TRANSLATION LINKS

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

An *interpretive* build of the

Lyde

English Schooner

1787
Scale 1:80

Checked the Resource File ?

03.HULL CONSTRUCTION

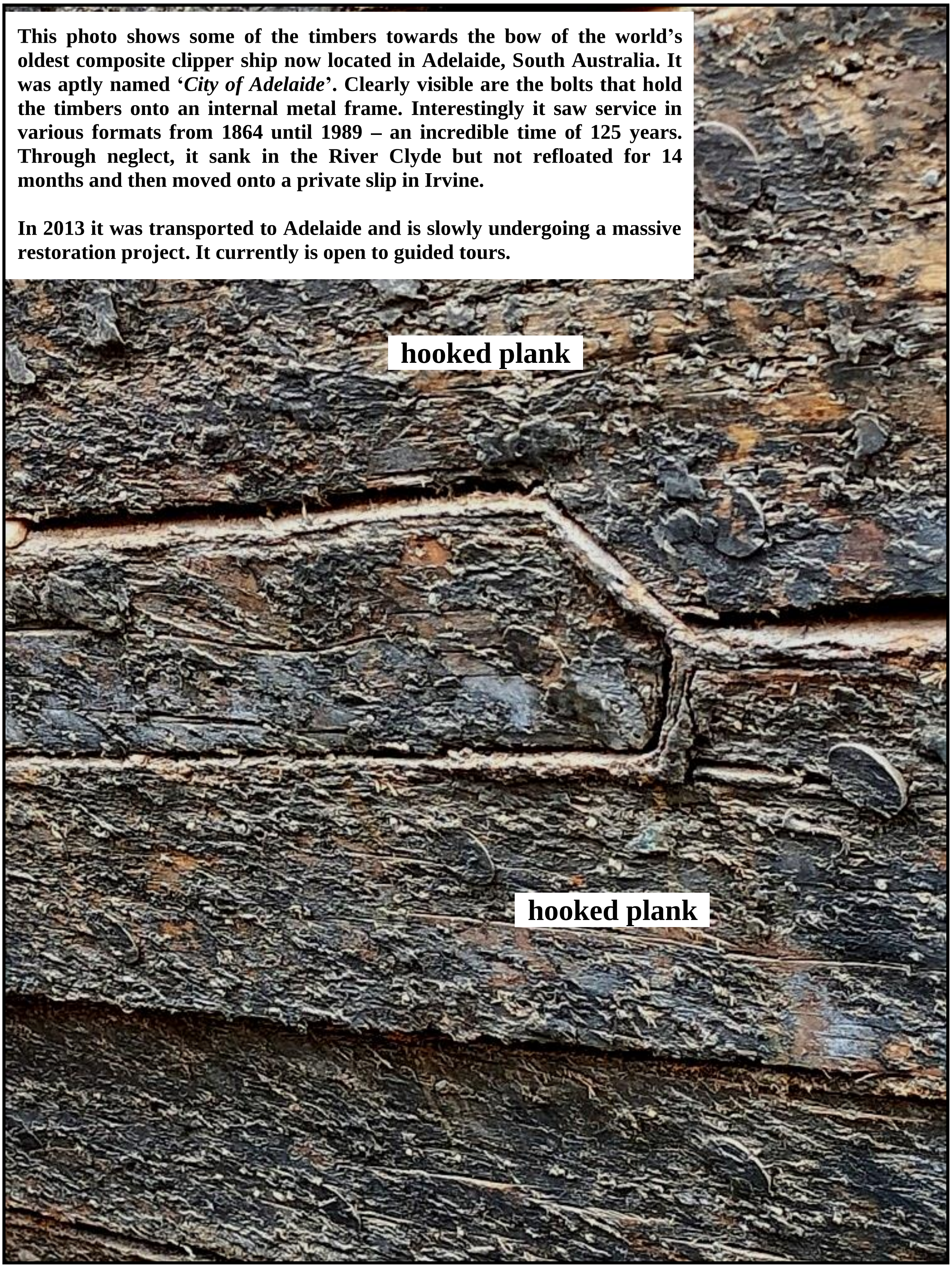
December 2022

My *interpretive* build is based on the supplied drawings, the kit material – and an amount of extra material.

