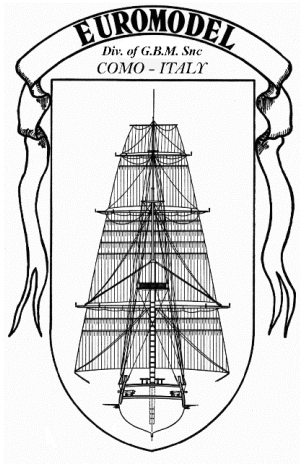
TRANSLATION LINKS

1. type into your browser ... **english+italian+glossary+nautical terms**
2. utilise the translation dictionary 'Nautical Terms & Expressions' from Euromodel website



Checked the Resource Information File ?

A research paper including an *interpretive* build

Royal William

1st. Rate English Vessel

Originally launched in 1670 as the 100-gun HMS Prince
Re-built and launched in 1692 as the HMS Royal William
Finally re-built again and ...

Launched 1719

Scale 1:72

02.HULL & MAIN DECK PREP.

November 2021

This paper is based on …
Euromodel drawings,
external references,
kit material,
***extra material*.**

This resource information was based on the original text supplied by Euromodel and then expanded in detail as the actual ship was constructed by MSW member piratepete007. [Additional & exceptional support was gratefully received from MSW members **marktiedens, Ken3335, Denis R, Keith W, Vince P**, **Pirrozzi & Bill Kent.** My sincere thanks to them and other MSW members who gave advice and gave permission to use some of their posted photos.

This is not an instructional manual but is a collaboration amongst a number of MSW members & others whose interpretations were based on the drawings and the supplied kit.

- Additional material used was dictated by personal choices.
- Greater simplification would be achieved by using the material as it is supplied.

Model Ship World Forum

I am indebted to those members who were, or are, involved in their own build of the Royal William and have allowed me to add photos from their posts – but not utilising their personal text - in the belief that the images could add both a stimulus and an interest to new builders of this ship. So my grateful thanks go to … Brian C; Denis R; KeithW; marktiedens; Vince P, Ken3335

They have taken the RW build to a much higher level than intended by this kit.

Reference Texts

Fighting at Sea in the Eighteenth Century; The Art of Sailing Warfare by Sam Willis (2008)
Historic Ship Models by Wolfram zu Mondfeld (1989)
Seventeenth Century Rigging by R.C. Anderson (1955) [almost a complete copy of his earlier book ***The Rigging of Ships in the Days of the Spritsail Topmast, 1600 – 1720*** (1927)]
The Construction and Fitting of the English Man of War 1650-1850 by Peter Goodwin (1984)
The Masting and Rigging of English Ships of War 1625 – 1860 by James Lee (1984).

For the purposes of discussion, this ship is considered as an 18 C build.

Content

[To navigate through the contents – use 'control + click']

Illustrations

[The figures below are not hyperlinked]

CHAPTER 1: BASIC HULL

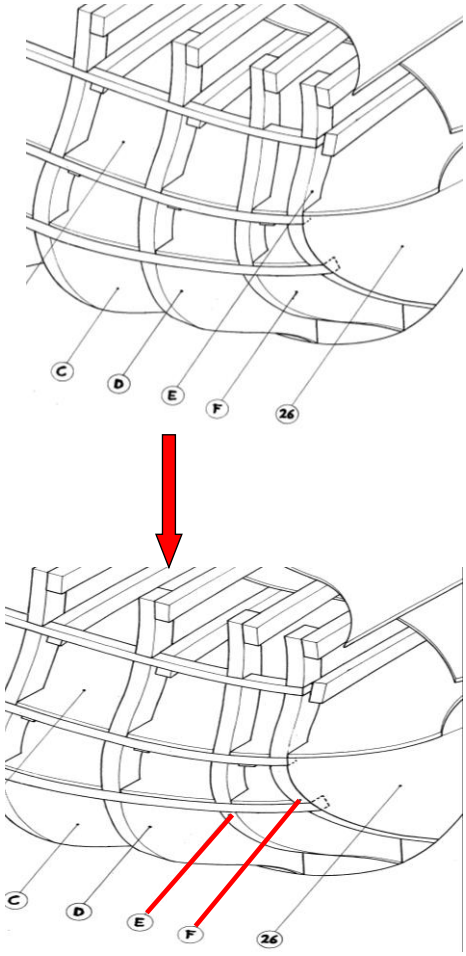


Figure 1: Plan Sheet 4 Correction

Plan Sheet 4 Correction

The drawings show the frame arrangement as '… D-E-F' and that, of course, is correct.

However, the lines identifying those frames) in upper part of Fig. 1 from Plan Sheet 4 are incorrect. The two red lines in the figure below correctly connect the letters 'E' and 'F' with their appropriate frames.

N.B. Frame F is approx. 3 mm. below the foc'sle deck alignment but this IS correct. [Refer to 'Frame F Plus']

Hull Integrity

The fifteen transverse pre-cut ‘bulkheads’ were slotted into the false keel as a dry run to determine the fitting of joints. A significant number of the cross-joints were a loose fit and some packing was needed.

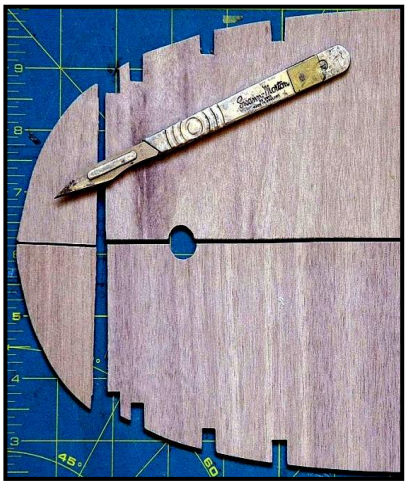


Figure 2: Shortening of Gun Decks

Both the lower first gun deck (22) and the upper second gun deck (23) were trimmed as necessary at the bow end to ***finish flush with the forward edge of the last frame*** to allow the fitting of the solid bow blocks.

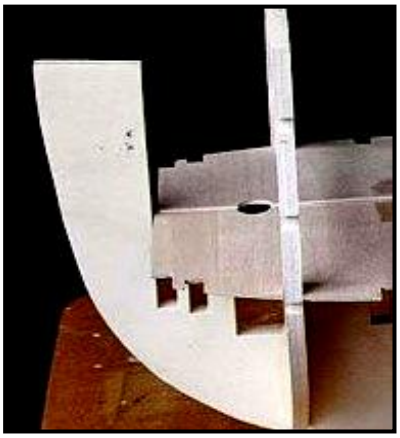


Figure 3: Shortened Lower Gun

Alignment of the beams supporting the decks was excellent.

All 15 frames were removed from the keel.

Baseboard Example

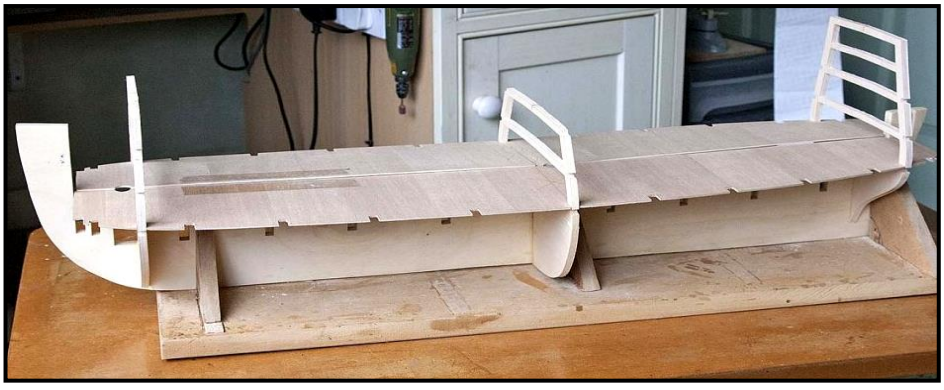


Figure 4: Another Baseboard Example (Royal William)

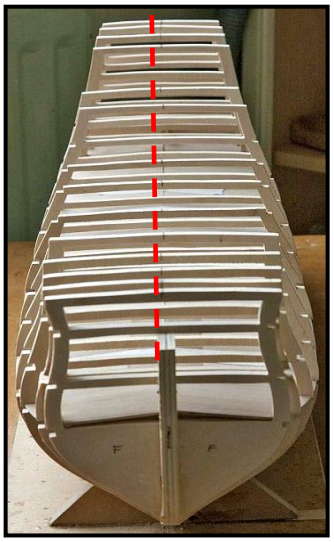


Figure 5: Mid-Line Points

Alignment

Frames

- centre point was marked on the top of each frame
- a string/ cord – *illustrated by an off-set broken red line in Fig. 5* - over the length of the ship can be a useful addition to keep checking the marked mid-line points.

