (white) the side planking, the vertical transom planking, and the upper deck planking.

2) Once the base coloring, set aside any further painting or weathering at this time. Go to **Phase 4, section 4.6**, and complete that section. As you are preparing the individual components, be thinking about their color. You will be soaking your coaming, molding, wale, rub tail, and toe-rail. to "set in" the curvature for installation. Once the pieces have clamped and dried to shape, you can base coat and re-clamp until dry. When dry, you can apply your base color the exposed surfaces, off the boat. Let them dry, and glue in place.

Using your imagination:

Waterline: Illustration 355

1) The red zone: the white, light brown, darker brown, light gray-green, and the rust are old hop scotch chalks from a box left in my garage when the girls grew out of the hop scotch phase of their lives.

2) The chalk sticks scribe is applied, from a small stroke, with the tip, or light pass-over with the side of the stick and then rubbed in place with my index finger.

3) The white zone: a rust color chalk after and wiping down of a diluted base coat of water and ink.

4) Distressing in bottom planking and the side planking is limited. By that I mean broken or missing wood fittings, warping, scraping gouges docking, paint lost from age, rotted, or damaged planking, broken fittings, missing lines, frayed and broken lines, oil spills paint spills, another boat paint or buoy by side scrapping, or a complete loss of paint completely.

Illustration 357: The completed deck and cockpit.

So here are some tips:

1) I use a single edged razor blade to scrape paint off.

2) To warp a piece of planking, soak in water and then clamp at both ends, twist to the desire warpage, and let it dry to shape.

3) Scrapes and gouges can be made with small chisels or #11 X-acto blades.

4) Wear and tear can be accomplished with wire brushes and scraping with the teeth of a razor saw.

5) If in a diorama, pilings shape nicely with a rasp.

6) If I want a broken plank, I pick up a plank and snap it off.

7) Dirt and grime can be washed on, chalked on, and even dry brushed on when using paint for rust, or earth tons, brass, gun metal, etc.

8) Rail road scenic grasses, coal, sand, dirt from the back yard, scraping from a rusted pipe in the basement, can also be used. These items can be "sprinkled on" and set with hair spray or watered down clear Elmer's school glue from a spray bottle

9) **Caution:** chalks should be rubbed in place and not over sprayed. I have found that the spraying can change the color or even "blow away."

Illustration 358: A view from stem to stern, with practice block of the side planking, wale, and rub rail.

Illustration 359: It is my intention to put this sharpie into a diorama.

10) **Note:** Every section of this weathering: process was done first on a small piece of scrap wood. Note the test mock up in **Illustration 358**. In may be trite, but "practice makes perfect."

In the end:

SUGGESTION: When you think you are about done, you are done!

Note: Mast, gaff, and boom were made of pine and were moderately base coated.

Phase 5

Masting, Rigging, and a little more to finish!

5.0 An Outline of Phase 5:

For the masting and rigging section write-up of the sharpie models, you will see a third option of build – an unpainted model with a full reveal of all the elements of the build. I made this option by reading and editing what I have written, to make sure that I have described every task in a readable and sensible manner. I also wanted a prototype that was wasn't painted or unpainted from hardwoods. I made this model using basswood and pine with an extensive reveal of the interrelations of all the components. Section 5.3 shows you some pictures of the of the build from the start of the installation of the upper deck

5.1 Mast, boom, & gaff construction and rigging, (Plans sheet 7 of 8)

Research Locator:

John Leather, **The GAFF RIG Handbook,** Woodenboat Books, (Brooklin, Maine, USA), 2004 (reprint)

Emiliano Erikson, **The SAILMAKER'S APPRENTICE**, International Marine, A Guide for the Self-Reliant Sailor, (Camden, Maine), 2001

Time Life Books: **The Classic Boat,** (Alexandria, Virginia) 1977.

Iain Oughtred, **SPRIT RIGS**, Wooden Boats magazine, May/June 1987, pp. 80-86

Materials: Mast: 1/4" x 1/4" Pine, Gaff/Boom 1/8" x 1/8" Pine, Stiffeners 1/64" x 3/32" pine strips

Making the mast from a 1/4" x 1/4" x 18-1/2" piece of pine finished to a length of 16-1/2".

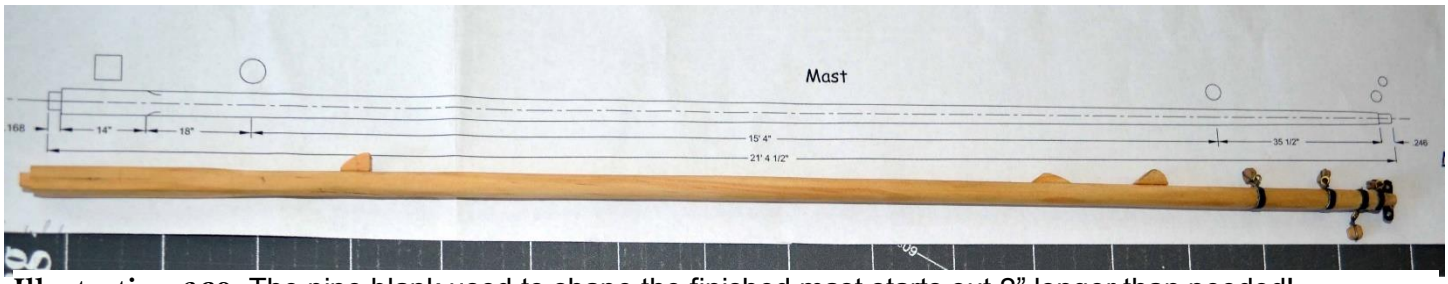


Illustration 360: The pine blank used to shape the finished mast starts out 2" longer than needed!

NOTE: There are many ways to shape a mast, the most common of which is a dowel. I choose a technique that requires square stock, a small vice, a piece of sandpaper, and a shaping tool to seat the mast to the mast box. As a review, it is the same technique used to shape the bowsprit (**Phase 4, section 4.5**).

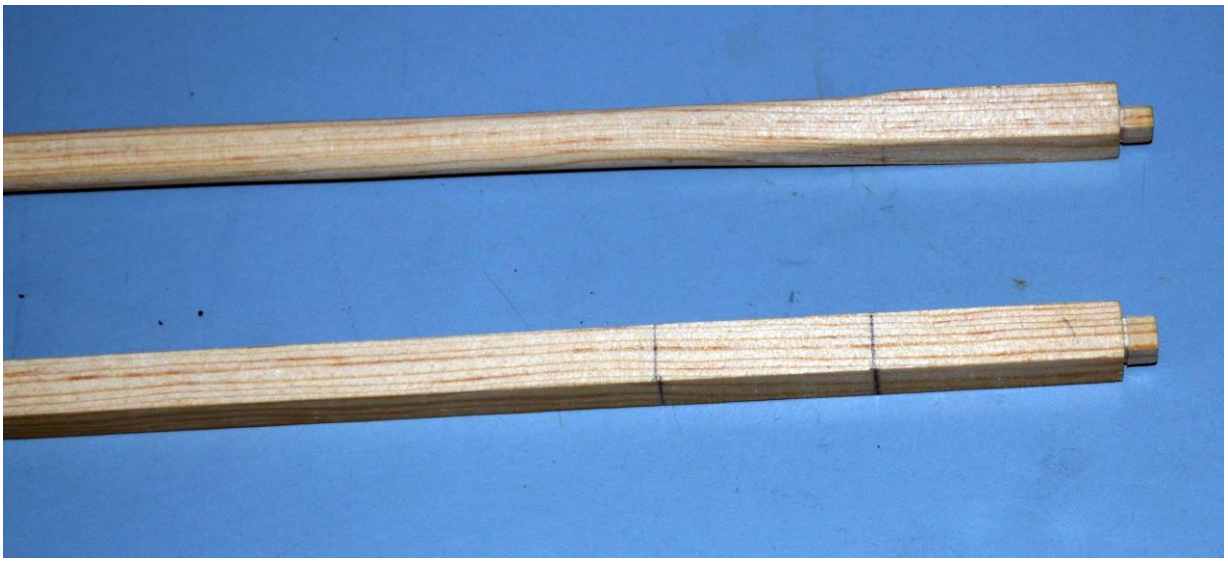


Illustration 361: The mast tenon formed.

The seating of the mast:

1) The first step is to seat the mast into the mast box by creating a 1/8" x 1/8" x 1/8" tenon.

2) I used my Preac saw to "shave", with the blade set at 1/16". I set the fence to 1/8", made a slight allowance for the blade thickness, and notched the 4 sides.

3) Now I ran enough passes through the blade to each side out to the end of the pine to form the tenon.

4) You can also take a single edged razor blade to create the 1/8" surround, trim the tenon to shape with the razor blade or a #11 X-Acto blade. Other options are a razor saw, chisel, and file.

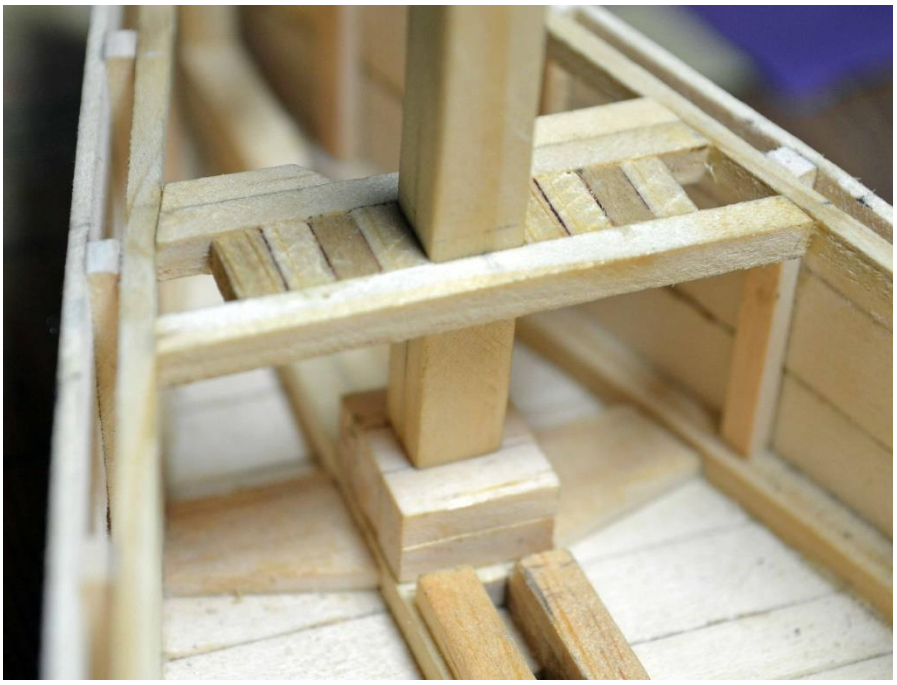


Illustration 362: The complete seating at the mast box.

The "Shoe Shine":

1) You will note that the mast rises through the deck as a square shape and transition to a slightly tapered circular shape run to the top. I scribed the location of the start and end of the transition areas.

2) I then start by placing the rectangular area into the vice and clamp the vice to a table edge.

3) The sheet of sandpaper (120 grit) is then cut into strips about 1/2" wide and 6" in length. Now I take a strip and give the pine a "shoe shine".

4) I do about 3" at each vise position, rotating the 4 face surfaces. The trick here is to count the number of passes (up and down stropping of the paper over each side surface) the same number at turn in the vice position. This will maintain the integrity of mast as you move along.

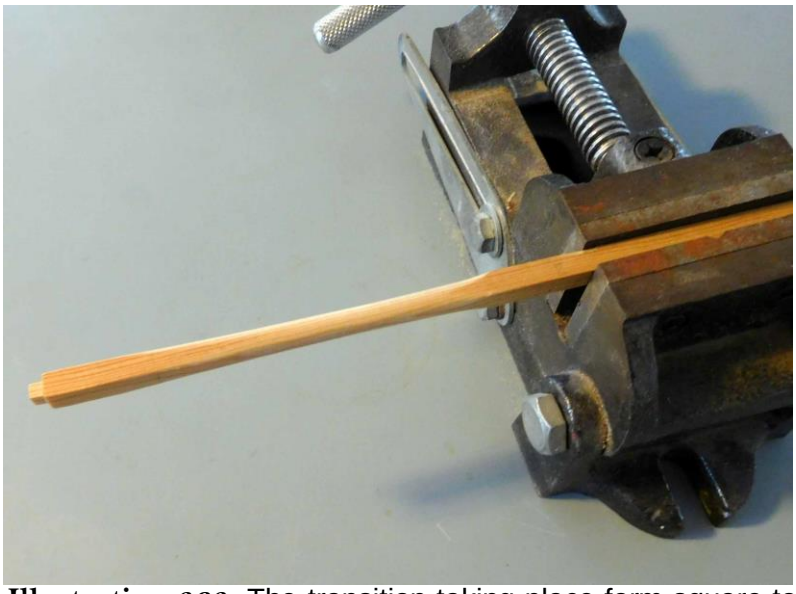


Illustration 363: The transition taking place form square to round.

5) Once the transition arrives at a fully circular surface, to taper, keep moving along at 3 or 4-inch intervals and increase the number of passes at each stop. If you arrived at 25 passes (i.e.) to circular, perhaps add ten more. At his point it is guess work but in the stropping process you are moving up and down the surface area, and visually, you will see some taper as you proceed up the mast.

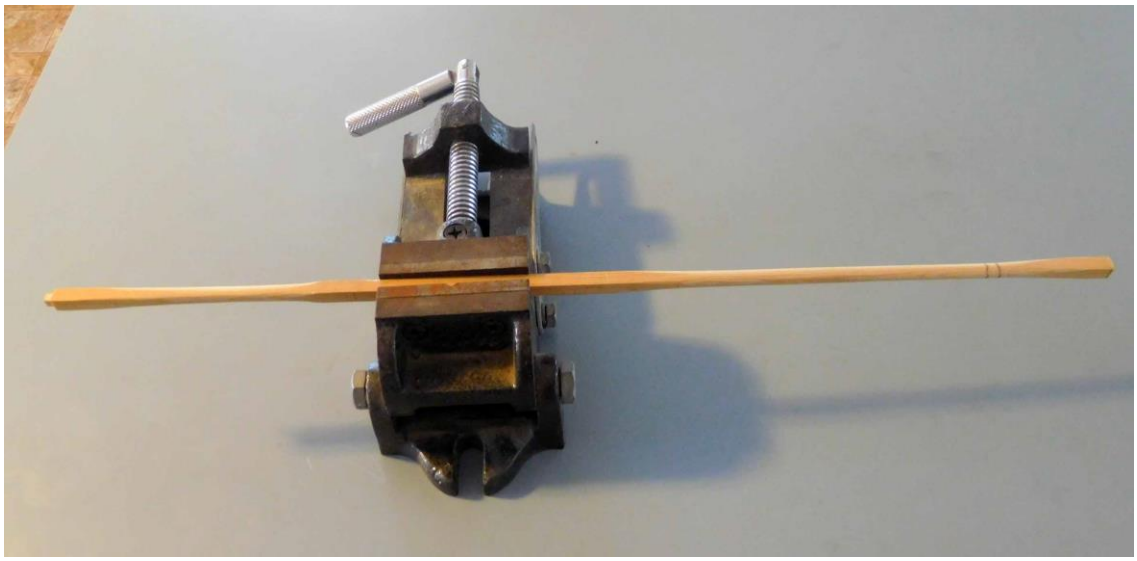


Illustration 364: Working from both ends.

6) To make is easier in visualizing the taper, work both ends simultaneously back and forth. Note the 1/8" reduction in circumference at the top of the mast to receive the fore stay. It can be shaped in the same manner as the mast tenon.

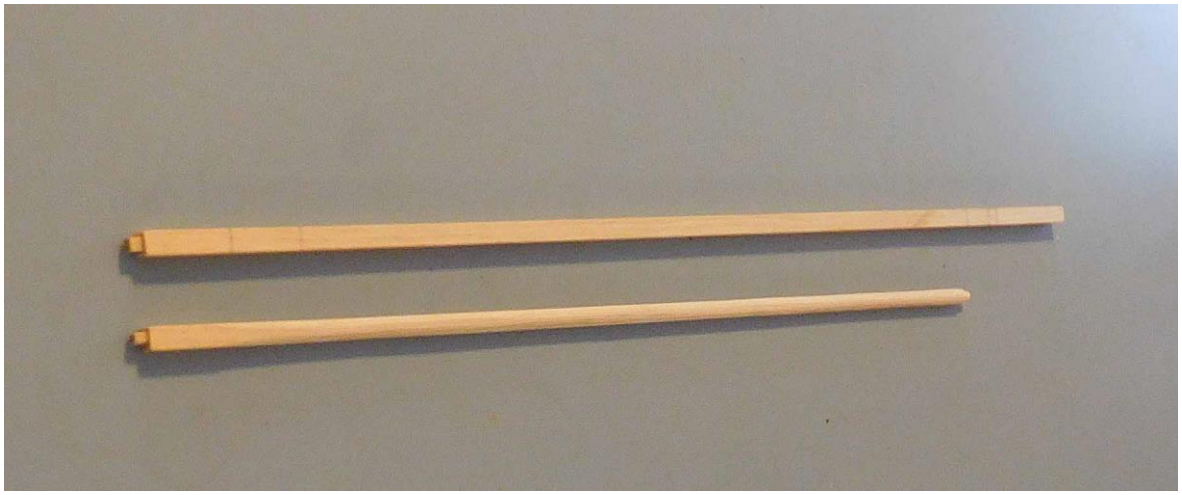


Illustration 365: From start to finish – It took me about one-half hour.