This work only illustrates how this ship might be built.The level of complexity chosen is up to the individual

This resource information was based on the original text supplied by Euromodel and then expanded in detail as the actual ship was constructed by the author, Peter Coward. Neither the author or Euromodel have any commercial interest in this information and it is published on the Euromodel web site in good faith for other persons who may wish to build this ship. Euromodel does not accept any responsibility for the contents that follow.

There were many distinctive variations in planking a ship. One such example is shown below where a plank situated near the bow is hooked to its ‘half’ width to allow the plank behind/ below to finish at half its width. This is only presented out of interest rather than suggesting it be used in this build.



This photo shows some of the timbers towards the bow of the world’s oldest composite clipper ship now located in Adelaide, South Australia. It was aptly named ‘*City of Adelaide*’. Clearly visible are the bolts that hold the timbers onto an internal metal frame. Interestingly it saw service in various formats from 1864 until 1989 – an incredible time of 125 years. Through neglect, it sank in the River Clyde but not refloated for 14 months and then moved onto a private slip in Irvine.

In 2013 it was transported to Adelaide and is slowly undergoing a massive restoration project. It currently is open to guided tours.

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Contents

Illustrations

[The figures below are not hyperlinked]

boccaportella

Chapter 1: HATCHWAYS

Quarter Deck: 1 & 2

- The ***aft end of the main deck plywood base projected out into the visible space below hatchway 2 area*** and whilst not a problem (since it would be covered by a grate), it was decided to remove this excess material.

- Short-sightedness in ***not installing the lower decks*** was going to cause a small problem with the ladder installations so the ship interior was painted with matt black paint. Some thought was also given to sliding in some pieces of timber to act as a 'deck'.

- With the deck beams installed, ***the planking of the quarter (and focs'le) decks was completed*** using the same method as for the Main Deck discussed earlier.

- The grate is inserted into the coaming to a ***depth approximating the surrounding deck level*** (Fig. 2).

Coaming Construction

Hatchway No. 2 is the most complex of all. Not only do the ***sides slope*** (shaded yellow***)*** but the two ***cannon ball racks*** (shaded blue) ***are cut into the sloping surfaces***. Not many builders appear to follow through with this aspect and just build coamings with vertical sides and two cannon ball strips placed against them. This build went with the intent of the drawings.

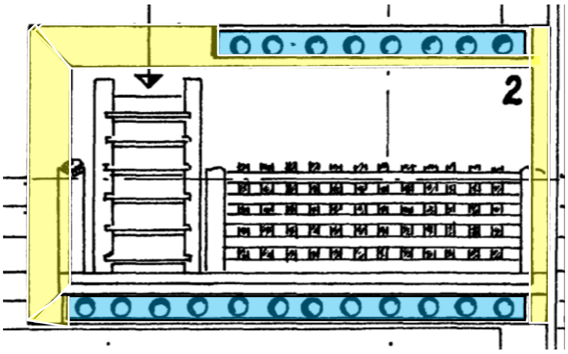

Figure 1: Sloping Sides and Cannon Ball Racks

Figure 2: Hatchway No. 2

The grate shown in Fig. 2 hides a division for the ladder.

boccaportella (cont.)