Decks

*Decks are notched to fit the frames …… **if the alignment is correct, then the notches will fit.***
Continual checking of frames as they are added is necessary (Fig. 6)

Fig. 6 shows how the first three frames were checked against the lower gun deck.

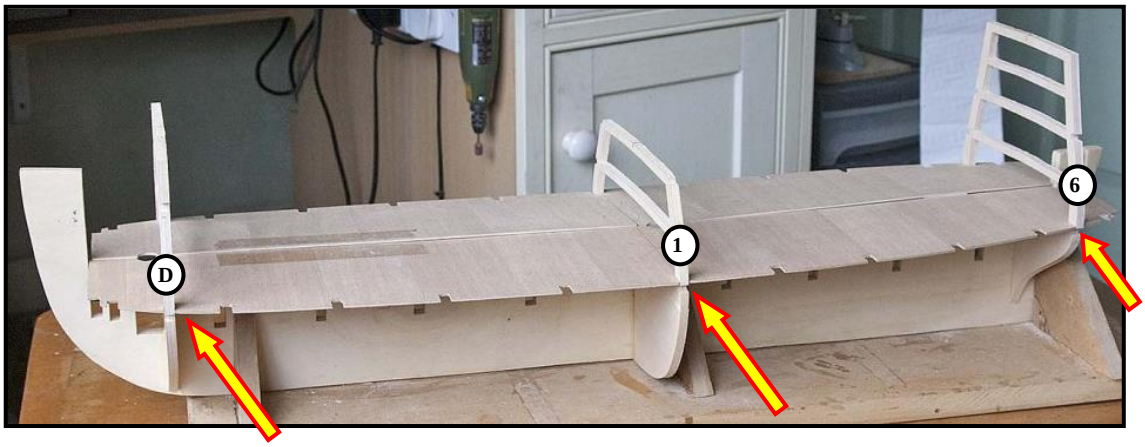


Figure 6: Dry Fit of Deck 22 (lower gun deck)

Modifying Deck 22

This deck is supplied in two longitudinal halves, but also *needs to be cut athwartships* into two halves across one of the beams as it could only be inserted down to the bottom level beams by inserting through the stem, sliding along what will be Deck 23 and then bending down to the lowest level beneath Deck 23 beams (just before midship).

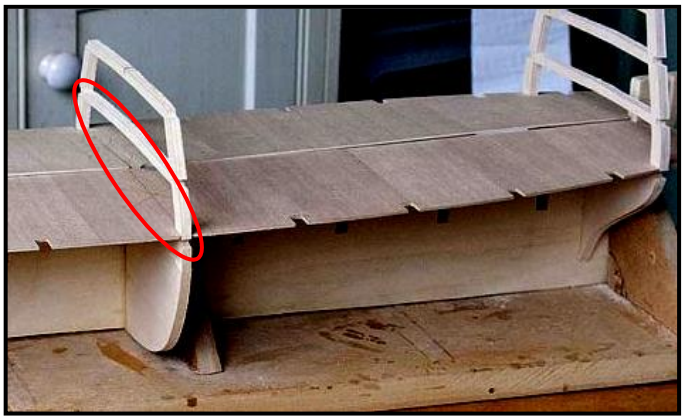


Figure 7: Cutting Deck 22 Athwartships

Figure 8:Rafter Square

An ***essential*** tool used to check the correct alignment of the frames with respect to the keel. The 120 mm. tool shown here is especially useful, having a wide flat surface along one edge.

Inner Cell

- Frames 2, 3 and the mid-frame ⊠ followed with strengthening pieces being inserted between them.

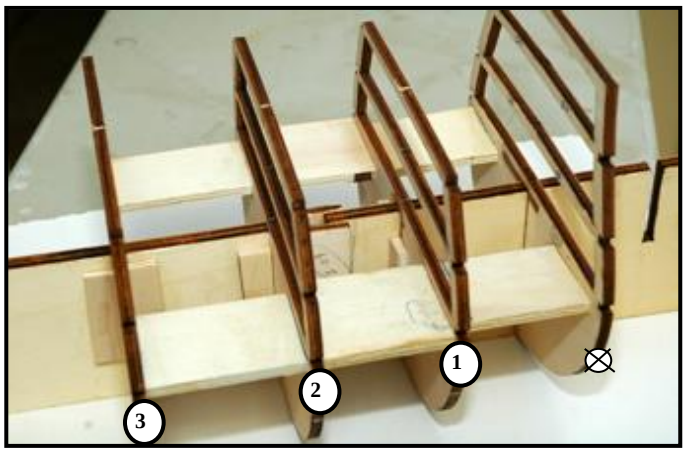


Figure 9: Central Strengthened Cell

Adjustments to Frames

1. In spite of the greatest care in fixing the fifteen frames in position, some mis-alignment can still occur. This is easily done along the upper sections where a strip of first planking is used to check if any of the frames are out of alignment.

Figure 10: Checking for Smooth Alignment of Frame Edges

Frame surface too low ? Building up may be necessary (Fig. 11).

One or more frame surfaces too high ? May need to be reduced.

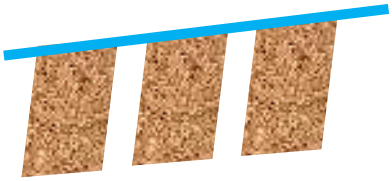


Figure 12: Frame Edge Fairing

Most frame edges at least will require some bevelling (i.e. 'fairing')

Figure 11: Frame Packing

In the end, many frames were altered – and using a plank to guage the flow across the frame profiles – it was almost a matter of throwing caution to the wind as many frame profiles were judged to be nowhere near perfect. The hull became the artist's canvas with the flow becoming the all important aspect. The main deck profile became the only thing to be kept constant.

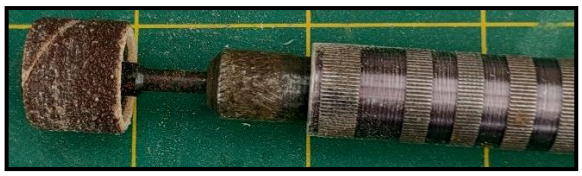


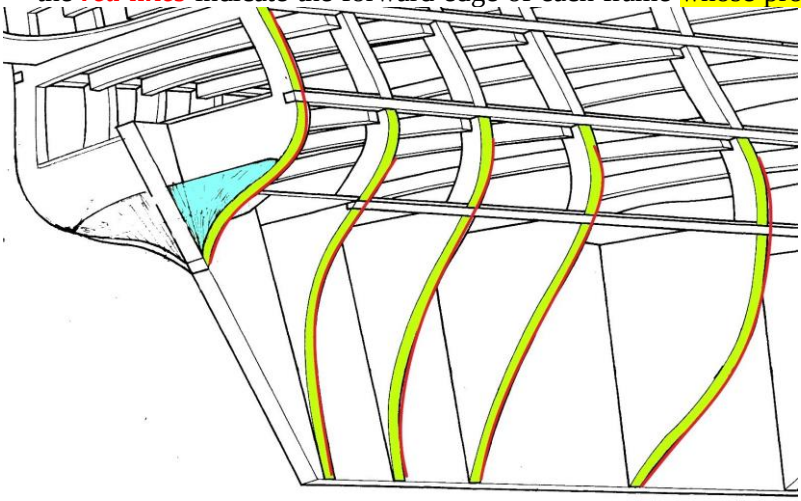
Figure 13: Sanding Drum (60 grit)

The main tool was a mini-sanding drum on a flexible drive ….