The Boom and Gaff:

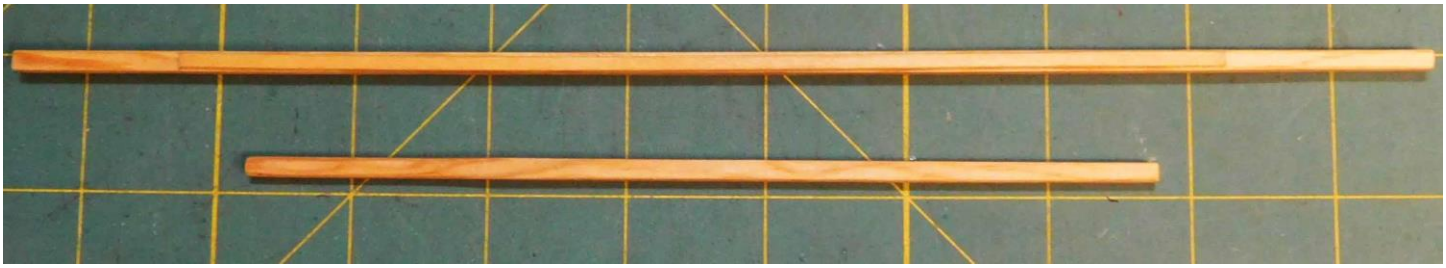


Illustration 366: The boom and gaff stiffeners.

1) **Materials**: Gaff/Boom 1/8" x 1/8" pine, Stiffeners 1/64" x 3/32" pine strips; length of Gaff is 6-1/2"; length of boom is 10-1/4"; length of Boom stiffeners (2) are 7-1/2".

2) Except for the very tip end of the boom, the stock stays square, with light sanded rounding of edges.

3) The gaff, however, is transitioned to a circular surface starting the transition 1-3/4" from its end. The square run of gaff stock also has a light sanded rounding of the edges.

4) With the completion of the mast, gaff, and boom, it is now time to make, locate and secure all the attachments to each component "off the boat".

The Main Mast attachments:

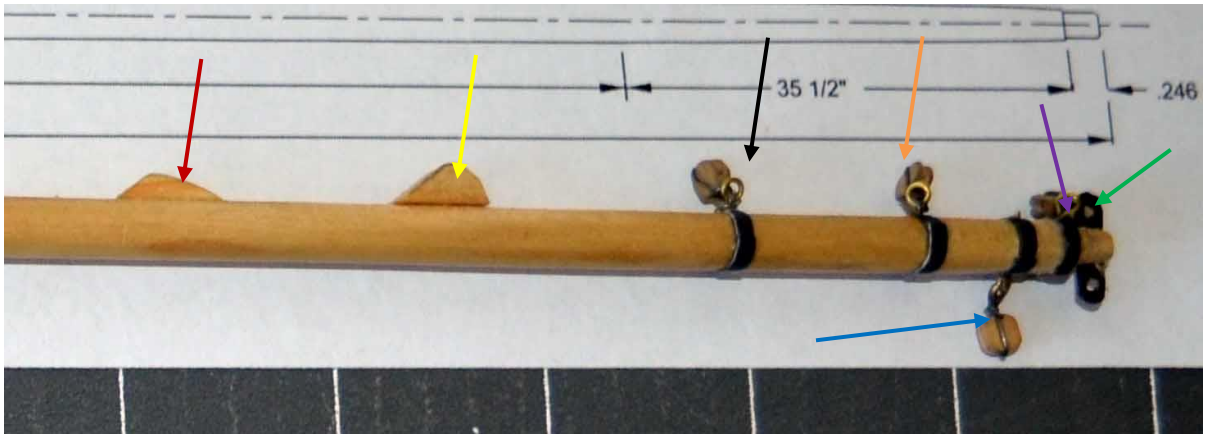


Illustration 367: The top of the main mast.

From top down:

1) **Green arrow**: mast head wye plate.
2) **Purple arrow**: topping lift block assembly
3) **Blue arrow**: fore halyard block assembly
4) **Orange arrow**: upper block assembly (Peak halyard)
5) **Black arrow**: upper block assembly (Throat halyard)
6) **Yellow arrow**: chock (throat halyard)
7) **Red arrow**: gaff tongue

From the bottom up:

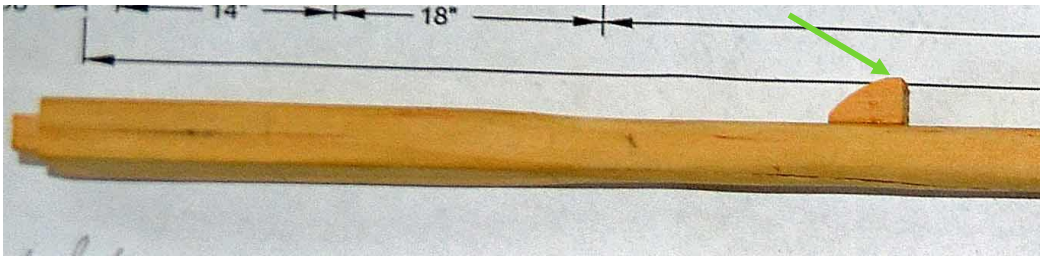


Illustration 368: A wooden mast hound-cheek boom support.

1) **Illustration 368:** **Lime green arrow**: mast hound-cheek boom support

The Gaff attachments:

1) **Illustration 368:** (below)**: Red arrows**: the bees to secure the bridle

2) **Illustration 369:** (below): **Orange arrows:** the two gaff jaws

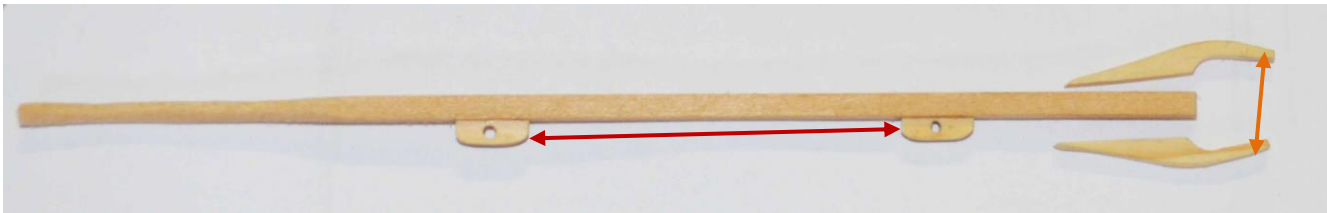


Illustration 369: the bees of the bridle.

3) The bees were made with 1/16" pine and the gaff jaws with 3/32" pine. A 1/16" inch drill was used on the bees, and a #72 drill bit was used to seat the parrel line and parrel beads.

The remaining gaff attachments (going aft):

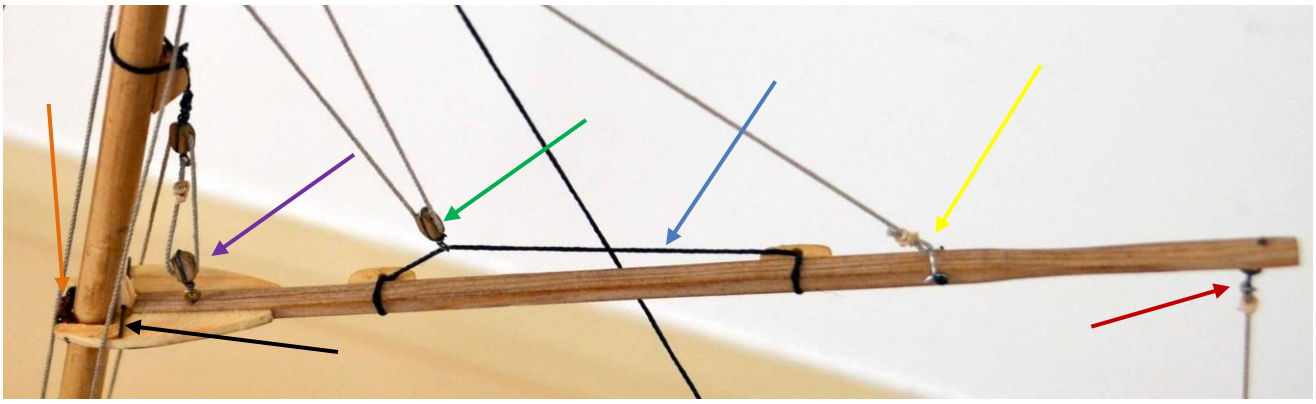


Illustration 370: Peak and Throat halyard rigging

4) **Orange arrow**: Parrel line and Parrel beads
5) **Black arrow**: blackened brass rod (to affix and maintain the gaff in position
6) **Purple arrow**: Lower halyard block assembly
7) **Green arrow**: Bridle block assembly (Peak halyard)
8) **Blue arrow**: the throat halyard bridle line
9) **Yellow arrow**: the throat halyard gaff bail
10) **Red arrow**: the main sheet tackle (eyelet and shackle)

The boom attachments:

Illustration 371:

11) (below): **Orange arrow**: cleat to receive topping lift line
12) (below): **Black arrow**: boom bail block 3
13) (below): **Purple arrow**: boom bail block 2
14) (below): **Green arrow**: boom bail block 1
15) (below): **Blue arrow**: boom block assembly for the topping lift
16) (below): **Yellow arrow**: the main sheet boom attachment
17) (below): **Brown arrow**: throat halyard mast cleat

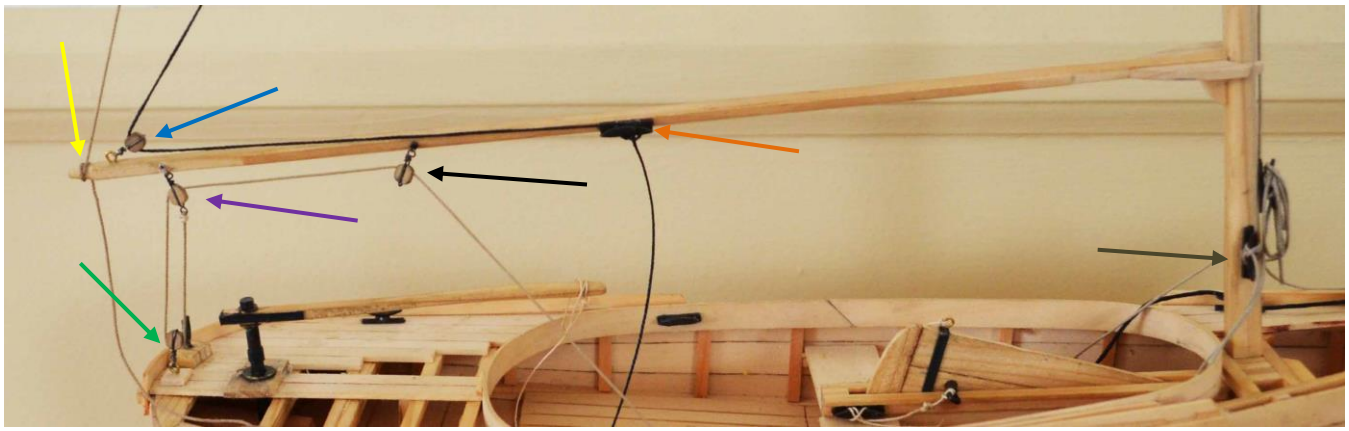


Illustration 371: The boom area rigging.

At

The bowsprit:

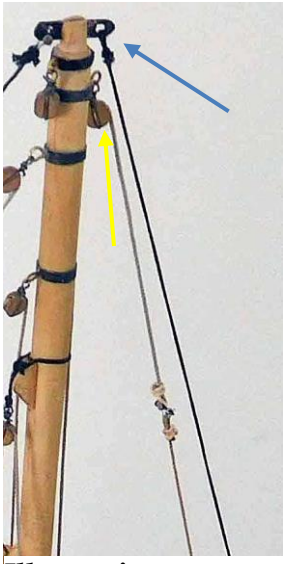


Illustration 372:

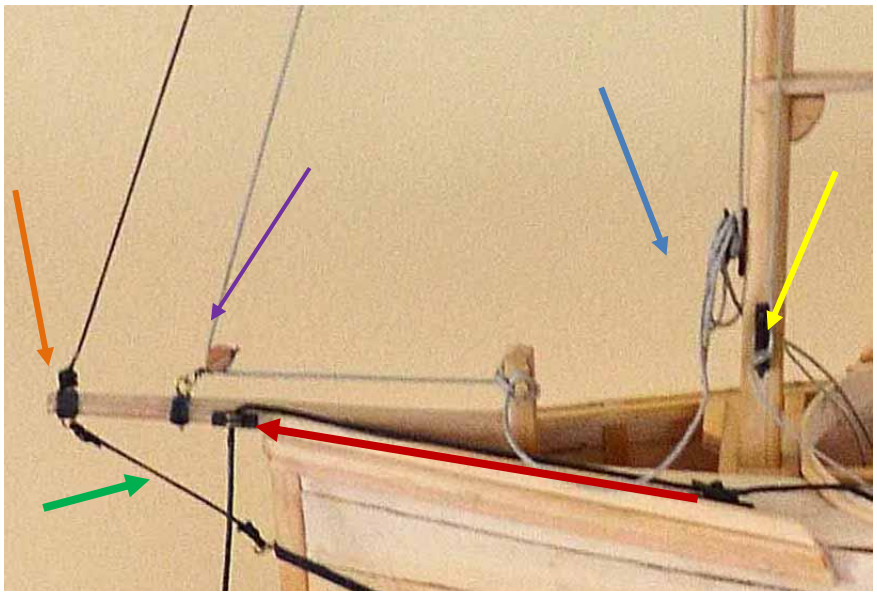


Illustration 373: The bow area.

Illustration 372:

24) **Blue arrow**: fore stay attachment
25) **Yellow arrow**: fore halyard block assembly
26) **Red arrow**: fore halyard shackle assembly

Illustration 373:

27) **Orange arrow**: fore stay-bobstay assembly
28) **Green arrow:** bobstay
29) **Purple arrow**: lower fore halyard block assembly
30) **Red arrow:** anchor cleat-bullseye assembly
31) **Blue arrow**: fore halyard mast cleat
32) **Yellow arrow**: peak halyard mast cleat

Materials:

Commercial materials used on my gaff rig Sharpie:

3/16" single blocks w strops (13)
Cleats (7)
Brass eyelets
Parrel beads (Jo-Ann's beading)
One Billings plastic anchor

Non- Commercial materials used to complete the following attachments on the gaff rigged Sharpie:

Single blocks stropping (13) - 28-gauge steel galvanized wire (blackened)
Bridle – (1) thread
Boom bails (3) – 24/28-gauge steel galvanized wire (a larger shackle)
Chock (1) – pine
Thumb cleats (1) - pine
Shackles (5) - 24/28-gauge steel galvanized wire and small pin
Mast head wye plate (1) - pine
Mast Tongue (1) - pine
Parrel beads (4) line - 24-gauge steel galvanized wire
Various rigging line threads

Shop Note: The making of a shackle and bail

The shackle jig:

1) On a 4-1/2" x 6-1/2" x 3/4" pine board I selected a few different pins, brads, and even a finishing nail, and tapped into the board at one end. I did not bunch them together be rather left a little room for the bending the wire.

2) I then took two 1/2" x 5/16" x 1-5/8" pine blocks and drilled a hole to tight fit a push pin (**yellow arrow**).

3) I scribed positioning lines for the two blocks and glued them in place.

4) I now place a "turning post" in position 1/4" from the block. The post should have a circumference to allow you to form the size of the shackle you need to make (**red arrow**).

5) The far side uses the same pin size but allows for a larger circumference to make the bails (the **blue arrow**).

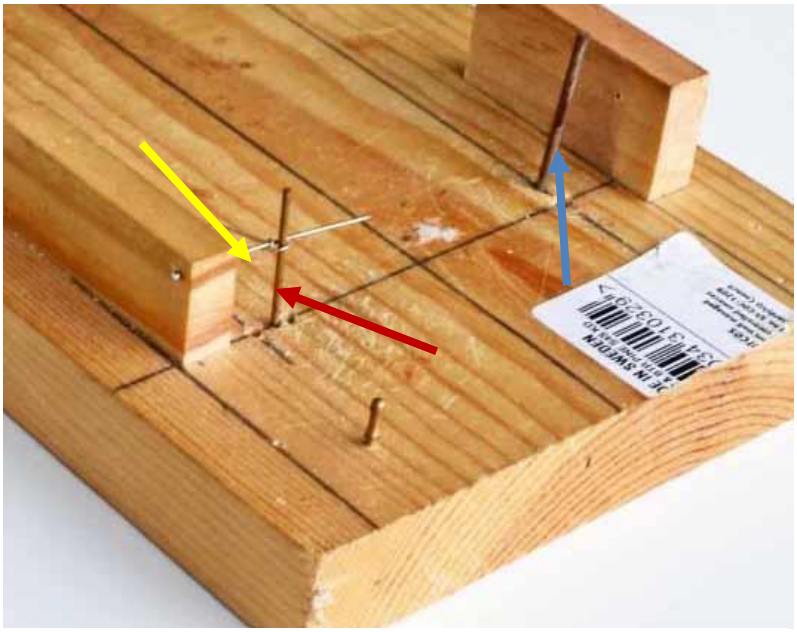


Illustration 374: The shackle jig.

6) The “turning pins” should be the same size desired of eyelet desired. If the “turning post” is a finishing nail, remove the head of the pin.

7) Place a 2 or 3-inch length of the wire at the turning pin. Leaving the top arm of the wire about 1/2” past the pin. Placing my thumb to hold the arm tight to the jig surface, with a needle nose plier, I pull the wire around the pin to form the first eye of the shackle. You may have to push the eye down to the surface of the jig. Now raise the wire up off the surface, use a second plier to pull both ends of the wire tight to the pin. **NOTE:** The eye of the shackle, must go through a receiving eye on the stropped block. In addition, the head of the pin (the bolt of the shackle) will do no good if the shackle eye doesn’t prevent a pass through.

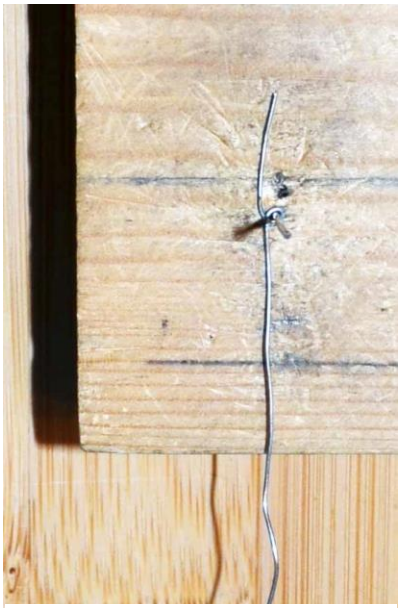


Illustration 375: Eyelet.