2. On the lower section of many frames running towards the aft end, the situation is quite different and the builder must appreciate what happens when distinct curves are created.

Fig. 14 illustrates the outer edge of the last five aft frames where …

- the ***red lines*** indicate the forward edge of each frame whose profile must be retained. Removal of this forward edge will create huge problems for the hull profile.



- the ***green-shaded areas*** will all have a distinct bevel, being determined as an overall flow towards the stern
- the ***blue-shaded area*** will show a curved surface interfacing with the ***green bevel edge profile flow***.

Figure 14: Profiling the Aft Frames

The notches in those frames that were bevelled will themselves need to be bevelled inwards to allow for the correct seating of the stringers.

Fig. 15 illustrates the intent shown in Fig. 14 where a planking strip is used to fair the frames into one longitudinal profile.

Figure 15: Fairing the Frame Edges

Stringers

Supplied: 4 x 4 x 840 mm. (6)

Figure 16: Fixing Hull Stringers in Place

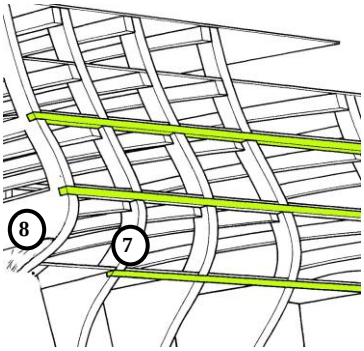


Figure 17: Hull Stringers

The stringers were a good fit into notches provided but there was no notch in Frame 8 at the aft end for the lowest stringer on each side, so that timber was terminated at Frame 7 (Fig. 17).

[Fig. 18 provides a contrast where a builder added a notch in Frame 8]

The lowest stringers on both sides (with the excess length) were easily held in position using mini cable ties (Fig. 18).

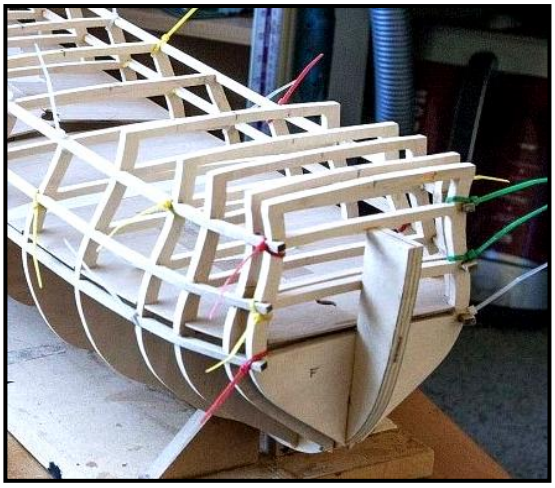


Figure 18: Holding Stringers in Position

After all the stringers were fixed, only Deck 22 could be fixed into position.

Decks 23 & 24

The upper gun deck (23) and the main deck (24) were inserted through the stern frames (Figs. 18 & 19 below).

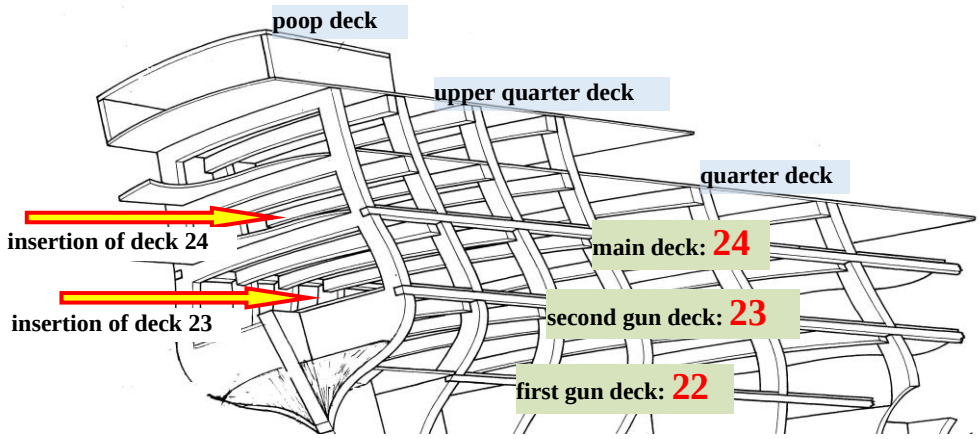


Figure 19: Diagrammatic View of Gun Decks

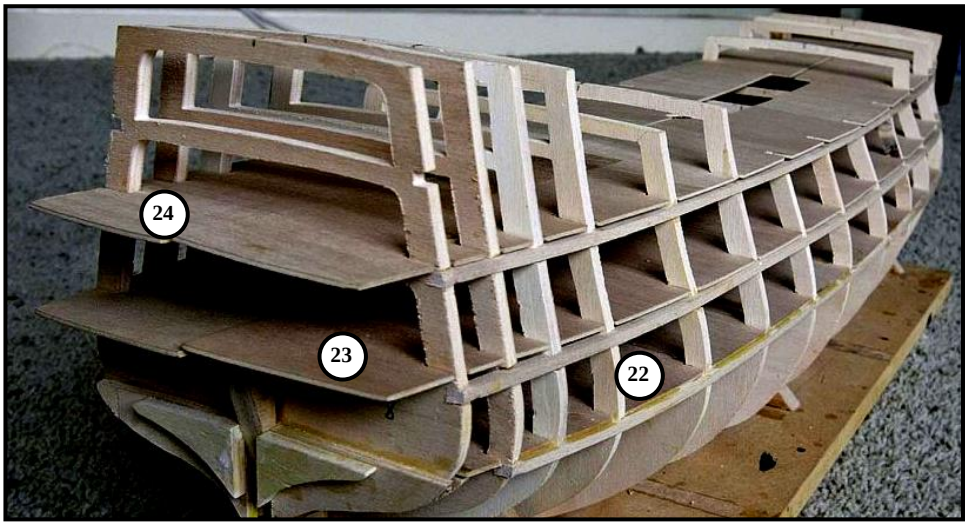


Figure 20: Temporary Insertion of Decks 23 & 24

Holding Components in Place

Figure 21: Fixing the Bottom Deck

Deck edges required clamping down during the fixing process and small clips (Fig. 21) like those from a stationer's shop are ideal.

At this stage,
only lower gun deck 22 is fixed
in position.

The deck panels needed to be held down during the fixing process as well. Pieces of thick corrugated cardboard inserted between the beams of the frames and the deck surface worked well – although tapered wooden blocks (Fig. 22) are an excellent alternative.

Figure 22: Using Wedges

Mizzen Mast Step

Figure 23: Mizzen Mast Step on Deck 23

Before the decks are closed up, the mizzen mast stepping, a block with an 8 mm. hole was fabricated and painted black.

With all three lower decks either secured or dry fitted in place, the mizzen mast was inserted through the decks and placed into the step vertically and at the correct cant. The step was then secured to deck 23.

Forward Keel & Bowsprit

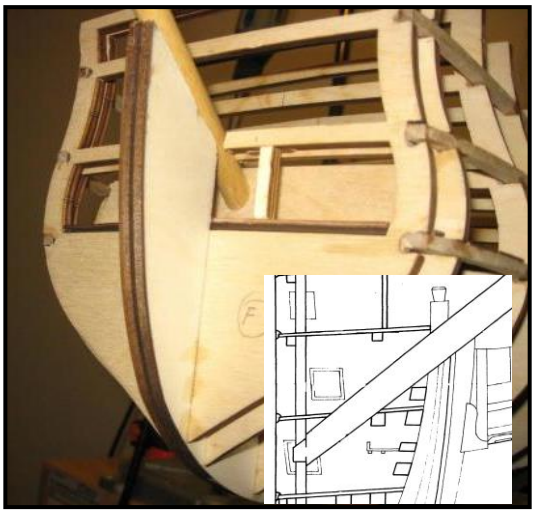


Figure 24: Angled Keel Support

Some builders at this stage cut off an angled section of the keel and temporarily insert the bowsprit mast into a seating in Frame E (Fig. 24). However, there is no need for this hole to even extend as far back as Frame E.

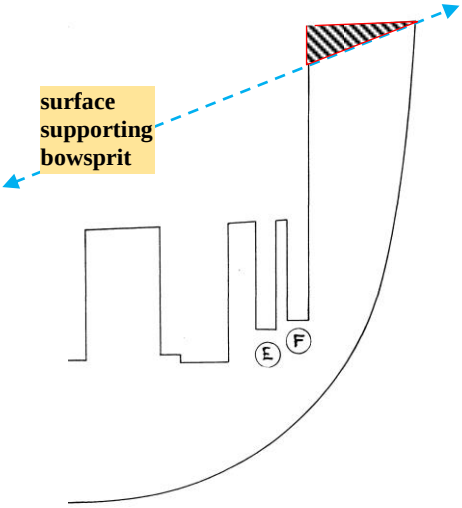


Figure 25: Mast Support

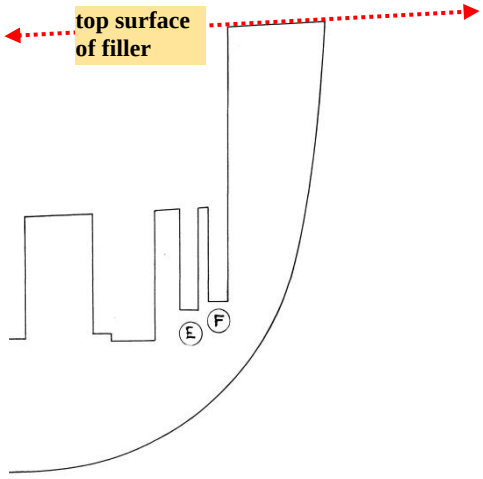


Figure 26: Aft Inclining Filler Blocks

The separation between the bowsprit mast and the beakhead (Fig. 27) determined this inclination. A small portion of the bowsprit intrudes into the prow deck forward edge before going into the hull and terminating in the filler blocks/keel. The bowsprit is ***10.5 mm***. in diameter when it enters the hull (but ***12 mm.*** is supplied).

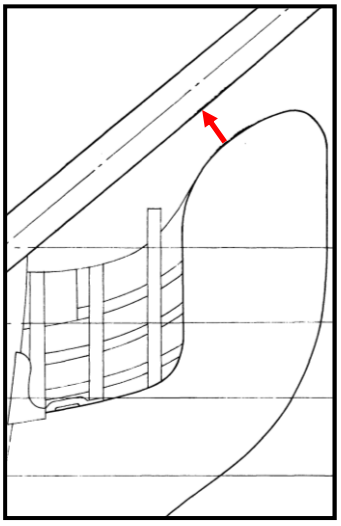


Figure 27: Determing Bowsprit Angle

A very common approach used is shown in Fig. 28 where the filler blocks are placed in position either side of the keel as supplied without making an angled cut.

Figure 28: Bow Fillers in Position

Figure 29: Hole for Bowsprit Mast

At some stage, a hole will need to be drilled in the keel & filler blocks as shown in Fig. 29.

An alternative approach is suggested as follows …

The thought is to form a slot perhaps two-thirds through the plywood keel (Fig. 30, white shading) but provide a temporary strenthening piece (red) fixed in position near the outer opening. This could easily be drilled out after the filler blocks and first planking were in position. The angle can be determined making a template based on the drawings … but some adjustment may well be necessary.

Having created this channel, the two filler blocks can now be fixed in position.

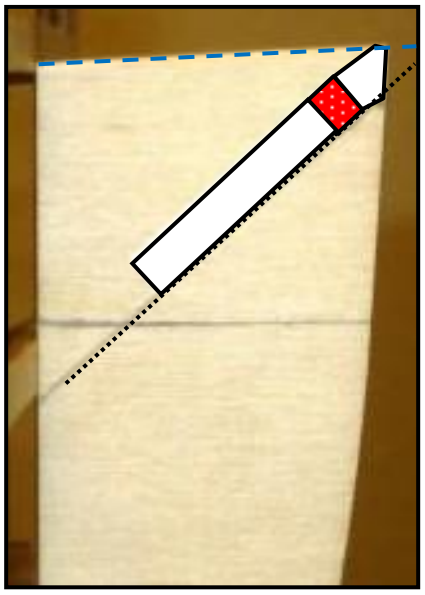


Figure 30: Suggested Mast Channel Opening

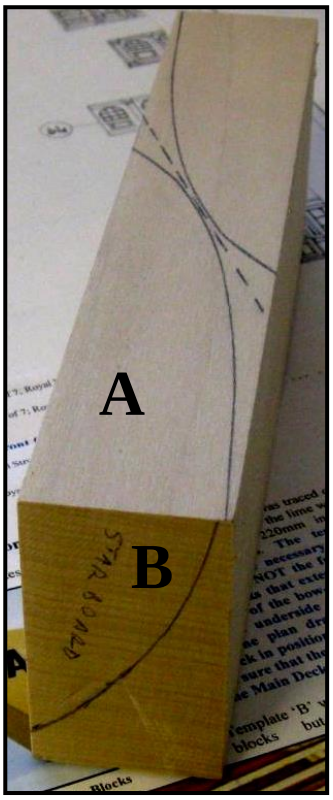


Figure 31: Tracing 'A' and 'B'

Bow Filler Blocks

Using the larger of the two stem block templates provided in the drawings, outline 'A' was traced out as shown in Fig. 31 onto the wood block ***40 x 70 x 220 mm.*** in two opposing positions.

The template only showed the necessary line of curvature and NOT the full length of these blocks that extended from the bottom of Frame F up to the underside of the main deck. The plan drawing showing the block in position is conceptual – make sure that the block extends up to the main deck level.

Template 'B' was then traced onto the blocks but in complementary positions. Both blocks had a third line marked on them using the frame against which each would sit. The block was held in position with the main deck above it to mark that contour as well.

Rough shaping was easily achieved using the disc on a bench sander although careful use of a sharp knife would achieve a similar result. It is useful to do as much contouring of the blocks before they are set in place.

After fixing in place against Bulkead F, a sanding drum on a Dremel power tool was used to achieve the correct contoured shape. Some rubbing down with sand paper was finally used. Minor adjustment to the bevelling on the frames near the bow blocks was also necessary.