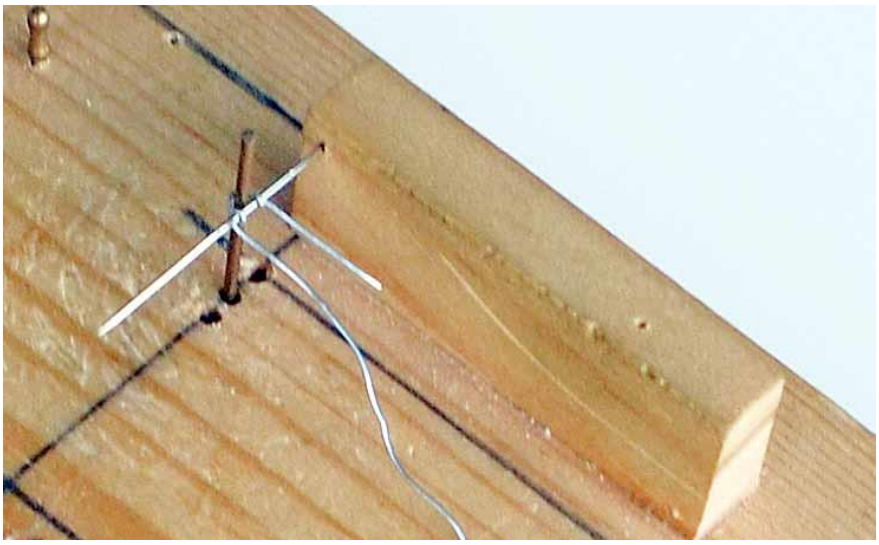


Illustration 376:

7) The rest is easy: slide the pin back to receive the first shackle eye. With your finger, push the eye up to the turning post. Now wrap the wire around the post and go under or over and around the pin.

8) This is also a boom bail if made to the proper size.

Illustration 377: Block attachments

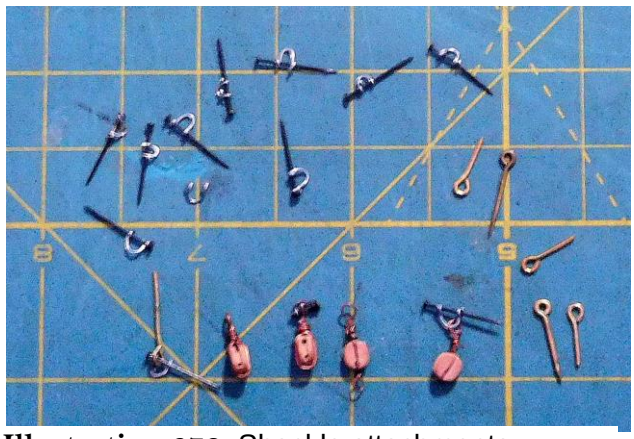


Illustration 378: Shackle attachments

9) Study the following illustrations: You will need single blocks (one eye and two eye), blocks to shackle, block to eyelet to complete the assemblies.

Shop Note: The making of a galvanized steel wire stropped block:

Illustration 379: The tools and materials.

1) In addition to the block and wire, I used a flat nosed plier, a soldering tweezer, a 1/4” piece of scrap wood, a wire blacking agent, and a nail clipper. I also utilized the shackle jig (not pictured).

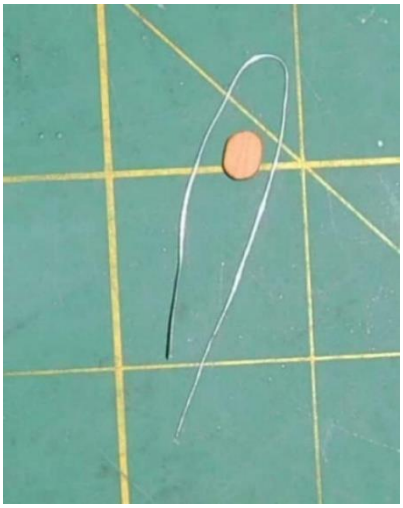


Illustration 380

2) This pictured wire is 28-gauge and the single block is 1/4”. My sharpie blocks are 3/16”, but I wanted to make up for my shortcomings in photography with a bigger subject as I described the stropping procedure. The wire used for the smaller block was the same, 28-gauge.

3) So, take a block and cut off a 4” length of wire.

4) Take the wire and bend a U-turn at the center line as close to the circumference of the block’s contour.

5) Hand can do the next step, or with the aid of the soldering tweezer. It depends on how nimble your hands are.

6) **Tip:** If you desire a black strop, you can purchase blacked wire if you wish to stay away from using the blackening agent.

Setting the strop to the block:

1) This may become a wee bit frustrating at times. Here are some precautions: Don’t do this procedure over a shag rug. If you have a wood or tile floor, remember that anything that leaves the work table can be as far away as possible just to annoy you, and remember, you might want to invest in knee pads and a good flashlight.

1) The goal here is to pull the wire around the stropping groove and pinch the wire's union tight to the lower surface of the block, holding the block firmly in its grasp. If you are using your hands, pinch the two wire arms with your thumb and index finger and slide the pinch point to the bottom of the block, as close to closure as you can. While keeping the pressure on, with our other hand twist the block two revolutions, testing to see that the block is still secure. If you find this too difficult, use the tweezer to keep hold of the block.
3) Now you can finish the attachment of the strop with the flat nosed plier. Close the plier just above the end

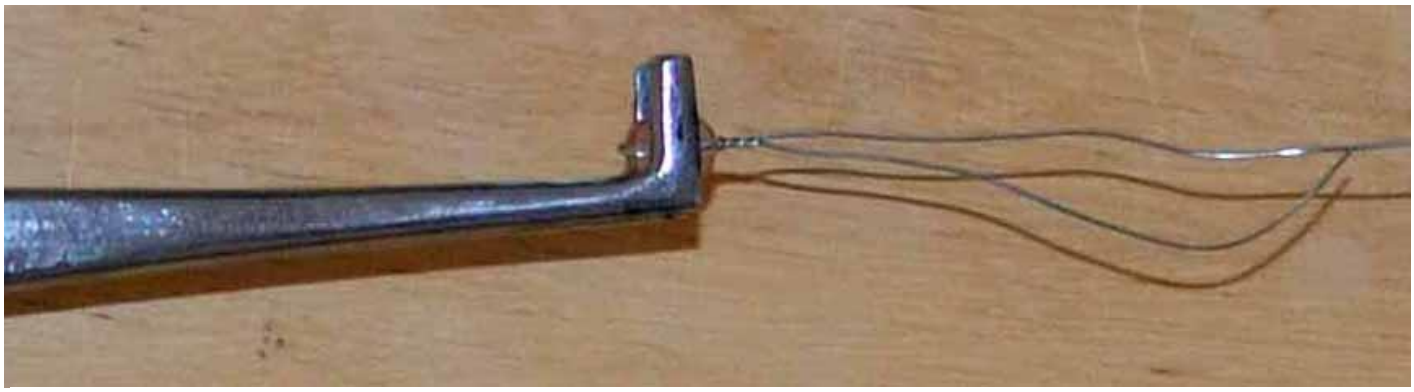


Illustration 381: Using the soldering tweezers as a clamp.

of the two twists. Keep the pressure tight and turn the block again (in the same direction) to take up any remaining "slack".

4) The position of the clamp by the pliers will determine the distance the eye will be from the block. **Illustration 383** shows a close eye, which is a result a very of tight initial two revolutions.

5) **Illustration 384** shows the longer stem, most likely 2 to 3 extra revolutions.

6) **Illustration 381** shows the distinct separation of the two arms. I used a nail clipper to sever one of the arms, (it doesn't make any difference which arm). Separation with a nail clipper should prevent your block from ending up armless. I know from experience. Note: The clamping of the plier can bring the two arms together. When you have stem to your liking, release the plier, and separate the arms if necessary

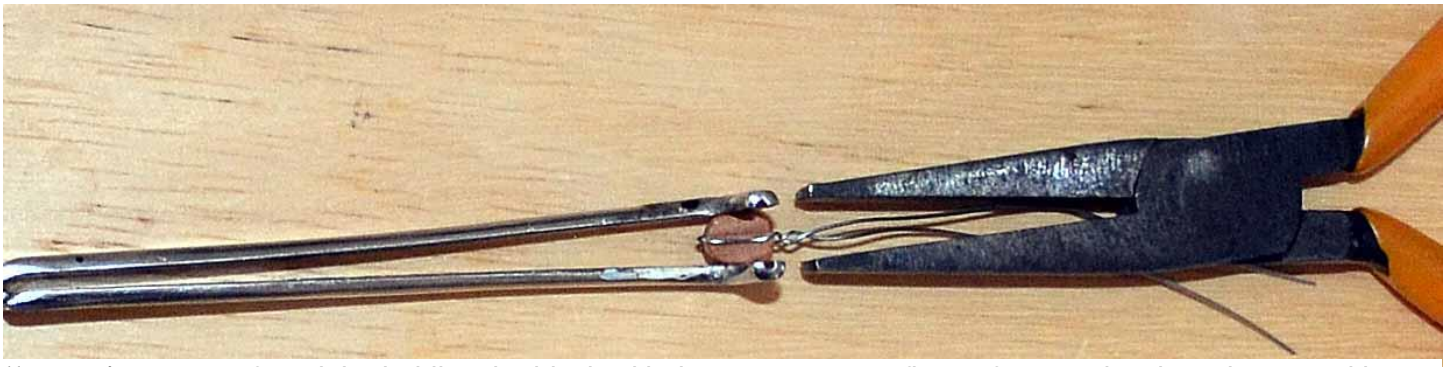


Illustration 382: I found the holding the block with the tweezer, on a flat surface, makes it easier to position the desired stem length.

Forming the eyelet:

1) I chose the circumference I wanted on a post of the jig and I placed the “tail” of the remaining arm at the starting position of turning forming the eye. Caution: If the block you are making will be shackled, remember that the eye of the shackle will have to go through the eye of the block.

Illustration 383: A short stem.

2) Wrap the wire around the post going just beyond 360-degrees. Make sure the overlap lies flush on top of the wire at the start of the eye.

Illustration 384: A longer stem**.**

3) Placing a finger to hold the block in position, I pulled the wire tightly around the post. The circle was now formed with the wire crossing over the starting position.

4) With the eyelet formed, use the flat nosed plier to hold the eyelet at the crossover position. Slide the face of the plier up against the position of the arm at the crossover point. You can no longer see the eye.

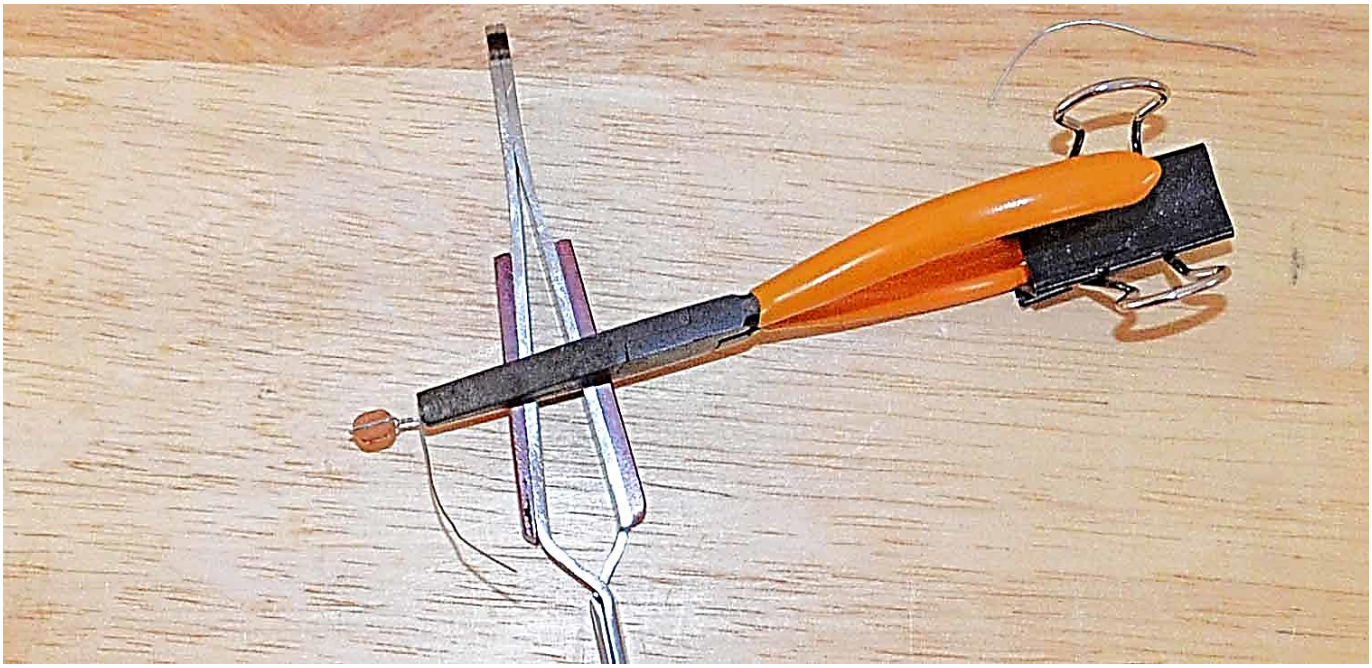


Illustration 385:

5) Holding the plier tight, begin wrapping the wire arm back down to the block. You must keep the wire taught so that each revolution abuts the previous turn.

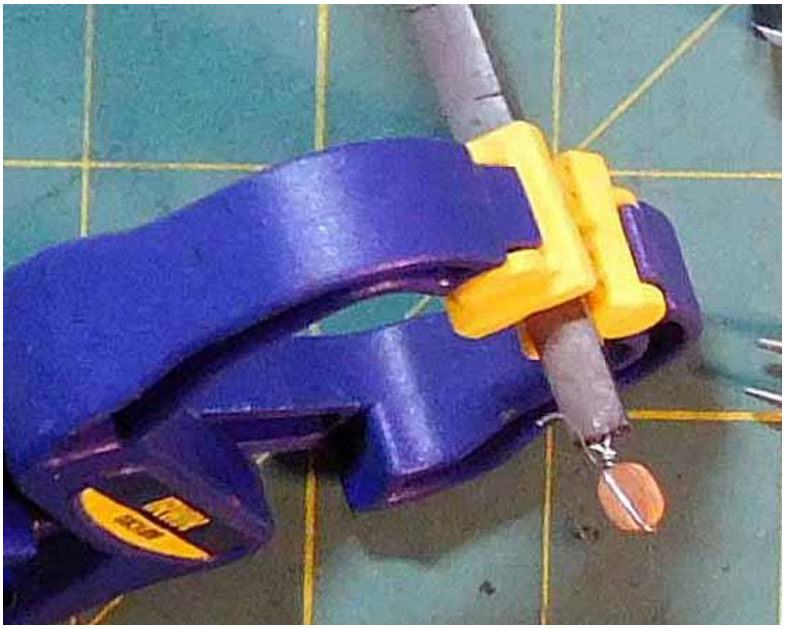


Illustration 386: Ready for the last half-turn**.**

6) With the nail clipper, it's time for the other arm to go and your block is 'good to go".

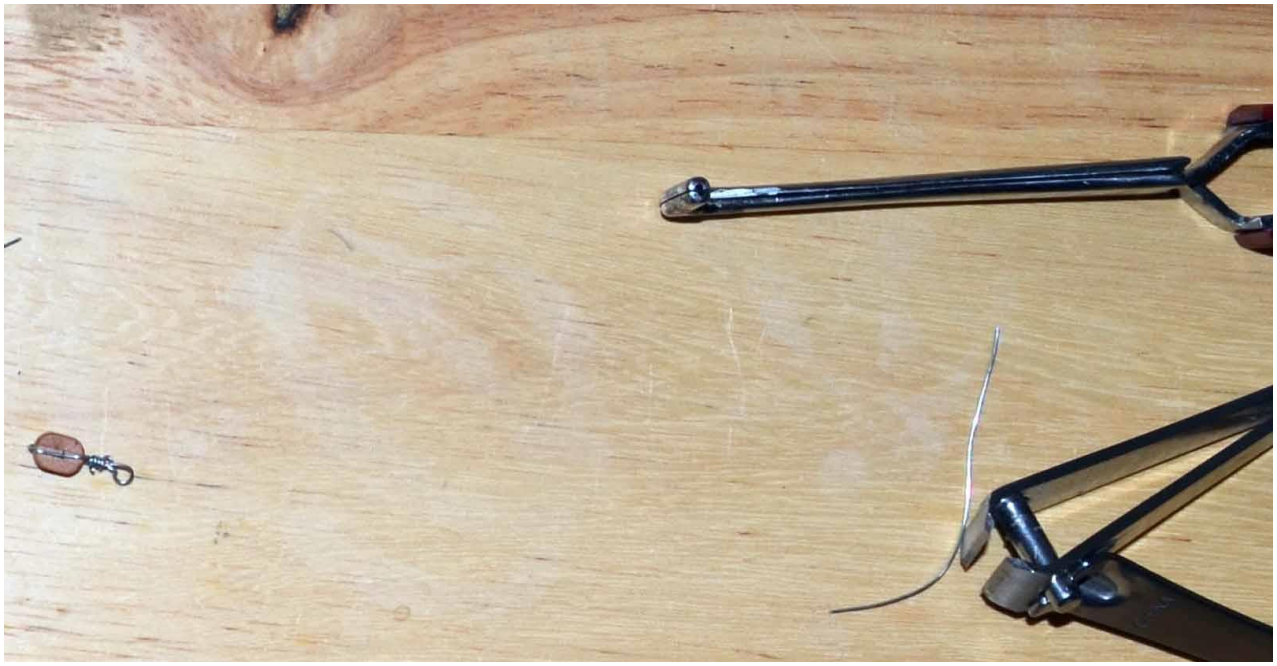


Illustration 387: One done!

7) The finished stropped block can then be dipped in the blacking agent if you prefer. Just read the instructions on the Blacken bottle. Put a short piece of wire through the eyelet and dip it in some lacquer thinner and let dry. The into the blackener. Pull it out, rinse with water, towel dry, and you are done.