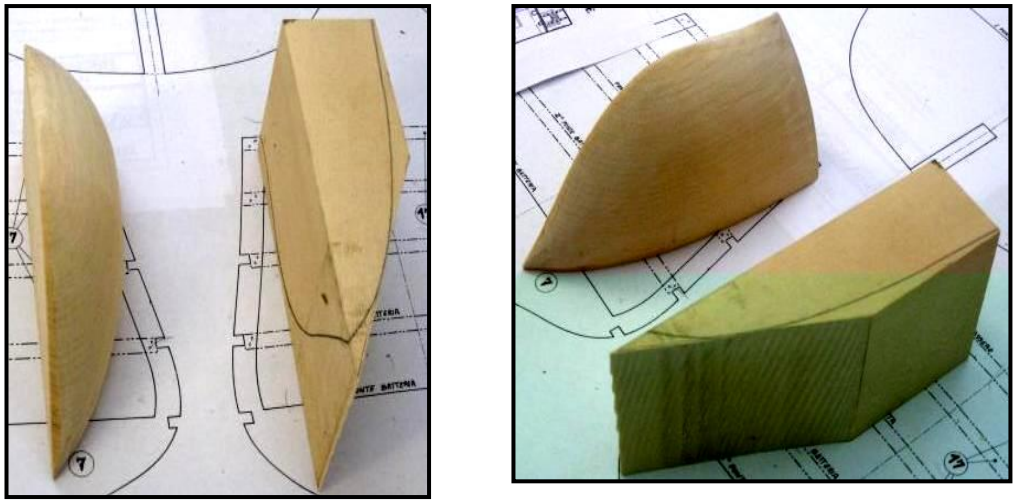


Figure 32: Shaped Bow Blocks

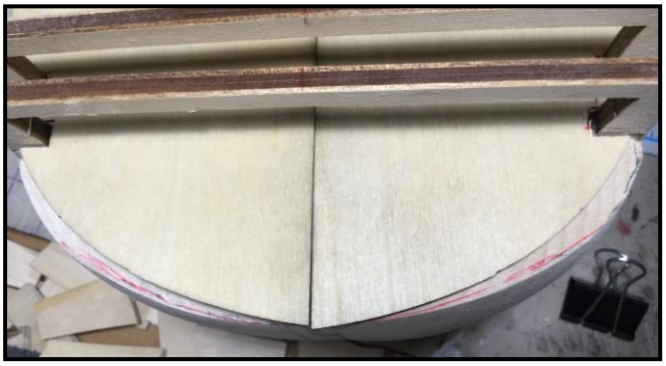


Figure 33: Incorrect Drawing Profile

Fig. 33 shows a disparity between the drawing template profile (red line) and the main deck profile (plywood) that should fit the block shape. As occurs so often, common sense must prevail which in this case will lead to the block profiles being cut back (almost ?) to the deck profile.

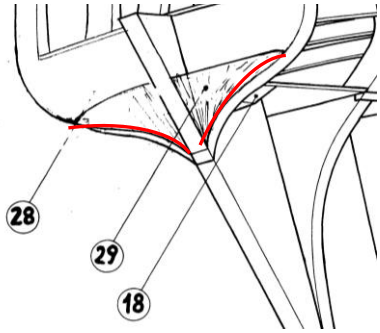


Figure 34: Stern Contour Pieces

Stern Blocks

The port and starboard contour blocks each consist of two blocks (28+29) as shown in Fig. 34. (Sheet #4 indicates one block only but that came out of 6 mm. thickness and not the 5 mm. as supplied in this kit).

A block #18 is added to each side on the forward surface of bulkhead #8 immediately underneath deck # 22.

The positions of the combined contour blocks 28 & 29 were determined by fitting their lower edges against the edges of frame # 8 (red lines, Fig. 34) whilst fitted against the central keel. This then will make them level with block #18 !

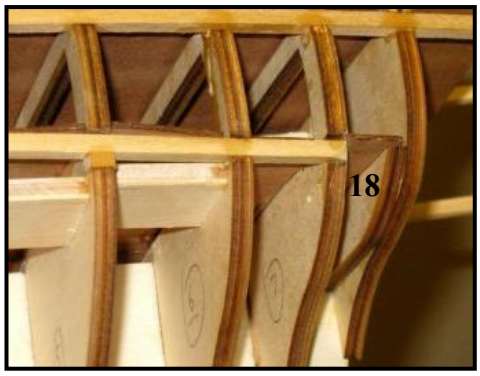


Figure 36: Piece 18

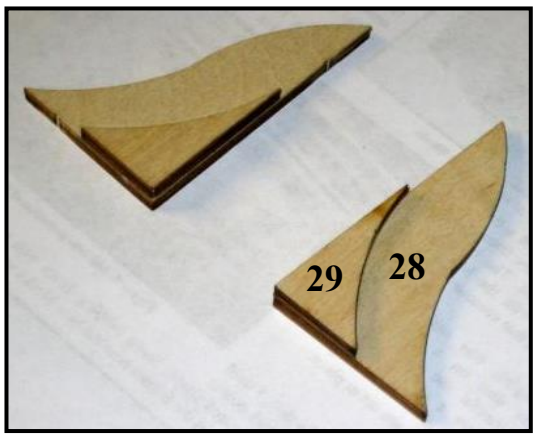


Figure 35: 28 & 29

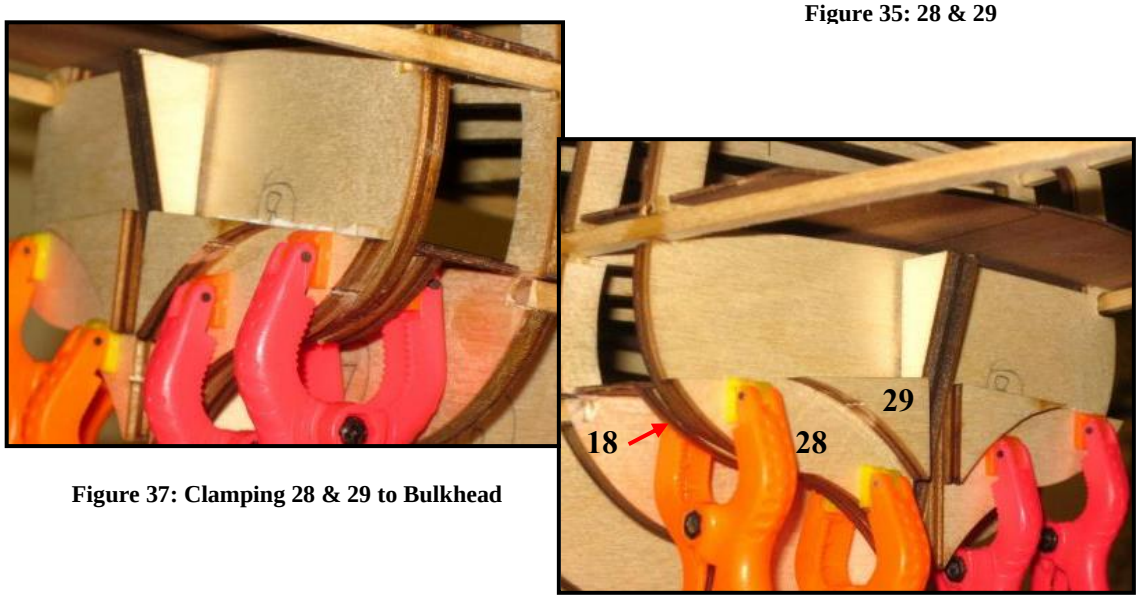


Figure 37: Clamping 28 & 29 to Bulkhead

This step added bulk to the stern frame and allowed for a large amount of contouring. Surprisingly, the rather large and odd-looking blocks on the stern transformed into two ***small but well-contoured blocks***. Frames 6 & 7 then had to be sharply bevelled to fit in with these blocks.

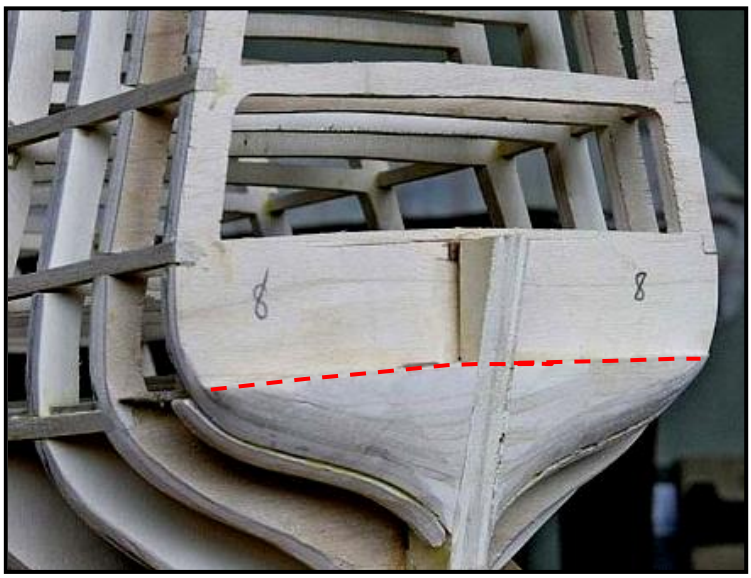


Figure 38: Top Edge of Blocks 28 & 29

At first glance, the top edge of blocks 28 & 29 in Fig. 38 appears to be straight but it has a rough curve to accommodate a transom support carving to be added later.

The incomplete stern carving shown in Fig. 39 has a slight curvature athwartships and is designed to sit over blocks 28 & 29. The detailed commentary for this carving will follow in another file.

Figure 39: Transom Support Carving

Extra Bulkhead Support

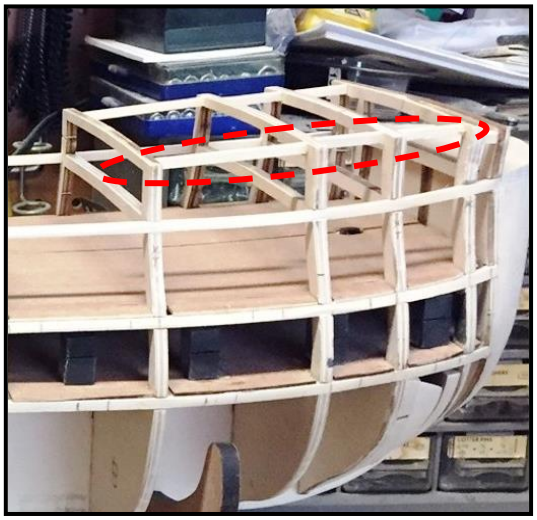


Figure 40: Strengthening the Upper Bulkheads

Seen in Fig. 40 are the lateral markings on both gun deck stringers for the half-gun supports. However, in this build there are *some supports not required as three gunports per side are closed. Refer to File.03, Figs. 3 & 4 for more detail.*

Half-Guns

From Plan Sheet 8, all four gun levels are shown with ***gun carriages***, but in this kit build, the approach is simplified. The carriages ***on the lower two gun decks are substituted with supporting blocks or strips***. Such pieces are painted black and whether there is a carriage or not is not easily noticeable.

*It is worthwhile considering that there are at least **two different ways of** creating half-gun supports.*

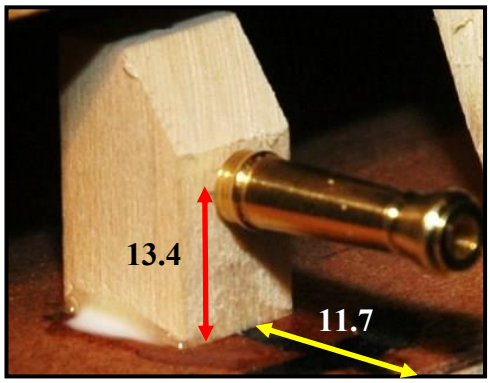


Figure 41: Trial Placement on Gun Deck 22

1. Supplied Material

After the gunports have been cut out, blocks (Fig. 41) are placed onto the plywood surface of the two gun decks in pre-determined positions, both along the ship and athwartships (refer to Fig. 43).

All blocks would be ***22 mm. in height*** (except for the two main deck blocks mounted in front of the bulkhead being only ***16 mm***.).

2. Sourced Material

Strips of perhaps plywood are mounted vertically between the frames at a pre-determined distance from the deck edge; this allows for some latitude in setting the gunport positions.

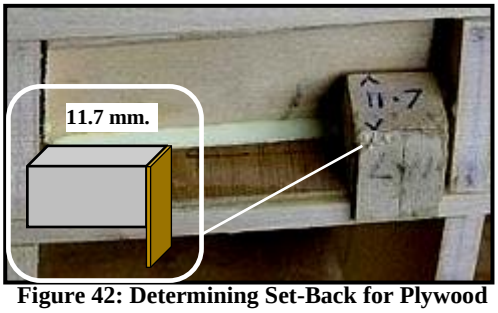


Figure 42: Determining Set-Back for Plywood

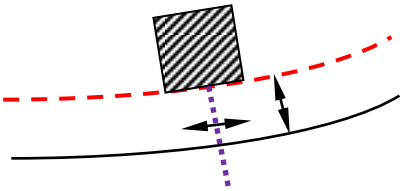


Figure 43: Block Positioning

It is useful to mark the position of the leading edge for either the strips or blocks on both gun decks before starting the first planking. This applies to both lateral (broken purple) and depth (broken red) measurements (Fig. 43).

From Plan Sheet 8, the cannon projection was marked inwards from the hull edge for each set of guns and then adding a guessed hull finished thickness of 1.9 mm.

Setback Measurements

lower gun deck (22): ***11.7 mm***
upper gun deck (23): ***14 .0 mm***
main deck (under quarter deck): ***10.0 mm***
main deck (under forecastle deck):***10.0 mm***

Scratch-Build Approach

Presented purely out of interest, one builder decided to still insert the half-guns into the supporting plywood strips as described above but also added a pseudo-carriage between the support and the hull. So, from the outside it appeared that there was a carriage present.

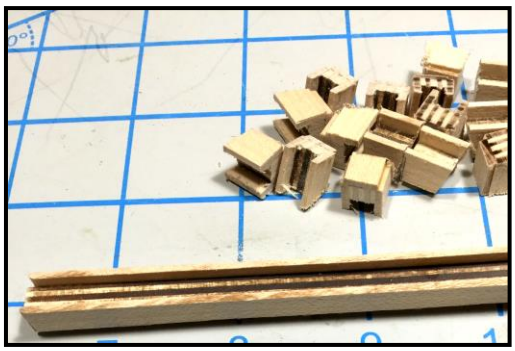


Figure 44: Pseudo-Carriages for Decks 22 & 23

Obviously the first planking has not been attempted at this stage, but two different images to consider are shown below …

Figure 45: Blocks in Position on Lower Gun Deck (Deck 22)

Positioning the supporting gun blocks laterally along the deck can pose a problem but often that is due to incorrect interpretations from the drawings. However, the use of supporting strips rather than blocks totally overcomes this problem.

Figure 46: Strips Instead of Blocks

Figure 47: Blackening the Support Strips

Gun Barrel Heights

(centre above deck surface)

lower gun deck: ***13.4 mm***

upper gun deck: ***11.7 mm***

main deck (underneath quarter deck): ***9.5 mm***

main deck (underneath forecastle deck): ***9.5 mm***

quarter deck (behind bulkhead & in front): ***10.5 mm***

CHAPTER 2: OFF-SHIP WORK

Main Deck Planking

Many will choose to add the main deck first and then plank it
or… some will plank the deck away from the ship.

In this build the latter approach was followed.

Figure 48: Simple Continuous Planking of the Main Deck

Continuous Planking

The basic planking of the deck is to run the full length strips (Fig. 48) provided from bow to stern. This ignores the concept of length discussed in 'planking principles' below but is certainly the easiest method of application and one that many builders will use.

Length

The decking in the 18th century was usually constructed with a very light coloured timber but there is a limit to what a budget-priced kit can supply. During this time, the **width** of decking timber was between ***8-14 inches/ 203 - 355 mm.*** [***2.8 - 4.9 mm***. at this scale of 1:72 and Euromodel supplies ***4 mm*** strips].

From European forests, the length of timber obtained varied between ***20-24 feet / 6.1 - 7.3 m.*** The latter length at this scale would be ***101 mm.***

To simplify things, ***100 mm.*** was selected.