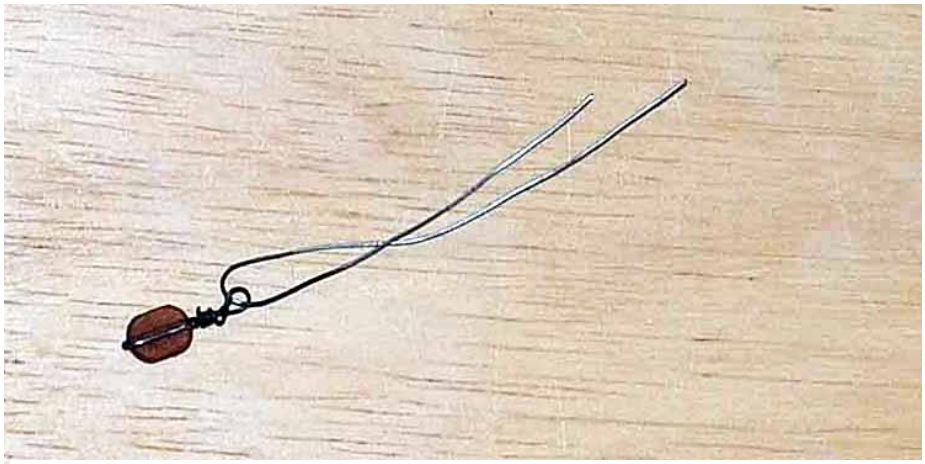


Illustration 388: Blackened.

In summary, you always have the option of using commercial fittings. I try very hard to show you my way, from my experience, and it is only one way of many other alternatives. I challenge you to take the leap: think things through, and create your own ways. "And if at first you don't succeed, try, try, again!'

Making the fittings:

To attach a fitting, you must make a fitting, and I find it easier to set up a “station” for a single type of fitting, in an amount required of the entire boat (i.e., stropping of 13 blokes, 5 shackles).

Some last-minute aids that made things easier for me:

1) After some thought I found it easier to make the bail block assembly easier. The jig is only needed to form the first eye. First locate the position of shackle and drill your hole on center. Take the wire and place the stropped block eye into the shackle. Now place the pin (shackle bolt) through the eye and then through the hole. Make sure the eye is properly secure, and draw the wire around the gaff and wrap around the pin. As you are wrapping make sure the shackle curvature is enough to allow the block to travel along the bail.

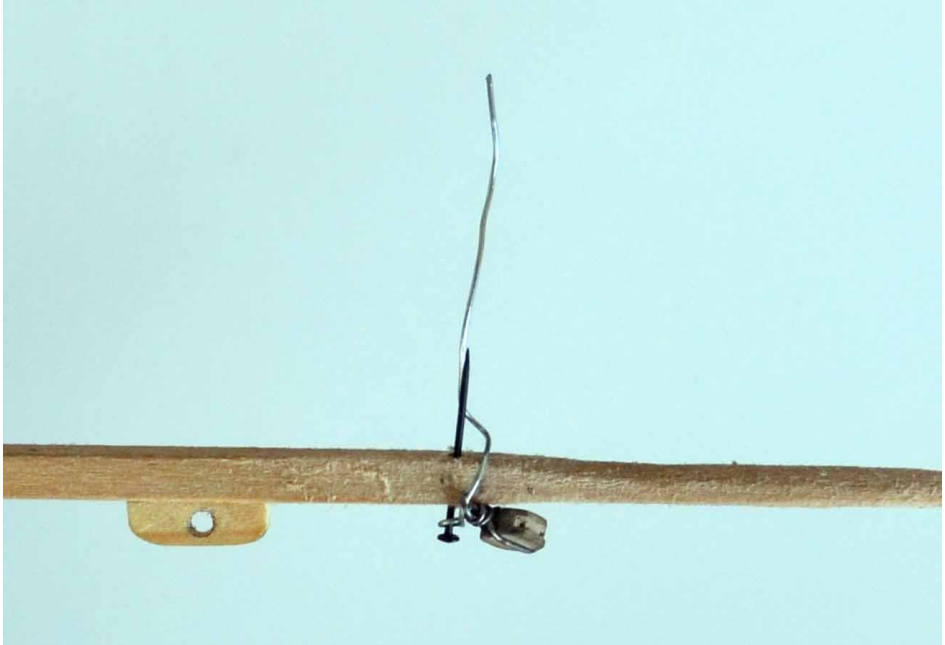


Illustration 389: The gaff becomes the jig.

Third hands:

1) A third hand is always nice when attaching fittings. You can even beget creative at times and customize to your needs. Pictured here, is my clamp with a clamp to hold the gaff.

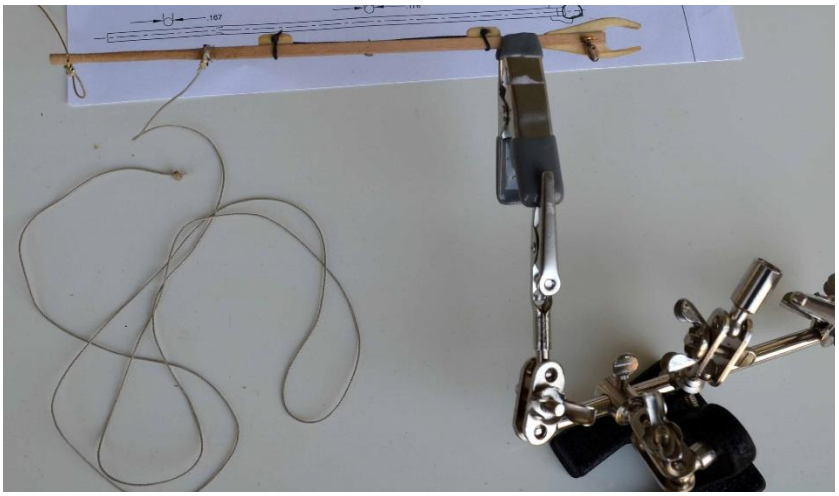


Illustration 390: My third arm.

Illustration 391: Just use your imagination.

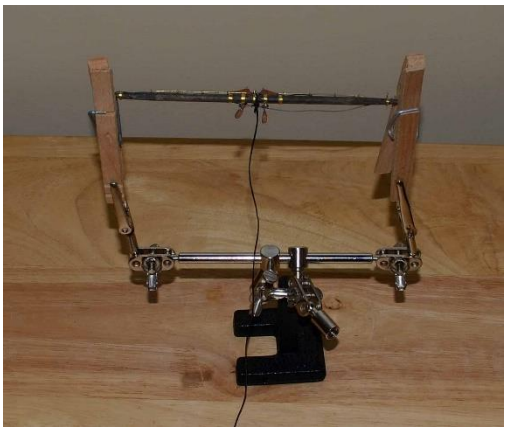


Illustration 392: Making the most of cloths pin.

Attaching the fittings off the boat:

I have found the easiest way to get the attachments in place, is to do them on the work bench and not on the boat. I lay out the fittings needed for the mast, gaff, and boom. I started with the mast, placing it on the plan, and scribe the exact location of each attachment. Then it's back to the work bench and attach the fittings. There is no specific order, they all must be set in place. Take care to see that each fitting goes is set in the proper direction: forward, aft, port, or starboard. **Note:** After stropping the blocks, I check to see that the line will pass through the block easily.

TIP: In testing your line, run a little super glue over the first 1/2" of one end of a short length of the line. Let it dry (it only takes a minute or so). Now, with an X-acto or razor blade, slice a point into the end of the glued line. The point will be easy to pass through the block. When the point is clear of the block it can be grabbed with a tweezer and pulled through the rest of the way.

When all the fittings are in place, check that they are securely attached. Nothing is more frustrating to start running the line taught and have a block drop to the deck when you are in the act of belaying the line. If you find the opening is too small, you can either change the size of the line you selected, or enlarge the hole. It is much easier to do enlarging holding a pin vise in one hand and the block in the other, as to enlarging when the block has been set in place.

The running of the lines:

Note: I consider three criteria: size of the line, color of the line, and the size of the block required. Right or wrong I use a line that "looks like the right line" when on the model. This is a small boat model at 3/4" to the foot with little requirement of multiple line sizes.

I proceeded in this order:

1) Bowsprit, bobstay
2) Forestay
3) Fore halyard
4) Throat halyard
5) Peak halyard
6) Topping lift
7) Main sheet
8) Boom bail assembly

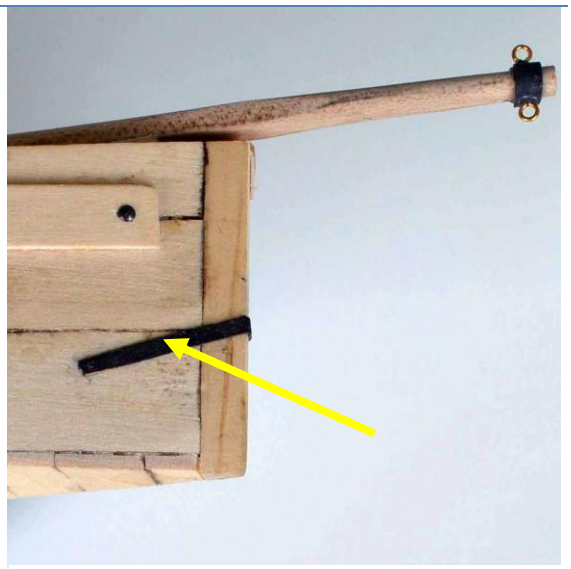


Illustration 392

Bowsprit and Bobstay lines:

1) The bobstay clevis was made of extremely thin basswood. (**yellow arrow**).
2) You might also go with thin brass or index card strips.
3) The angle of rise of clevis and the outer stern post really makes it difficult to go around the stem in one piece.
4) I went up one side with one piece and up the other side with second piece of wood. I sanded the forward ends to the be flush with the rise of stem post and then cut a small third piece to connect the two.

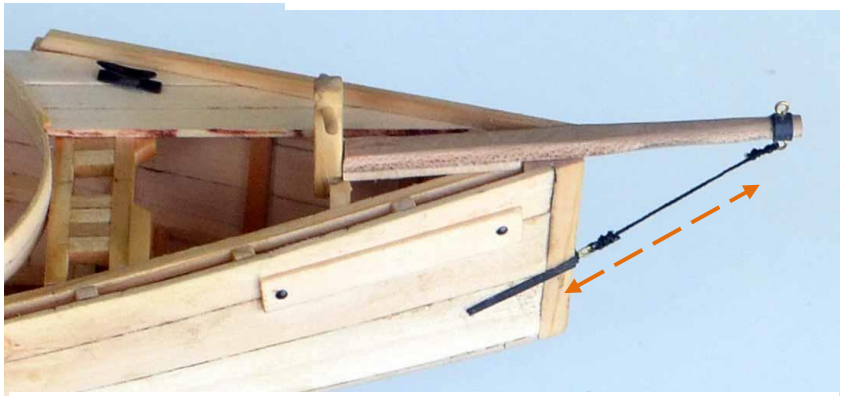


Illustration 394: The bobstay in place.

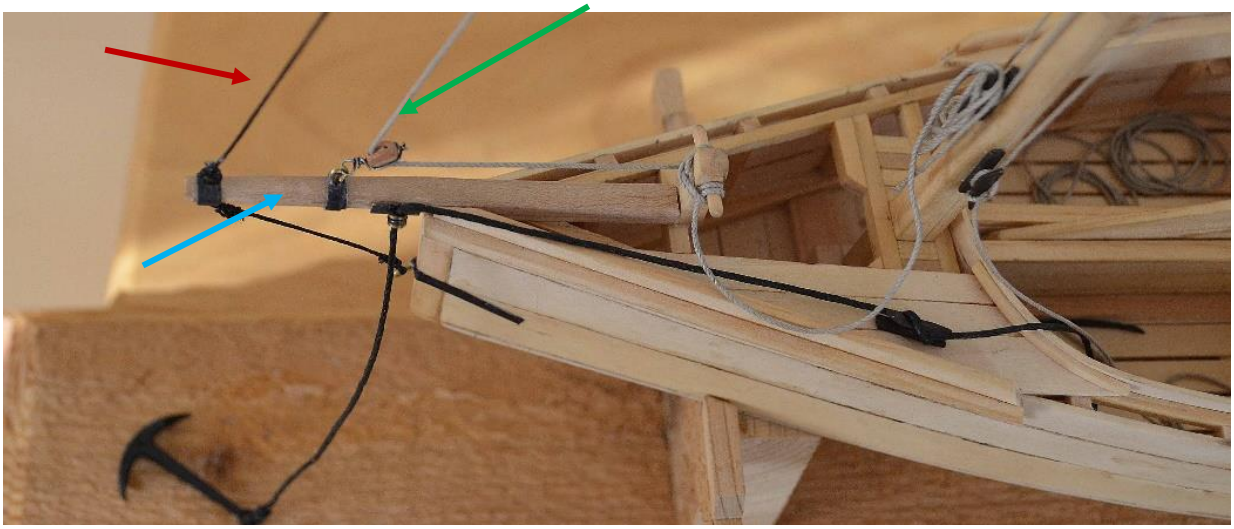


Illustration 395: Bowsprit receiving forestay, lower fore halyard, and anchor lines.

Fore stay dotted line:

The **black arrow** shows a single block attachment. I originally intended to run the topping lift through this block to a cleat attached to the lower mast, but decided it was too crowded down there.

Fore halyard lines:

Lower halyard dotted line

Upper halyard dotted Line

Line used as a stand in for jib sail location.

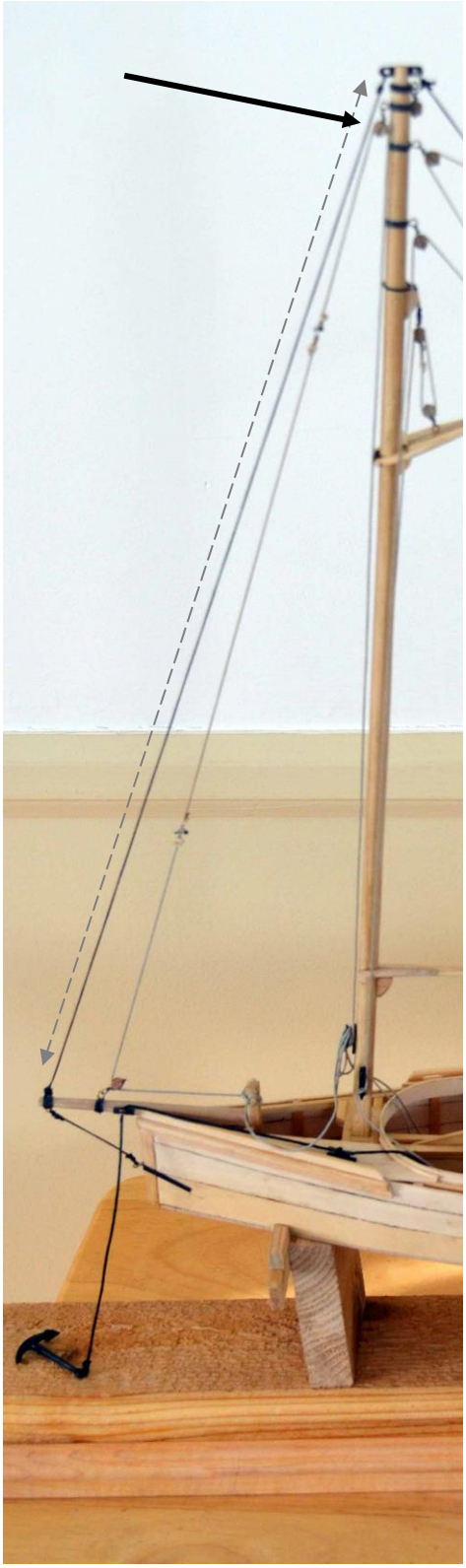


Illustration 396

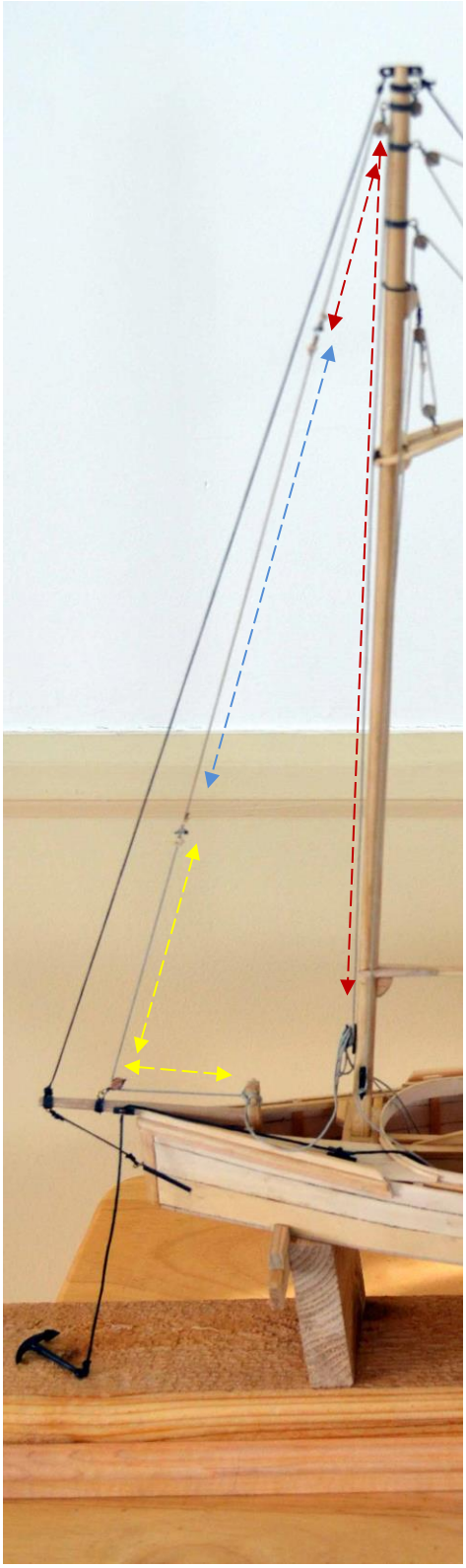


Illustration 397

The throat halyard:

1) The run of the throat halyard begins at the upper block assembly, the block being held in place by a groove in center face of a chock.

2) In runs down to the block below on the gaff then moves back up to the block from whence it came and runs down the starboard side of the mast to a cleat on attached a short way off the deck's surface.

3) Make sure, when tensioning the line, to hold the gaff jaws to the mast at the chock.