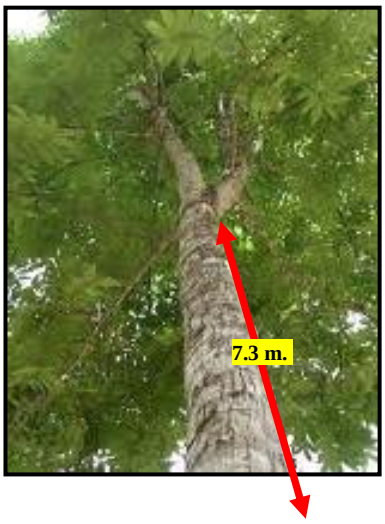
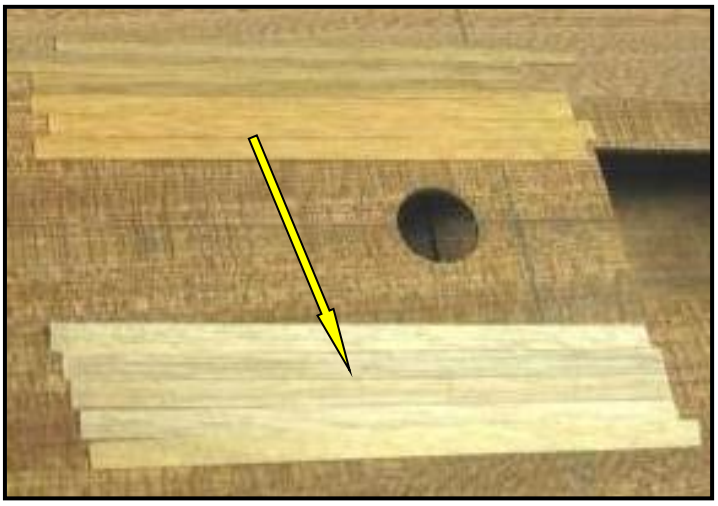


Figure 49: Determinant of Plank Length

Bleaching & Drying

The decks were well *scrubbed* and *weathered* which resulted in the timbers being much paler in colour than that supplied in the kit.



The effect shown in Fig. 50 was produced by soaking in household bleach for 15 minutes, rinsing in fresh water, placed between two flat press boards and allowed to dry in a warm place – usually in the sun.

The bleached planks are a little artificial and some 'dis-colouration' was utilized during the planking process.

Figure 50: Bleaching the Deck Planking

After a few hours, the boards are removed and the planks collected into a loose pile and, on foil, placed into a slightly warm oven.

Figure 51: Drying in a Warm Air Oven

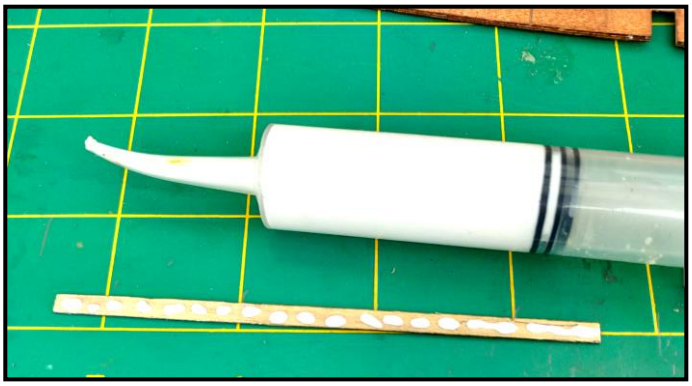


Figure 52: Application of Adhesive to Planks

Three Plank Shift

Most of the deck planking was carried out with ***100 mm.*** lengths. Shorter pieces were added (at each end) as necessary.

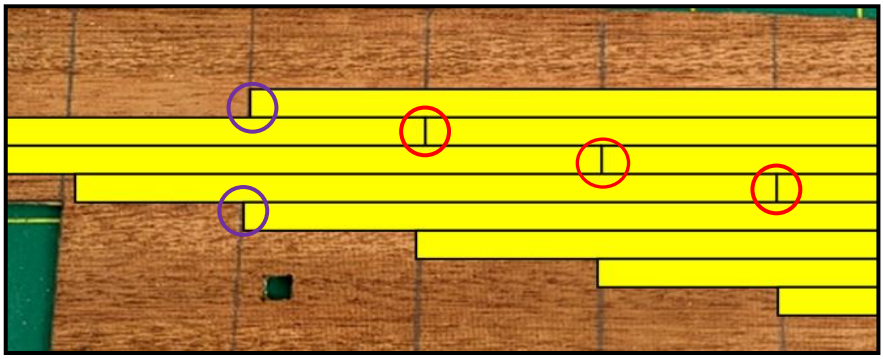


Figure 53: Three Plank Shift

Before even considering planking, it is important to mark out ***25 mm*** intervals along the supplied plywood deck. This will enable corresponding planks to exactly line up as the planking continues. Fig. 53 shows the shift of three planks (red circles) between two planks (purple circles).

Caulking

Caulking was achieved by the following combination …

length**: marking pen** *(one side only)*

ends: **graphite pencil** (one end only)

The gap between strakes/ planks in actual ships was '*caulked with oakum and paid with tar*'.

Sometimes used is a black marking pen with a broad, flat tip - quickly and lightly applied to only one side (along a length). By applying on only ***one of the adjacent edge***s (side) – Fig. 54 - this can reduce the effect of bleeding.

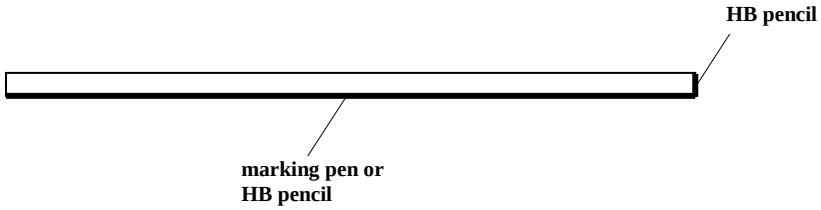


Figure 54: 'Caulking' a Plank

The end grain is especially liable to bleeding and many builders resort to applying soft 'lead' pencil or graphite on the end grain instead. Fig. 55, unfortunately, shows the unwanted end grain bleeding.

Figure 55: Satisfactory AND Unsatisfactory Caulk Simulation

Pressing

A scrap piece of wood (*originally for a different purpose*) was used to apply strong pressure onto the freshly fixed deck strakes in a forwards and backwards motion along its length. This was especially useful when dealing with some of the thin planks that were no longer be flat after being in bleach solution and then dried – many finished up having a slightly curved cross-section; pressing will serve to flatten them out onto the plywood surface. The heat generated by friction was useful in setting the PVA adhesive.

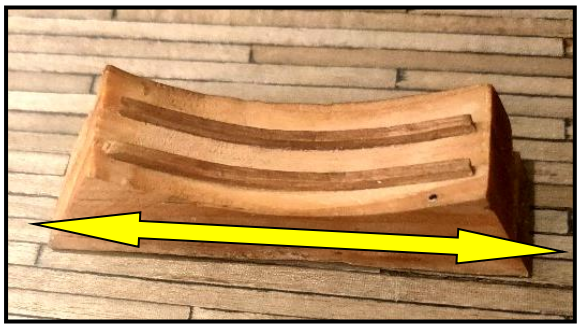


Figure 56: Plank Pressing Tool

The rubbing surface of the tool became dirty quickly and needed to be sanded clean quite often.

Having planked the entire deck, it is timely to make a significant decision.

Many builders ignore any historical reference to the method of securing the planks onto the underlying beams – treenailing, a method of inserting timber rods/ pegs through the deck and into the beams. Some builders go to extreme lengths to insert such timbers or most just create holes in the planks to simulate the treenails.

Treenailing

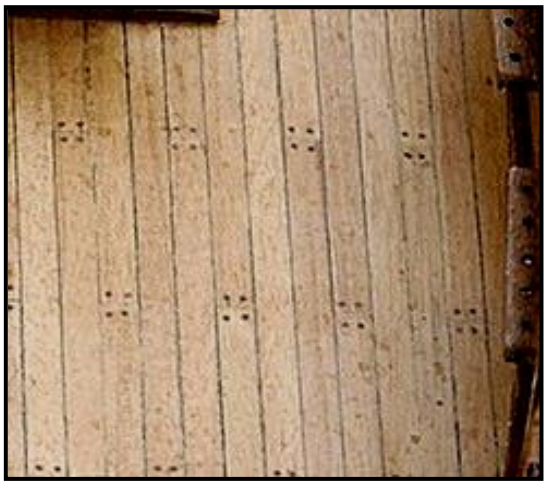


Figure 57: Partial Treenailing

Some add the treenailing holes where planks butt against each other along the length of the ship but fail to include the treenails that would exist along each length of planking.(Fig. 57).

The rows of treenails would follow the line of *every frame* they pass over and rows would need to be fitted between the frames of the model to fulfill this concept. Frame spacing varied according to both the time period and the type of ship.

This raises the question of how serious the builder is. Many will forgoe the arduous task of drilling so many holes !

Plan Sheet 8 (Fig. 58) dictates the closeness of the frames and hence the treenailing that *should* be undertaken.

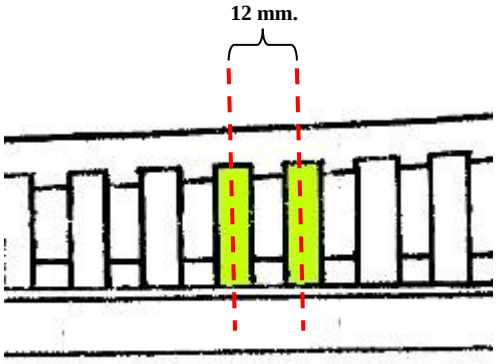


Figure 58: Closeness of Frames

The wooden treenails had a diameter of ***1.5 – 2 inches*** (i.e. ***0.5 mm – 0.7 mm.*** at this scale) so a drill bit of approx. ***0.6 mm*** was used.

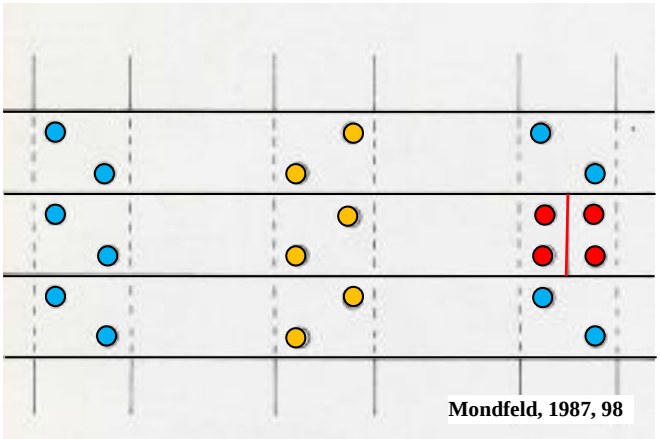


Figure 59: Treenailing 11 inch (4 mm at 1:72) Planks

Fig. 59 illustrates the treenailing pattern discussed by Mondfeld for 11 inch planks across three adjacent beams as well as across three adjacent planks.

For the Royal William, Fig. 60 portrays red and blue treenailing into underlying beams (broken lines) existing in this build as well as orange into non-existent beams. The beam separation is slightly wider than that in actual useage but is seen as a reasonable representation.

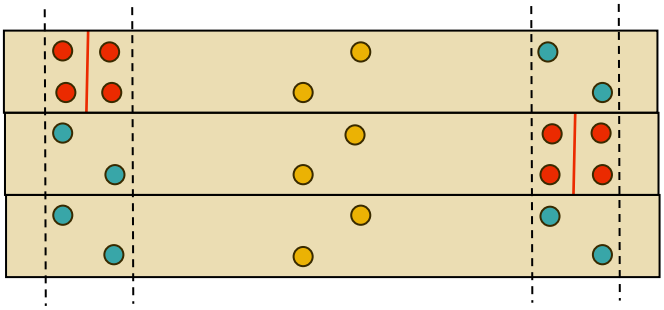


Figure 60: Treenailing Holes on Royal William

Fig. 61 shows the treenail holes drilled out on a deck (not Royal William) according to the pattern portrayed in Fig. 60.

After only a short way through drilling the holes with a pin drill, a small drill press supporting a Dremel tool was resorted to. This proved to be a long process – but the higher speed of the Dremel produced a cleaner hole.

When sanding the deck, the pencil lines proved difficult to remove without sanding through to the plywood base underneath. An ***alternative method was chosen for marking out the gun deck*** (check this out).

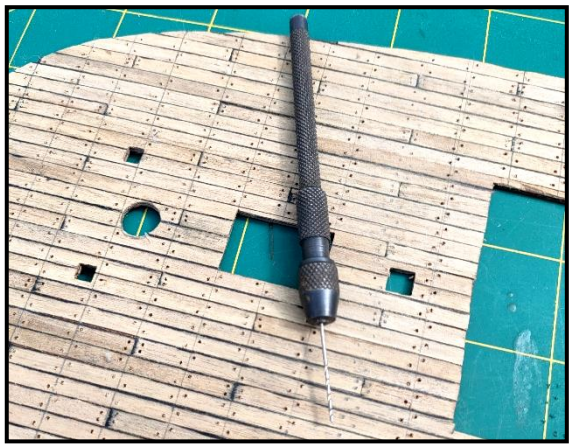


Figure 61: Drilling Treenails

After the Deck is Fixed in Position…

Figure 62: Staircase Obscured

Staircase

For a basic build, the staircase can be ignored since it is not readily visible (and is not provided for in the resource material). If choosing to include this feature, a 24 mm. square opening needs to be cut into the main deck, preferably before planking and certainly before installing the deck.

The metal casting used for the cabin bulkhead fascia needs to be painted correctly before fixing in position on the main deck and the stairs need to be assembled and eventually put in place before the quarter deck.

Commercially available stanchions pose a problem. The smallest ones produced the correct height of ***11 mm*** (when an upper & lower rail of 1 mm. was included) but the diameter was just over 3 mm. The drawing suggests a much narrower diameter (and hence railing width) but when used, the appearance was satisfactory. To accommodate the wider stanchions, the step width was increased to ***22 mm.*** and this assisted the appearance.

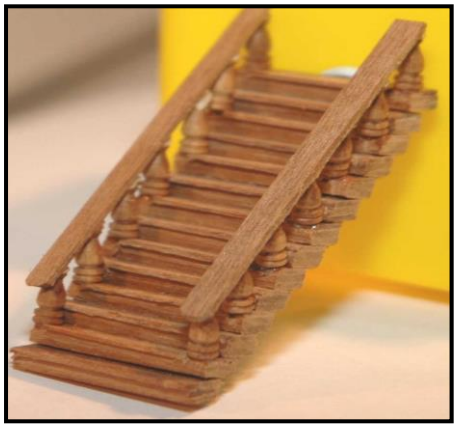


Figure 63: Completed Staircase

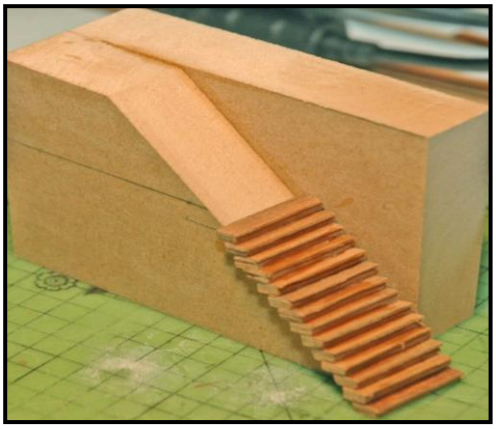


Figure 64: Beginning Staircase

The individual steps consisted of two pieces of ***1 x 5 x 22 mm.*** glued together with 1 piece ***1 x 6 x 22 mm.*** on top. Steps were sanded & adjusted for appearance. Fixing of the steps was accomplished using a 45° template as shown in Fig. 64.

Figure 65: Staircase Fitted, not Fixed