4) I did not want to pin or glue the gaff, so I cheated with a home-made pivot pin. I took a small piece of brass (blackened) wire and placed a hole to receive the pin through the chock.

5) An option would be to run the hole through the gaff jaws at the center of the mast, and make the relation a real pivot situation.

Note: By starting at the throat halyard, your assembly is unencumbered by the lines of the peak halyard.

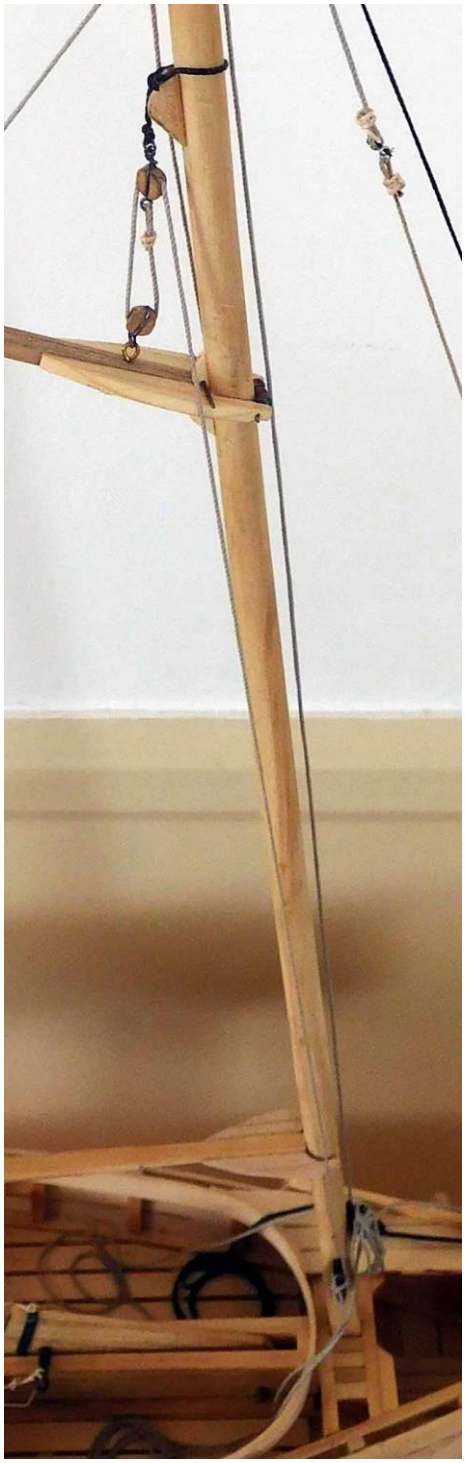


Illustration 399

Illustration 398

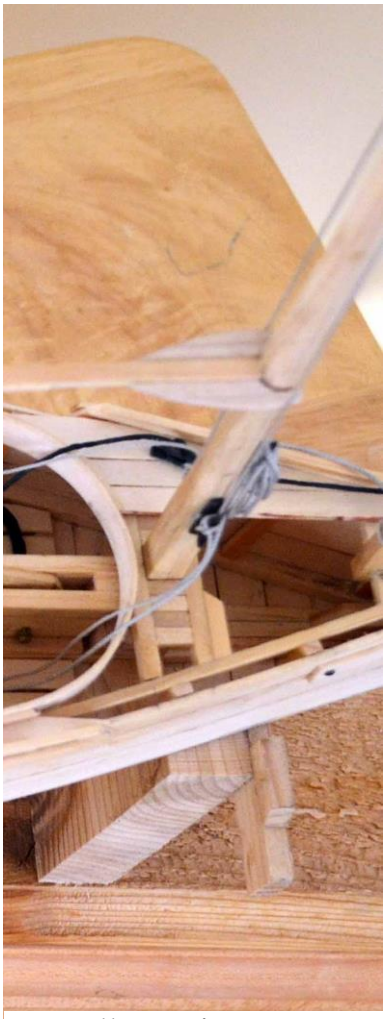


Illustration 400

The peak halyard:

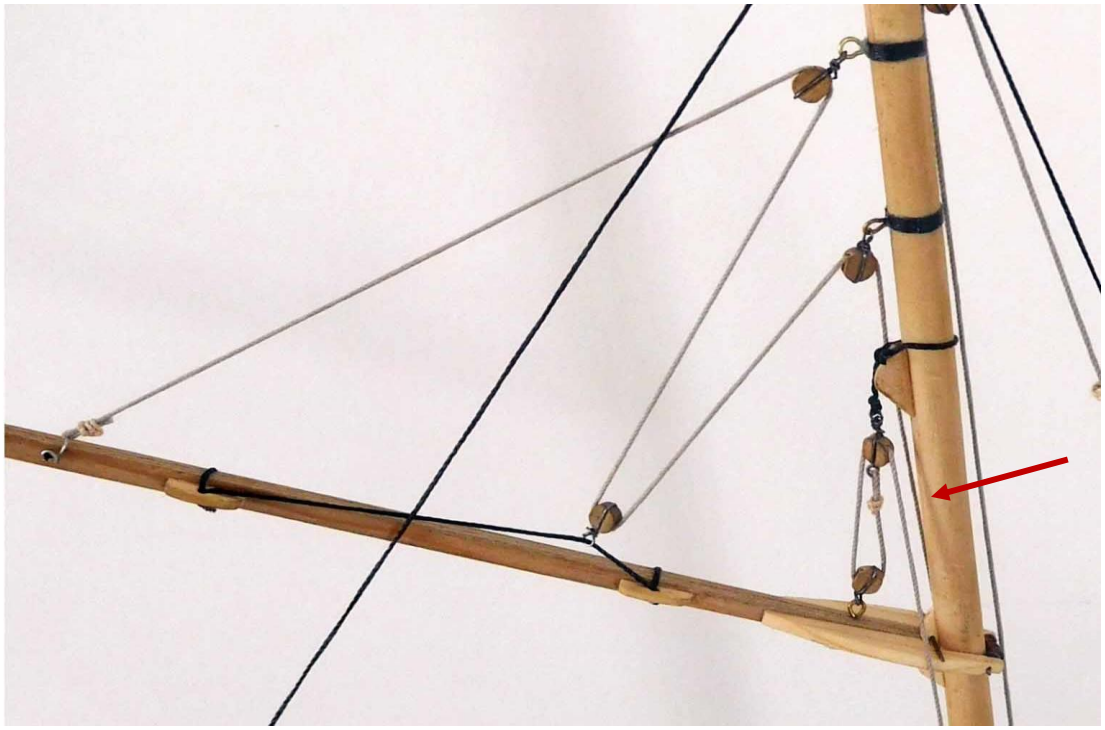


Illustration 401: The run of the line down the port side.

1) The peak halyard runs bail shackle aft upward through the upper peak halyard block on the mast, back down to the bridle block on the gaff, back up to the lower halyard block, then down to a cleat on the port side of the mast, even with its partner cleat on the starboard side of the mast.

Illustration 402

The topping lift and main sheet:

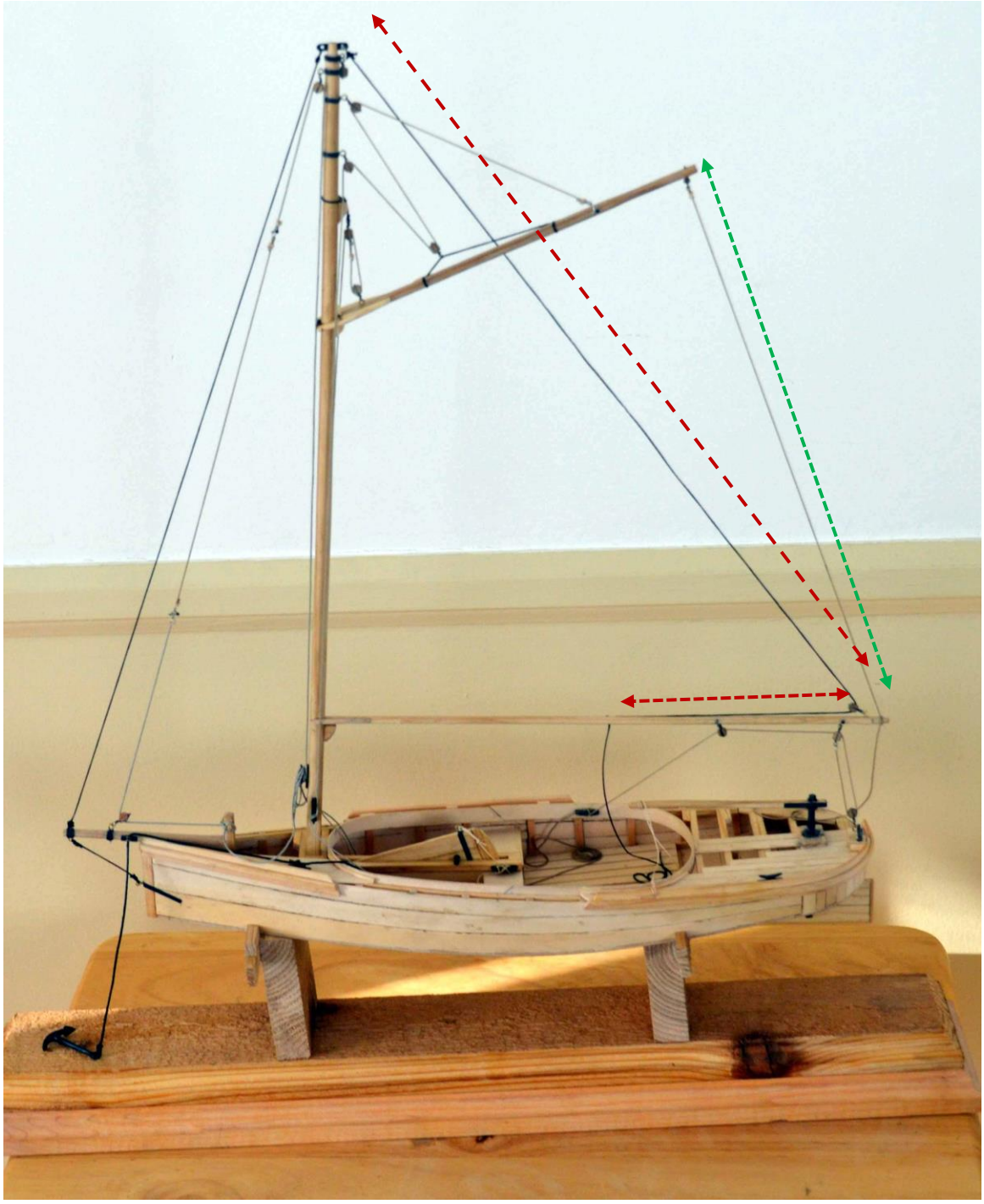


Illustration 403

The boom bail assembly:

1) The line starts with the aft bail block, down to the deck bail block, back up and through the aft bail block, forward to the second bail block and down to a side cleat on the cockpit coaming.

2) **NOTE:** Since I made my lines a lot longer than they needed to be (wiggle room), I brought all the lines to a length that allow proper belaying and coiling to the deck and/or the cockpit floor.

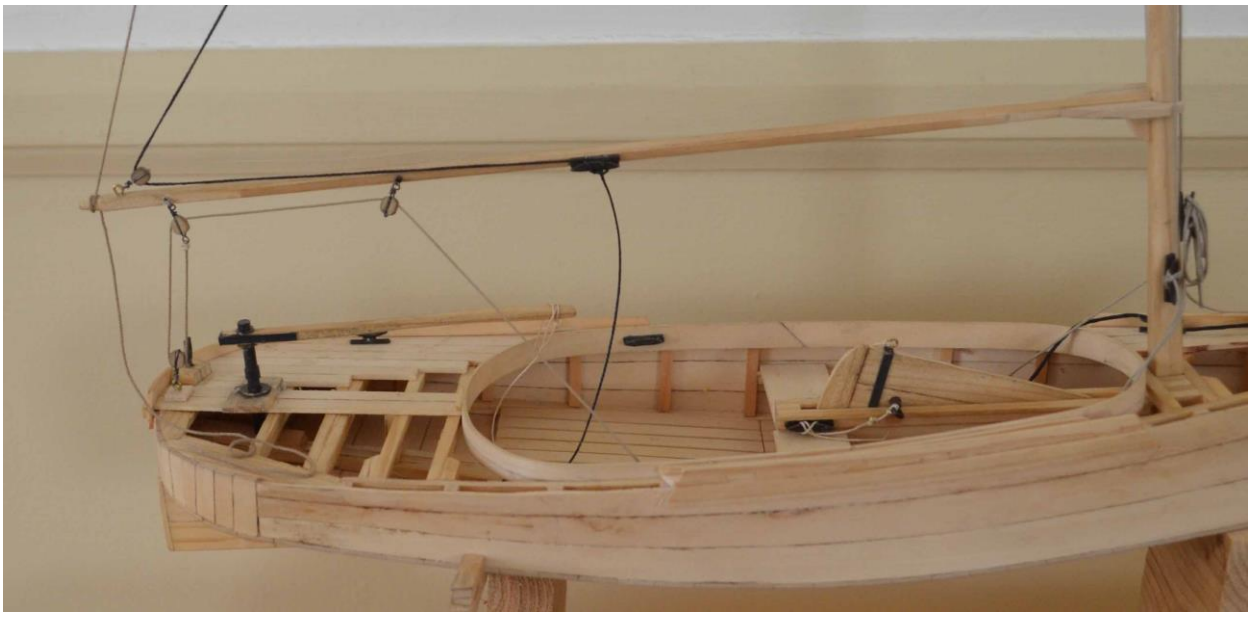


Illustration 404

Illustration 405

5.2 Mast, boom, & sprit construction & rigging (Plan sheet 8 of 8)

Note: This option is a very simplified generic "snotter" rig for a sharpie.

Illustration 406: Note the bobstay's need of repair.

The Main Mast Attachments:

From top down:

1) **Illustration 407: Green arrow**: fore stay
2) **Illustration 407: Red arrow:** sheave location.
3) **Illustration 407: Blue arrow**: fore halyard block assembly

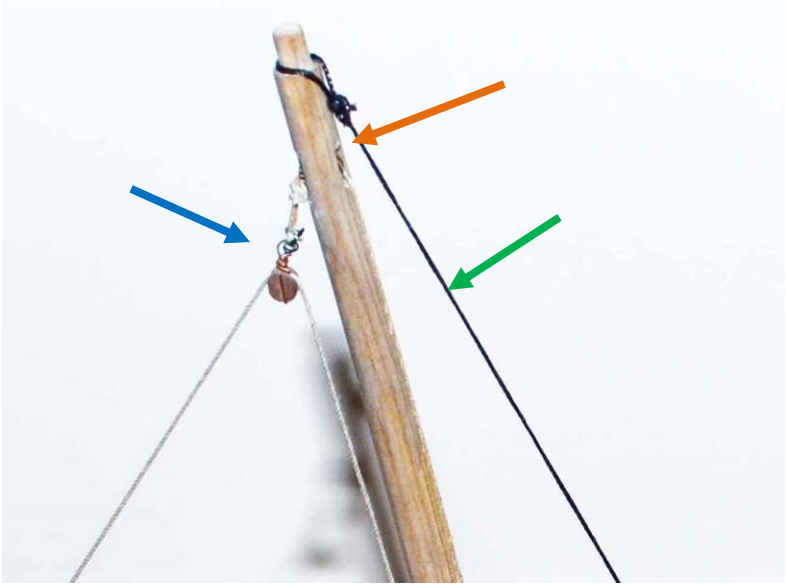


Illustration 407:

Illustration 408:

Illustration 409:

3) **Illustration 408: Wooden cleats**: lower forward for fore halyard, port for topping lift.
4) **Illustration 408 "Snotter" assembly arrow**: mast to boom
5) **Illustration 409: Blue arrow**: Thumb cleat

The Boom Attachments:

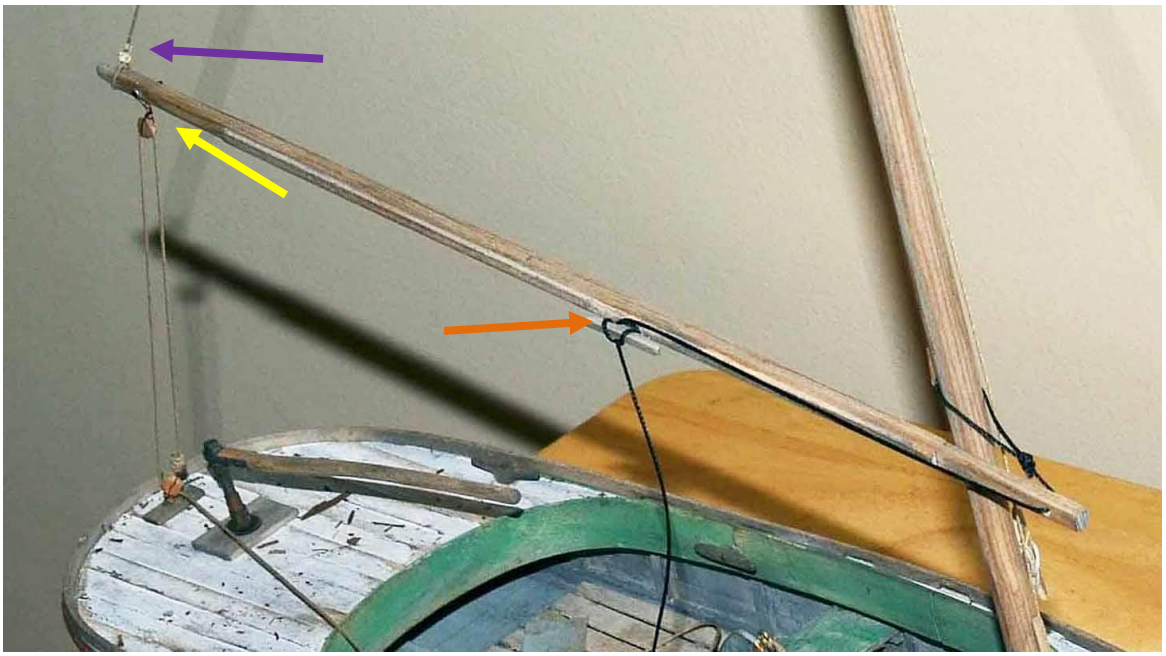


Illustration 410:

1) **Illustration 410: Wooden cleat**: for "snotter" assembly
2) **Illustration 410: Eyelet and shackle:** topping lift anchor
3) **Illustration 410: Yellow arrow**: Boom bail block assembly

Upper deck flooring attachments:

Illustration 411: Two starboard cleats in position.

Illustration 412:

The making of the wooden cleats:

1) On a strip of basswood, I scribed an outline of the cleats. I then used a 1/16" drill bit to form the base of the cleat. I then scribed the angle of rise to end of the cleats "arms". I used a Preac saw to release the strip.

2) Turn the strip upright and drill a pin hole down through the cleat at the **C/L**.

3) Now free the individual cleats.

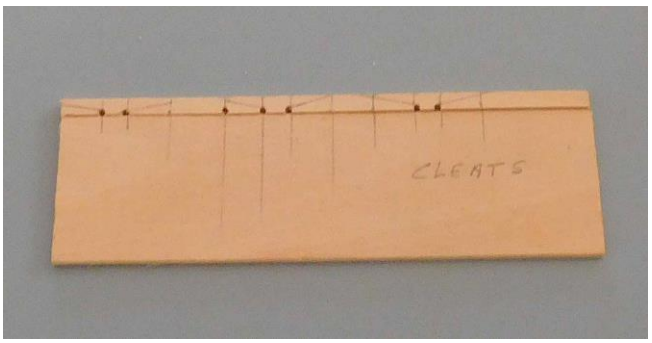


Illustration413:

4) Taking a single edged razor blade, the arms were shaped from the drill hole to the end of the arm.

5) Final shaping is done with a manicure file, by lightly rounding the edges to the final shape desired.

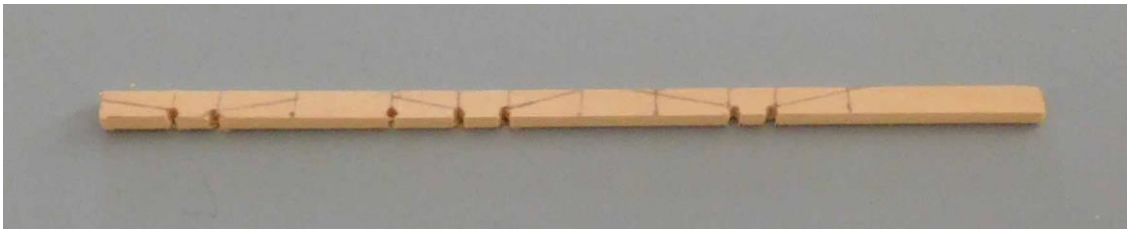


Illustration 414:

The lines:

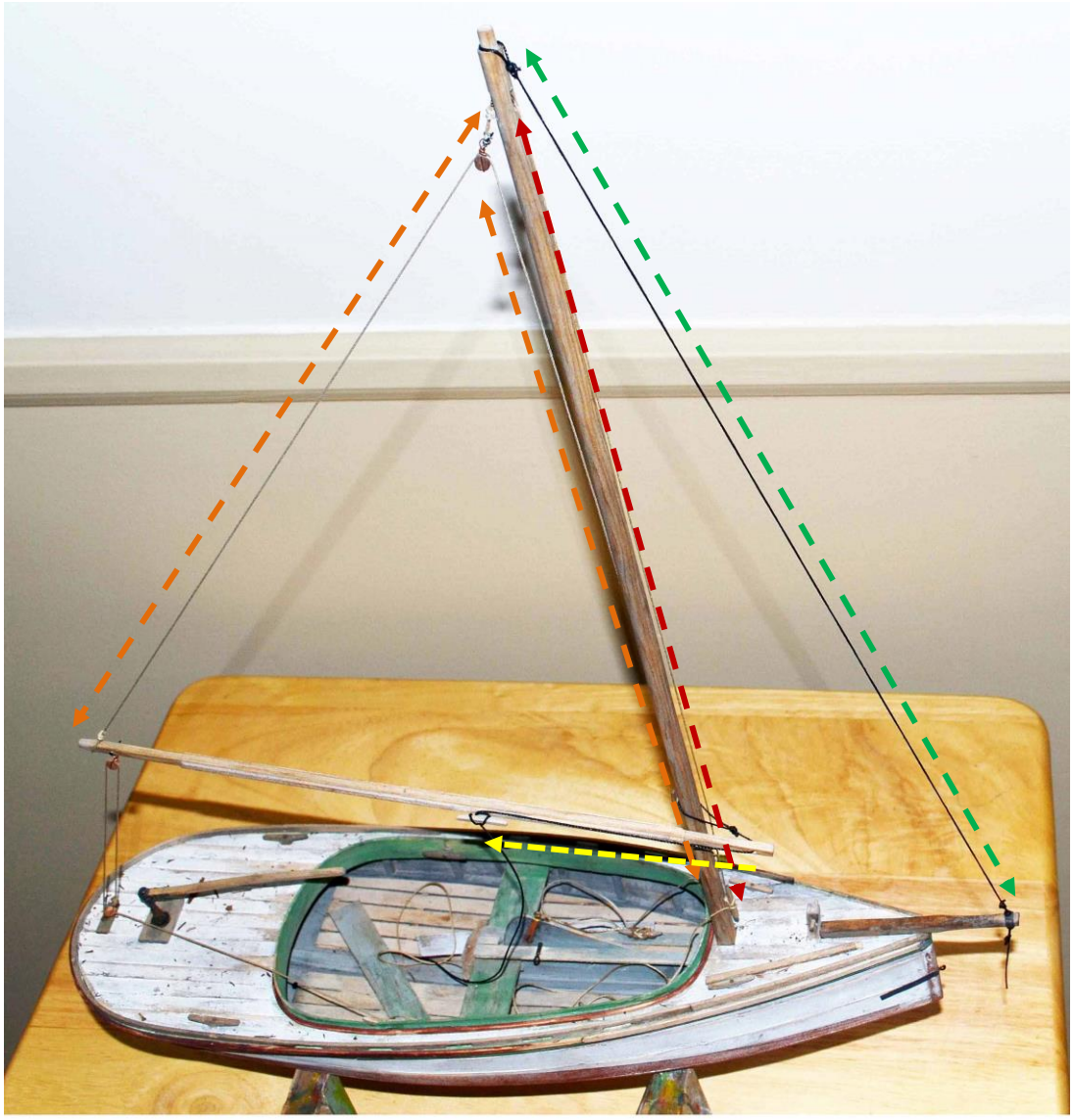


Illustration 415:

1) **Illustration 415: Green dotted arrow**: fore stay
2) **Illustration 415: Red dotted arrow:** main halyard
3) **Illustration 415: Orange dotted arrow**: topping lift
4) **Illustration 415: Yellow arrow**: snotter to cleat

5.3 Those who want to consider more reveal of the sharpie's interior construction.

I've always admired ship modeling which included getting to the inside of construction and well as the outside of construction. So, as I was building another sharpie I decided to do the same. I call it my 50/50 application of in and out viewing of almost all the components "below". I decided to plank only half the upper deck, leaving the other half with no planking at all.

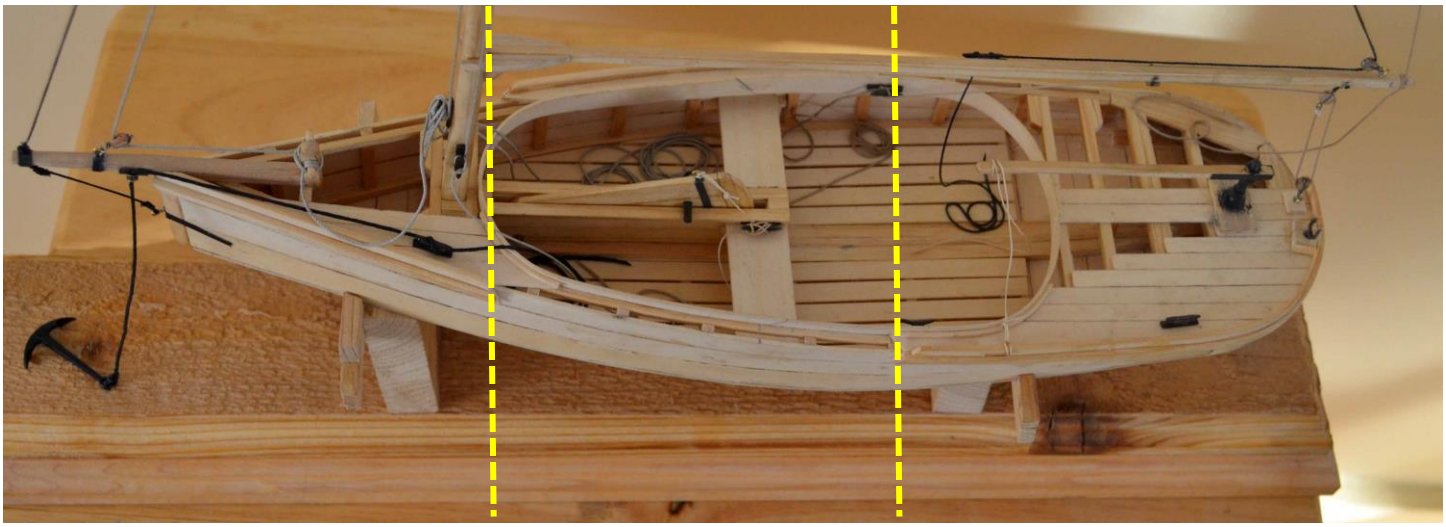


Illustration 416: The dividing to three sections: aft – midships – forward.

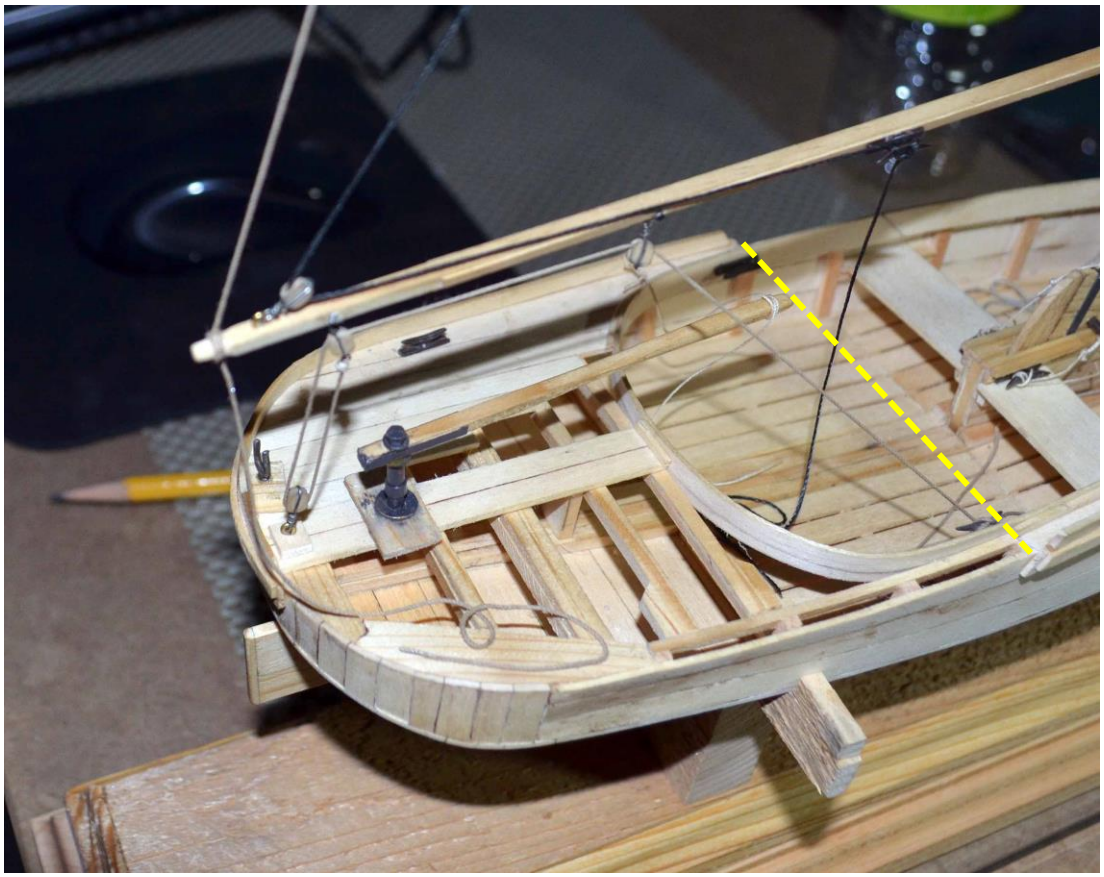


Illustration 417: The aft section.

Deck planking aft:

1) I left the starboard side off except for a plank that supports the rudder assembly.

2) I selected the aft starboard wale, rub rail, toe rail, and cockpit coaming of to a good view of the transom flooring and side framing.

3) The port side was a gradual move forward from the full plank at the rudder assembly to each interval at the deck beams.

4) All the railing and coaming were established from the center line of the transom.

5) Hardware fittings are attached to planked areas only. You must correlate which side to accommodate the rigging plan.

Deck planking center:

1) The exposed area is left to the port side.

2) The washboard planking is limited to the starboard side.

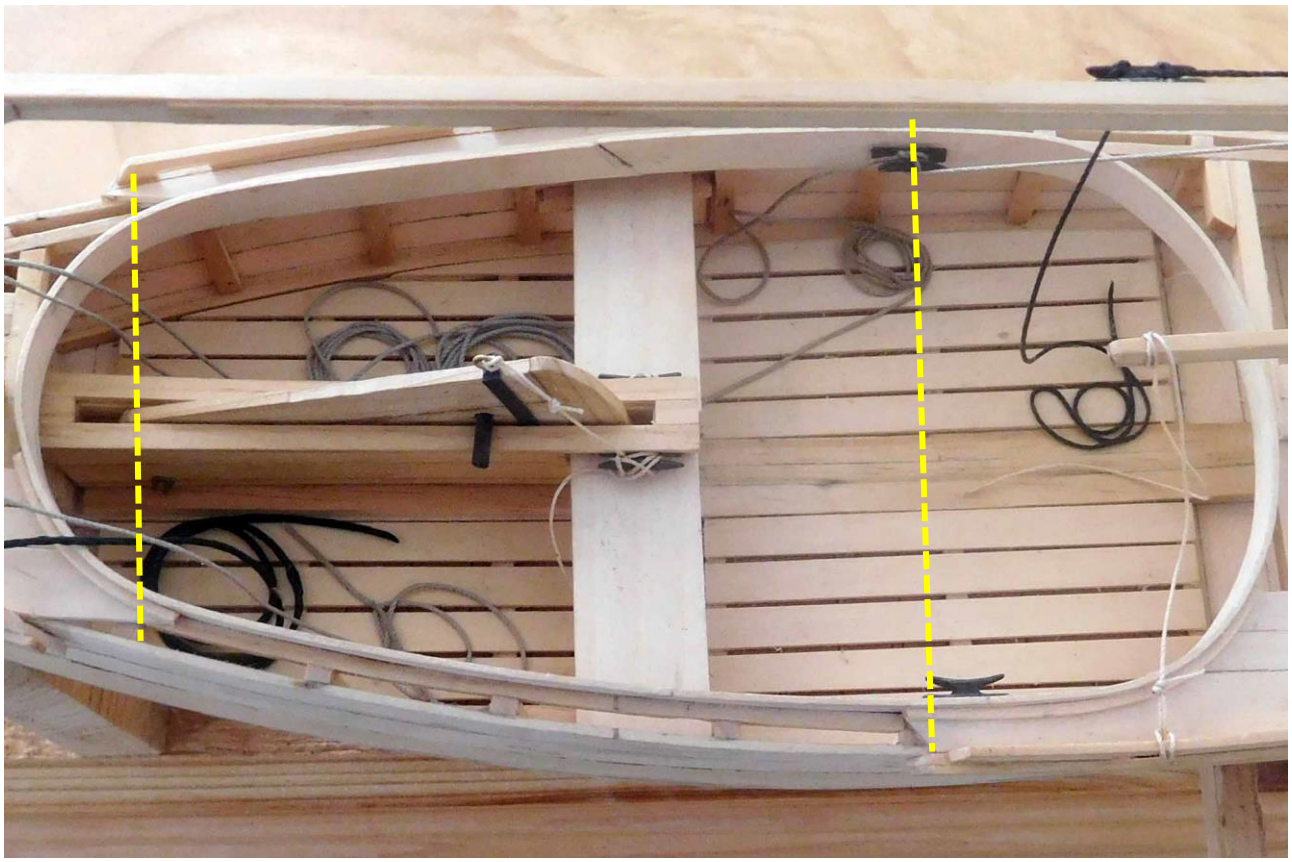


Illustration 418: The section caught in the middle.

The forward deck planking:

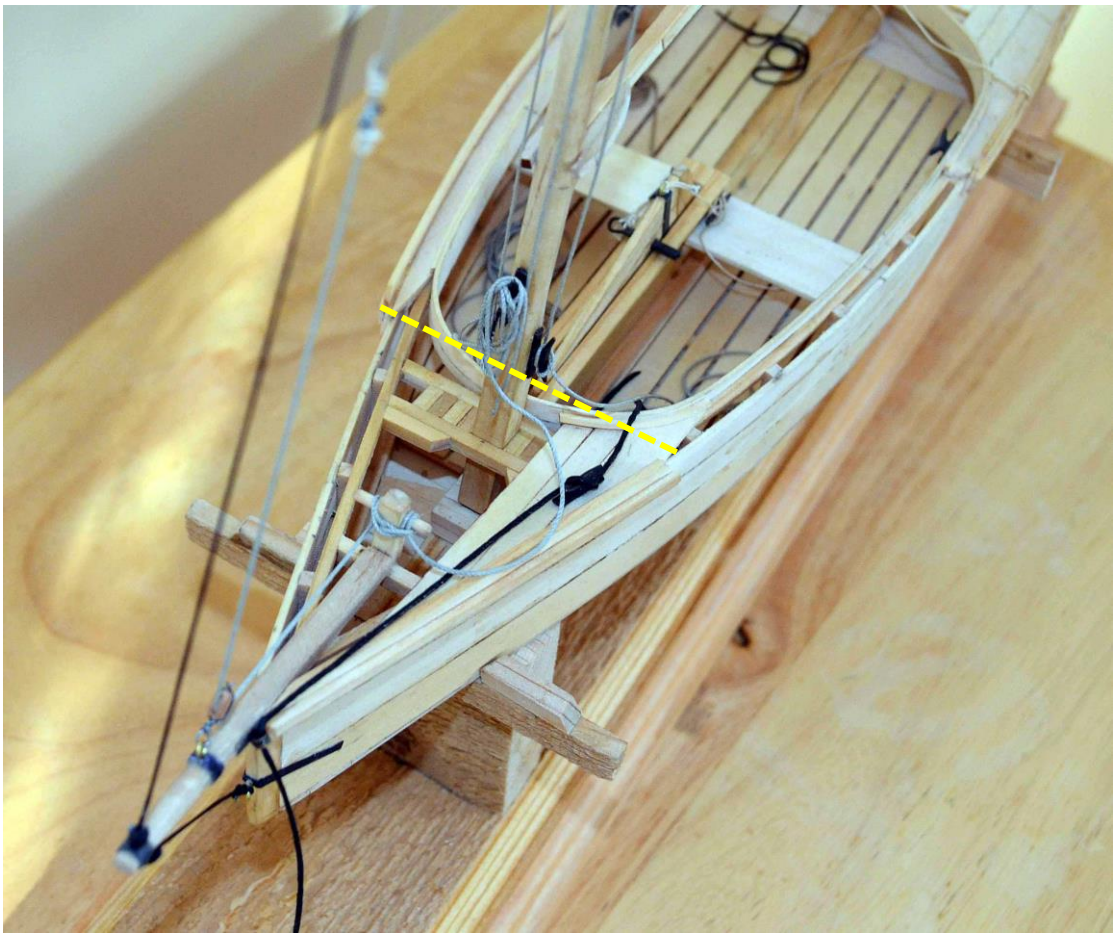


Illustration 419: No planking starboard.

1) The starboard side shows limited port planking, and a single plank under the bowsprit from the base of the bowsprit bitt,

2) There is no starboard planking. This shows the structure seating the mast.

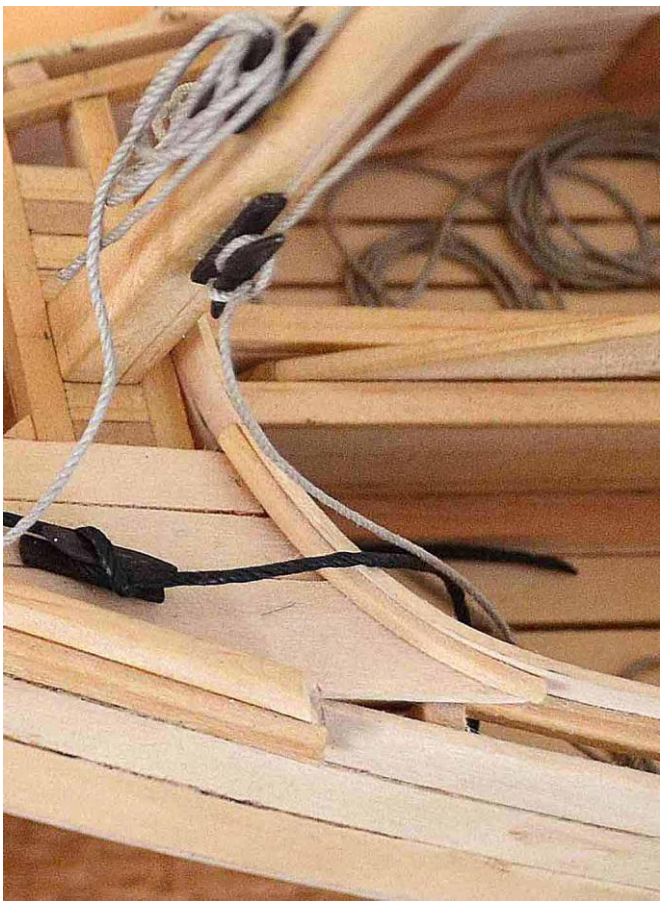


Illustration 421: A closer look.

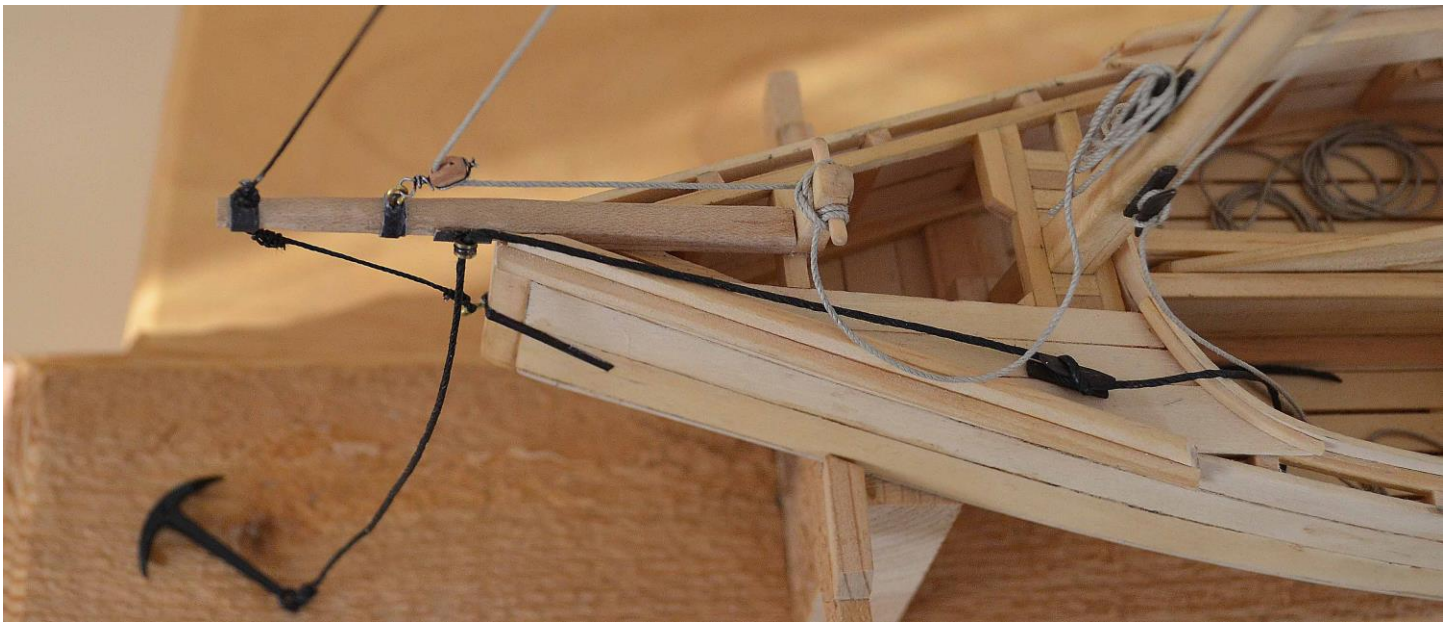


Illustration 420: Note: all the rigging attachments required are in place.

5.4 The saw horse construction:

Materials: From a 3/32” x 3” sheet of basswood, I cut 2 pieces1/2” x 3/32” x 5” long and one piece 3/4” x 3/32” x 5” long. In addition, the top piece was cut from 1/8” stock to the actual length on the drawings.

The drawings are on plan sheet 6, showing the individual components: Top (1), Legs (4), and the Side Supports (2, and Top, Side, and End views of the finished construction.

Transferring the cut-lines to the individual components.

Illustration 422:

1) Since my basswood stock was cut to actual width, length determines the cutting points. With the top piece cut to 5”, I lay it on the template. The original drawing disappears completely. To scribe the top surface location of each leg piece, you need to see the location of the legs at the top of the seating mortise of a leg 1/2” in width.

2) Remove the top piece and extend those lines on the template to be clearly visible. You can see the two-sided scotch tape in the picture. Add enough tape to hold the top in position on the template. **NOTE:** When looking at these pictures, you may see some scribed lines at the wood’s surface do not look like they are true to the drawing location. In most cases the discrepancy is because of my angle with the camera. is not directly atop of the wood. I do not use a tripod.

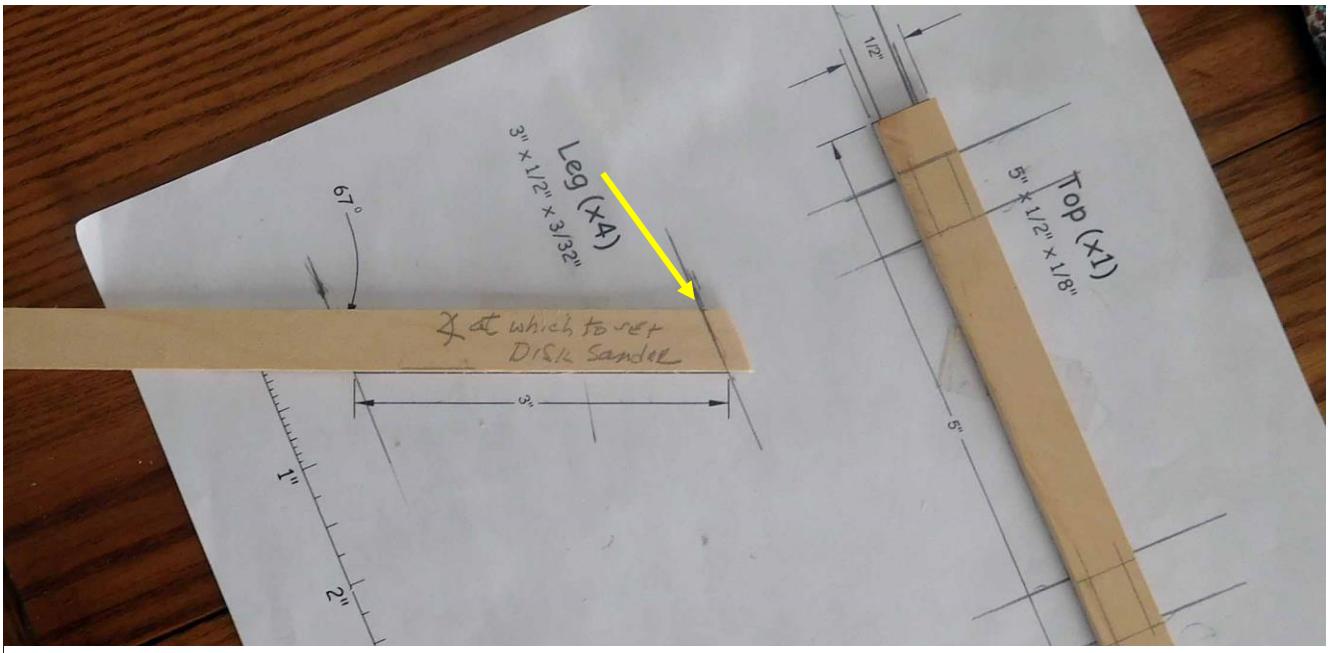


Illustration 423: Creating a 23-degree angle template to be used during scribing and later at the disk sander.

3) In simple terms, the saw horse components are all related in some manner to the 23/67-degree angles. The top piece seats the legs at that angle. Likewise, the legs sit flush with the upper surface of the top piece and flat to the floor at the same angle, and the side supports rest at 23-degrees to the bottom of the top piece.

The top piece mortise procedure:

1) I took a smaller piece of 1/2" wide basswood to explain how I made each mortise. It's also good practice to try your hand a couple times before going to the actual top piece.

Illustration 424:

2) Since the legs are made from 3/32" wood, the leg will seat into a mortise that is 3/32" into the top piece and proceed to floor at a 23-degree angle. A simple way to etch the top piece mortise location is to lay the top against a step block (or any similar 90-degree surface) then lay leg stock, on edge, hold firmly, and scribe your lines.

Illustration 425:

3) On the piece of wood just used in the scribing, note that the ends are set at 23-degrees. Place the piece against the angle block and slide it into position at each leg location. When line up with surface lines, scribe the 23-degree mortise angle to the piece. Make sure your angle is scribed in the right direction.

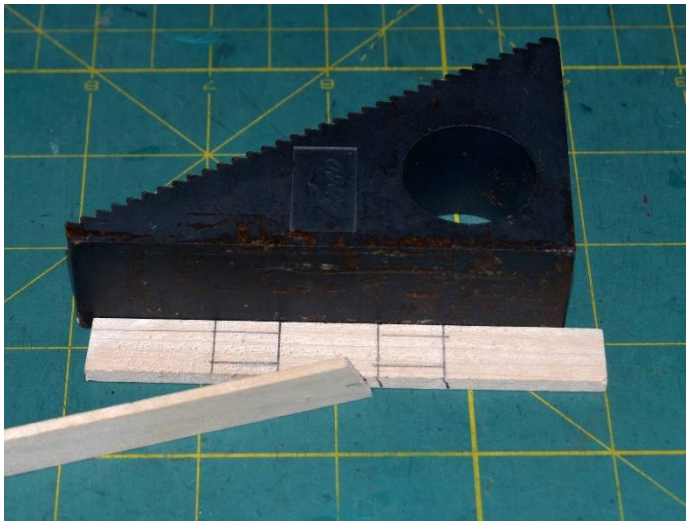


Illustration 426:

4) There is one more line that needs to be scribed and that is where the leg exits the mortise at the bottom of the top piece. The point of exit from the mortise at the bottom of the top piece, and it is a math problem.

5) Turning your top piece upside down, scribe the exit end lines across the surface.

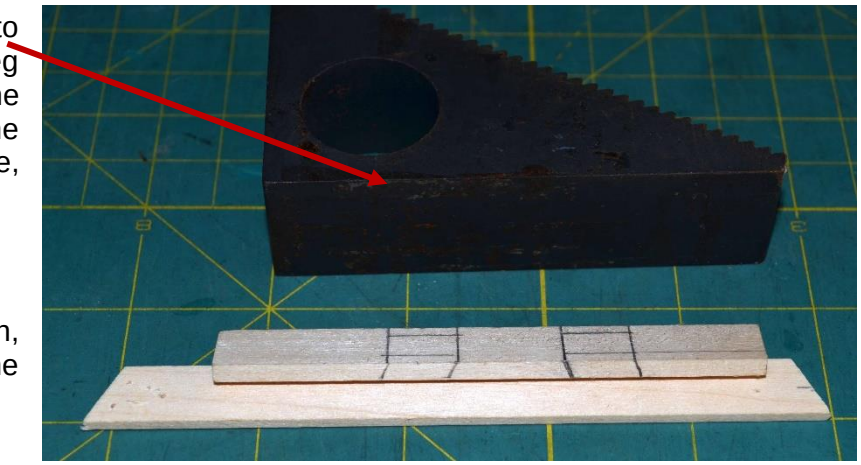


Illustration 427:

6) All the lines are now in place. What you need now is an X-acto knife, with a new #11 blade, and a small straight edge. Take the top piece surface and scribe the 3/32" seating line of the four legs.

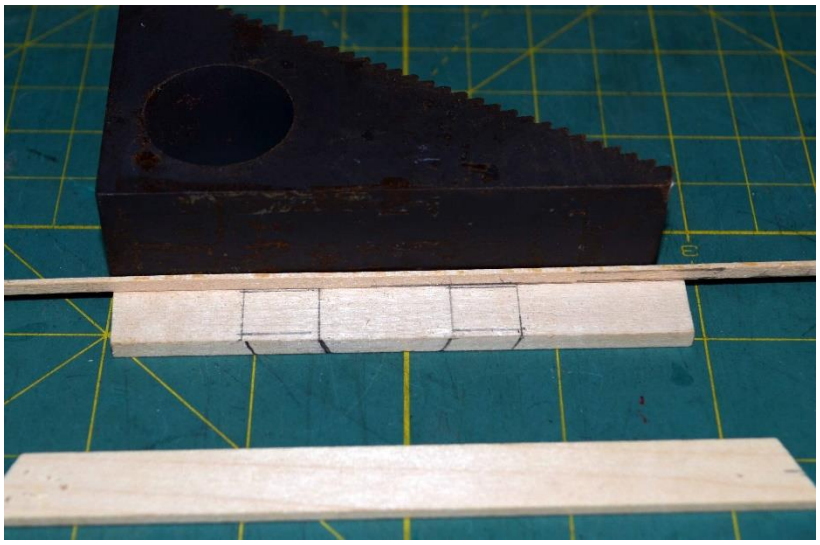


Illustration 428:

7) Then turn the piece over and scribe the 1/32" line of all four legs. One pass with the knife should be sufficient in depth.

Illustration 429:

The mortise:

1) To scribe the side angles of the legs into the top piece, I used a single edged razor blade. I carefully “rocked” the blade down to the 1/32” depth at the bottom. I then went to the 3/32” depth of the top. “Rocking” the blade is imitating a see-saw movement, rather than a push-pull slicing, or using a light tap-hammer. Since the leg is exactly 1/2” in width, the blade was “rocked” to the inside of penciled line. You can always extend it later, if needed.

2) Using an X-acto knife, I address the first carving area, the lower seating edge. With small, light strokes, I start from the middle and put the blade to me, one sliver at a time until I meet up with scribed line. I turn the top around and repeat the process to the other side. If the middle section isn’t exactly to the line, let it wait and move to the top piece.

3) Repeat the process by carving to the 3/32” line. You should now be looking at a ridge of basswood across the center of the mortise.

4) You now have established all the boundaries of the mortise area.

5) At this point, you bring down the mountain to create the flat, angled surface to receive the leg. I continue with the X-to blade, keeping the blade as flat to the surface as I can. (This process will include taking any remaining requirements left at Step 2.) A second option is to vice the leg and use a sanding stick of flat file.

6) Throughout this whole process have a piece of 1/2” planking to test the fit. Do this often.

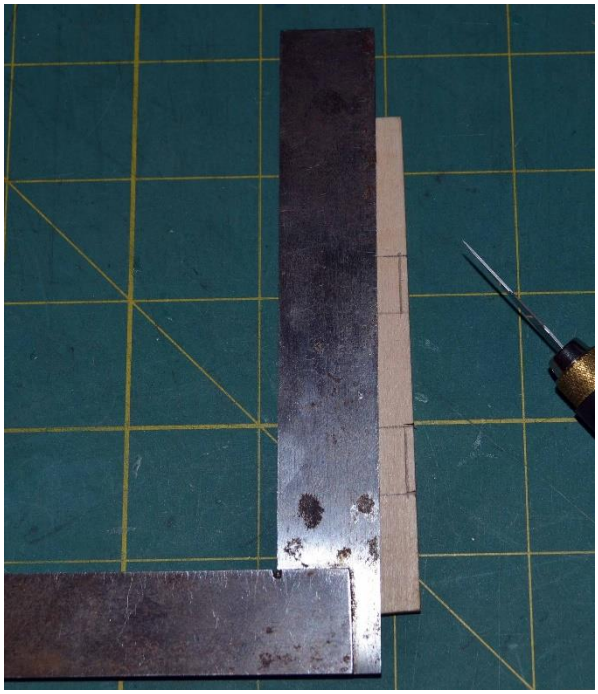


Illustration 430:

Illustration 431:

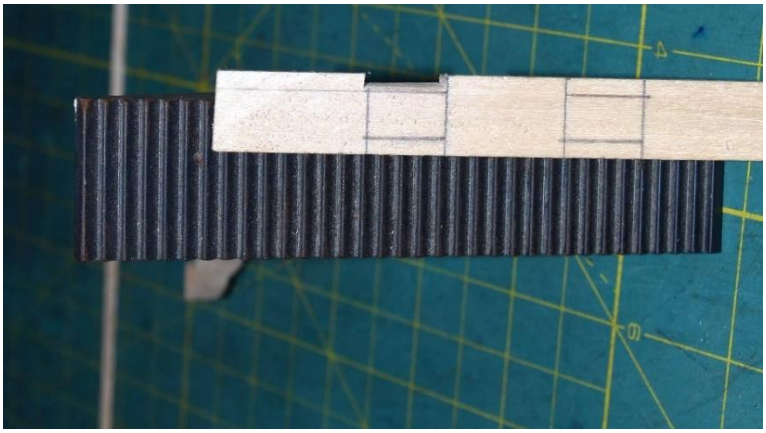


Illustration 432:

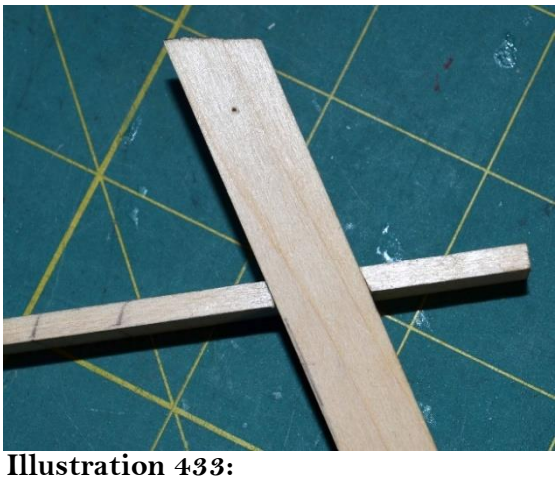


Illustration 433:

The legs:

1) I took a length of 1/2” basswood, long enough to accommodate all 4 legs, and transferred the lines of the plan.

2) Leaving a 1/8” spacing between each leg, I use my scroll saw to separate the legs, leaving an overhang at both ends of about 1/16”.

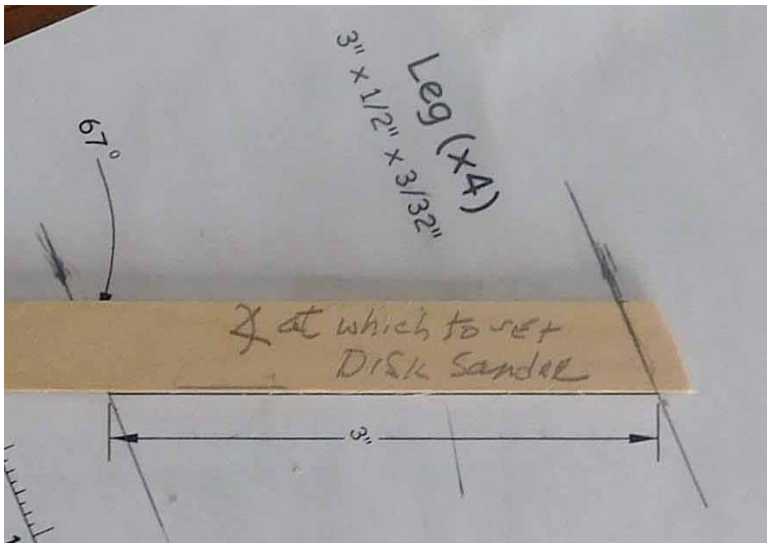


Illustration 434:

3) You will notice that at the same time I also transferred the lines of end supports. The basswood is from the 3/4” material.

4) I separated the end supports in the same manner as the legs, leaving the extra wood on each side.

5) Now, to avoid confusion in the seating procedure of each leg, I will mark each leg with a colored dot when I sand in the 23-degree angle.

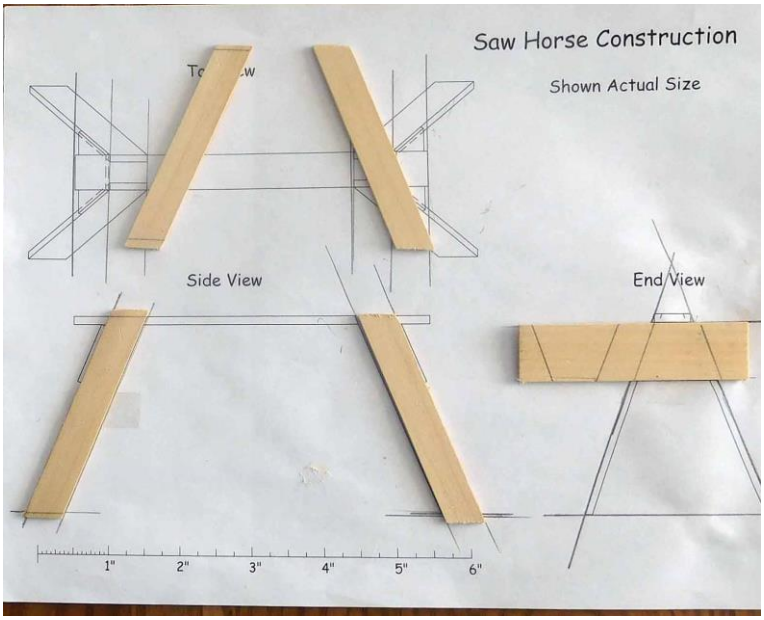


Illustration 435:

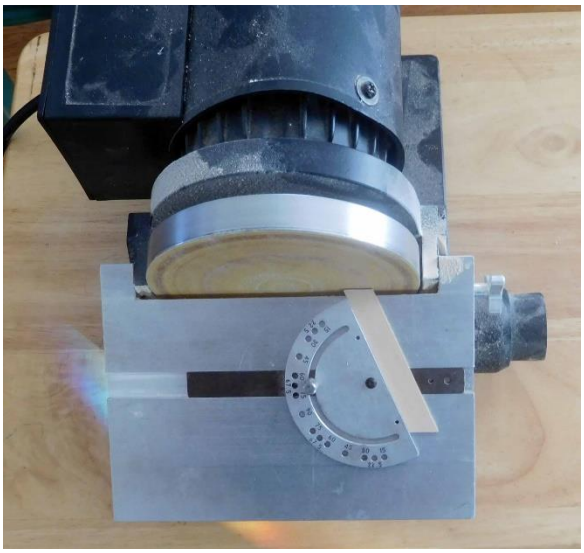


Illustration 436:

6) At the disk sander, I set the table to 23-degrees and the miter gauge to 23-degrees. These settings allow both angles to be set in place with at one time. Remember, each leg needs to sand flush with both the top piece and the floor. With the miter gauge set to the left side of the table you set one end of the leg, but which end, the top, or the bottom? It depends on where that leg is to seat.

7) Let's do the **red** dot leg first. I take a leg and decide which one it will be. The **red** dot is to be aft and starboard in the drawing and the seating position is the top piece. I place a **red** dot on the plan and on the leg's outer surface.

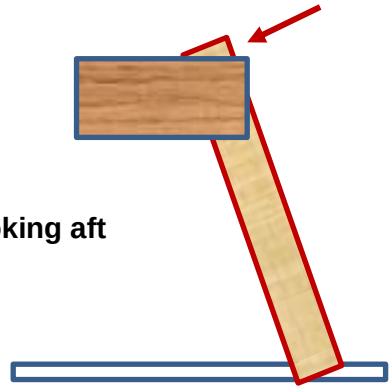


Illustration 437:

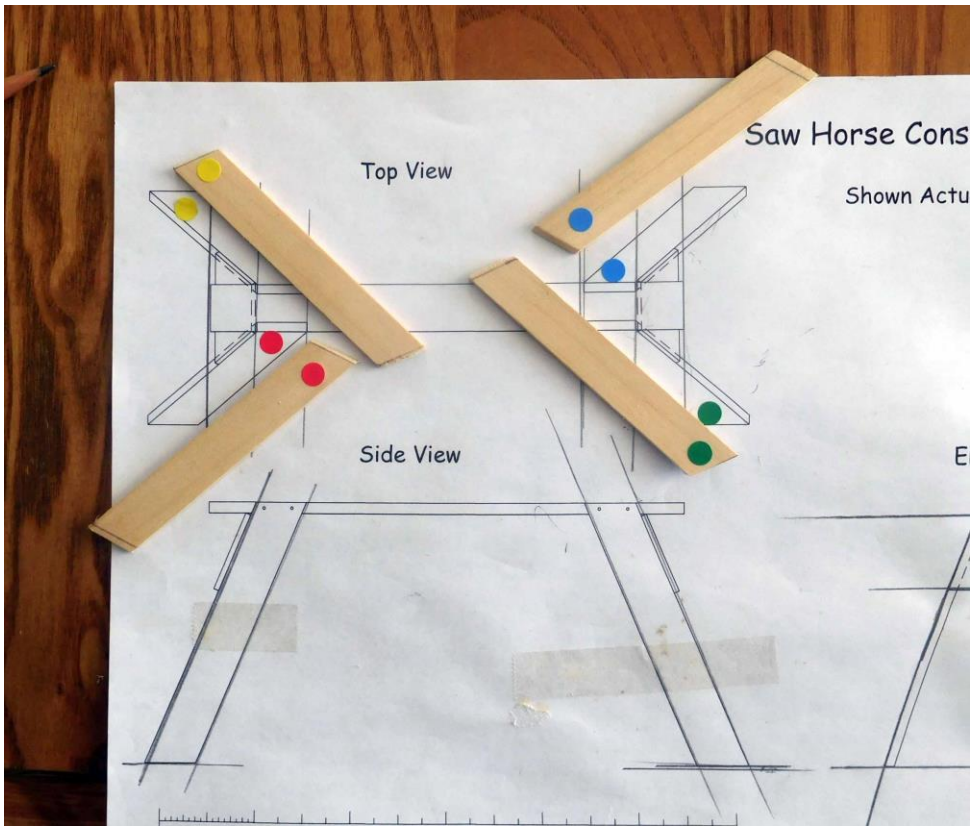


Illustration 438: It's necessary – no dots about it!

8) Moving the miter gauge angle to the right will also make it necessary to answer the question of floor or top piece at each of the 4 legs. Can you tell which side of the miter gauge will produce or **red** dot?

9) The answer is **Illustration 439** and the **red** dot is on the other side. Additionally, it could be used as the floor angle of the port side **yellow** dot aft. And it could be used for the port side forward **blue** dot top angle. And it could be used for the starboard side forward **green** dot floor angle. See why they need to be marked!

10) My advice is to do what is certain from what you just found out: lay the remaining three legs as shown in **Illustration 438** and put a colored dot on, as shown, on each leg. The use the disk sander, keeping the miter gauge as formed the **red** dot leg.

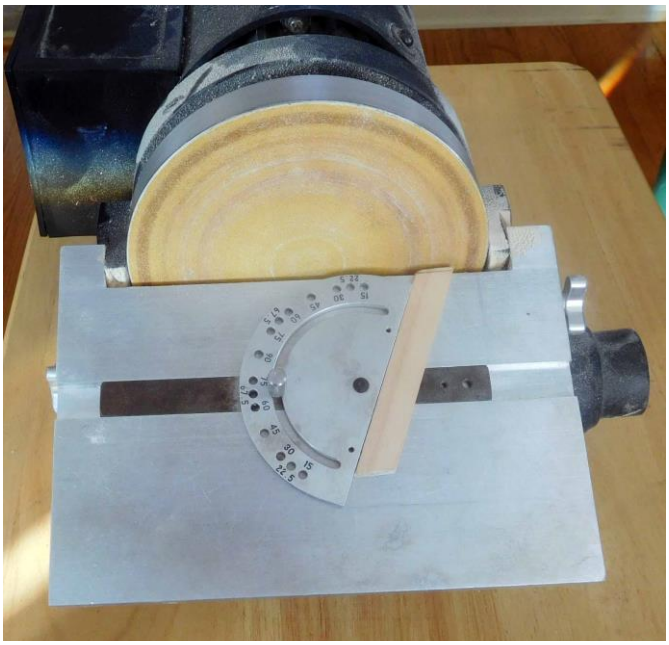


Illustration 439:

11) All the angles will come from the other miter gauge position. All you need to determine is to see that two of dots at the floor and two of the dots at the top piece will come from the 4 legs you have created.

The side supports:

1) All that is left here to bring the sander table to 90-degrees and carefully sand the top of the support piece that seats to the underside of the top piece.

2) Gluing the components can be tricky, for it is very difficult to clamp an angle. A suggestion, do one leg at a time. Lay the top piece topside down on a flat surface held in place with tape. Apply a bead of glue into the mortise. Take a small, say 3/4" x 2" wooden block, one end beveled to 23 degrees. Press the union with the block for a couple of minutes. Now, carefully remove the assembly and check the top piece and the leg are flush. Replace the piece and press until dry.

3) If you want to weather or age the saw horses, go back to Phase 4, section 3.8 and go for it.

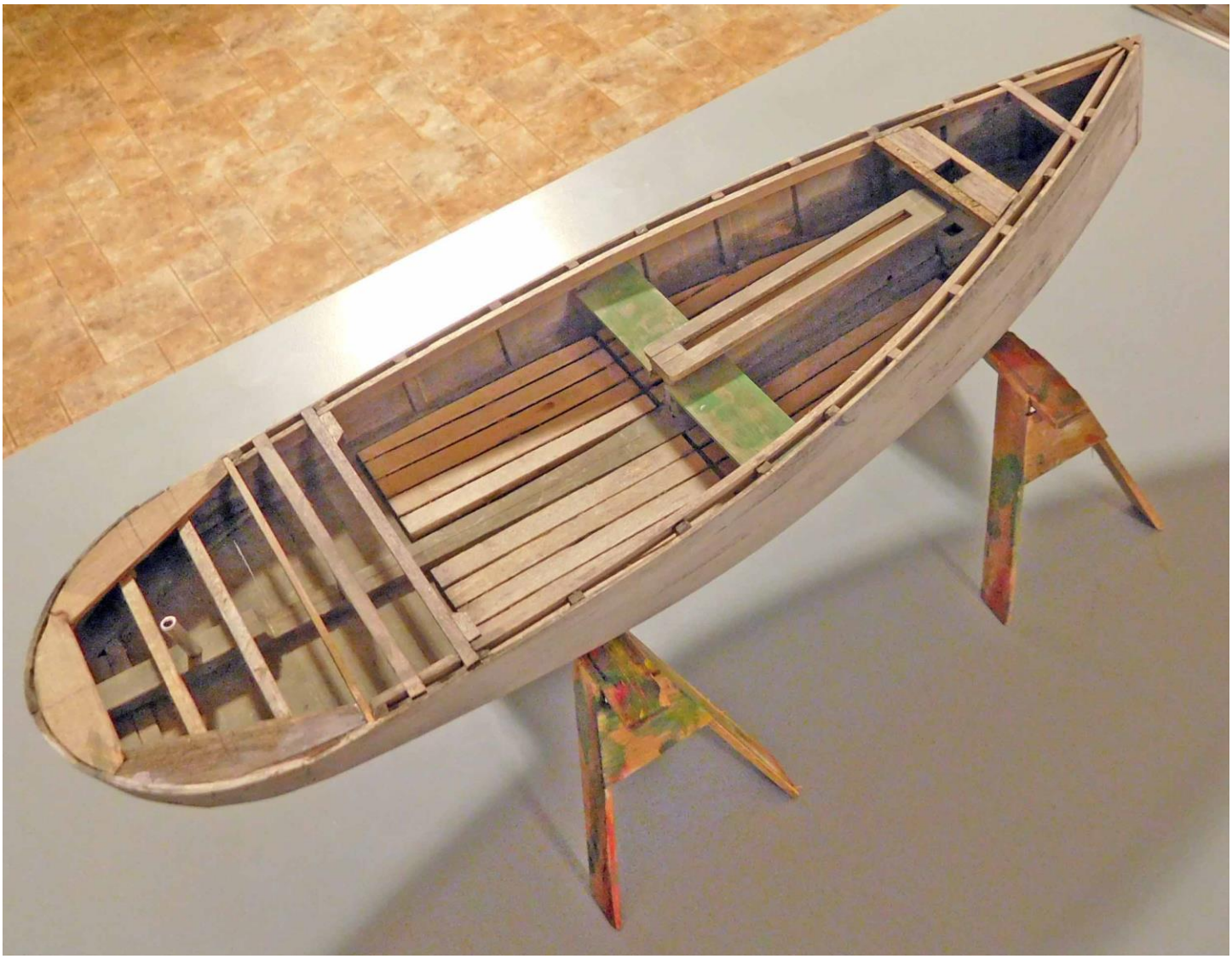


Illustration 440: These have been very useful, especially once the rudder assembly is in place. The hull can no longer sit on the **BJ2.**

Illustration 441: A set of saw hoses for each model.

I've had an amazing ride to get a manual of instruction that, I hope, answers any question you might have as you go through your build, and Al, the CAD man, has had as much fun as I have.

Happy scratch building,

Bill Strachan and Al Saubermann

January 8, 2018