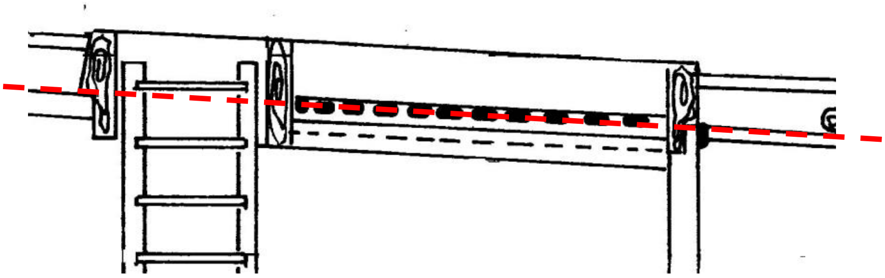

Figure 3: Grate Positioning

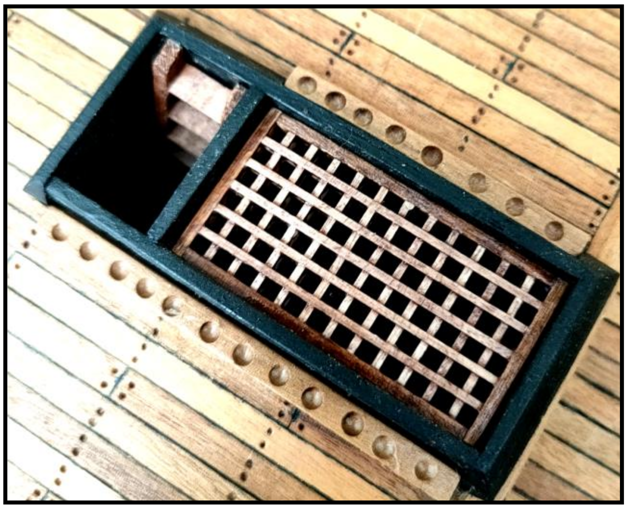

Figure 4: Cannon Ball Racks & Lowered Grate

Cannon Ball Racks

Drawings differ on the various plan sheets so some interpretation is required. The sloping sides were cut into as suggested in Fig. 3 but also extending outwards past the hatchway edge using some ***2 x 4 mm***. timber.

Fig. 4 shows ***sides cut vertical*** and cannon ball racks inserted.

Main Deck, 3 & 4

- in cross-section, the drawings show hatchway coamings are not of a simple configuration.
- coaming height differs between Plan Sheets 2 and 5. I went with Plan Sheet 2.

Alternative 1: The outer part that sits on the deck could be ignored and the hatchway surround just formed from one timber strip that fits *into* the space provided.

Alternative 2: An outer section can be added on as a plain *rectangular* or as a *triangular* cross-sectional form - either of which would sit *on* the surrounding deck surface. Fig. 5 shows the coaming as having a slight triangular section.

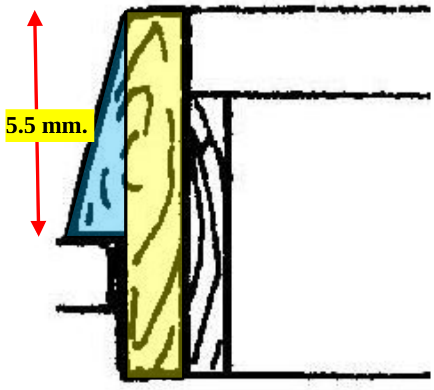

Figure 5: Athwartship Height at Mid-Line

Main Hatchway (No. 3)

Athwartships (across the ship) there is a significant camber that needs to be considered when constructing the coaming of the main hatchway. In Figs. 6 & 7, the two main strips collectively make up the height.

A ***12 mm.*** height inner strip (yellow) fits into the open space provided in the deck and an outer strip (blue) fits onto the deck surface.

Athwartships, this outer strip needed a distinct curve on the under edge to fit the deck camber. Its height (on the mid-line) shown in the drawings is approx. ***5.5 mm.*** in Plan Sheet 2 but ***8 mm.*** in Plan Sheet 5. In the end, settled on the lesser height. The final height at the outer corner was ***7.0 mm.*** (taking into account a change of 1.5 mm. from the mid-line).

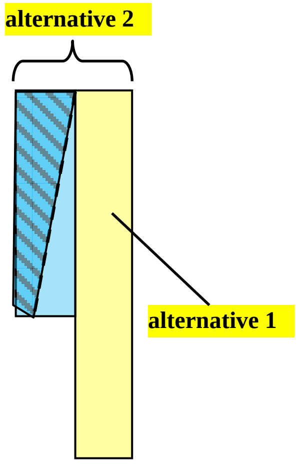

Figure 7: Initial Construction

The sides pieces were constructed from ***2 mm.*** thick mahogany (different timber but it was going to be painted black anyway). Both the inner and outer sections were glued together first and only then were the tapered sides formed.

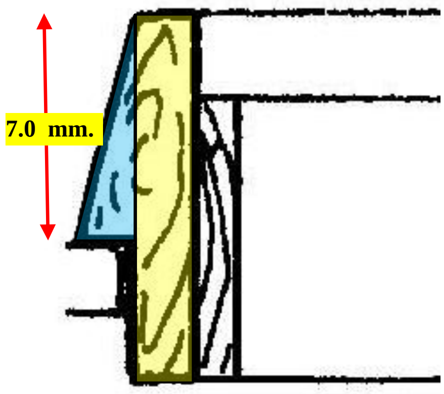

Figure 6: Athwartship Height at Outer Corner

boccaportella (cont.)

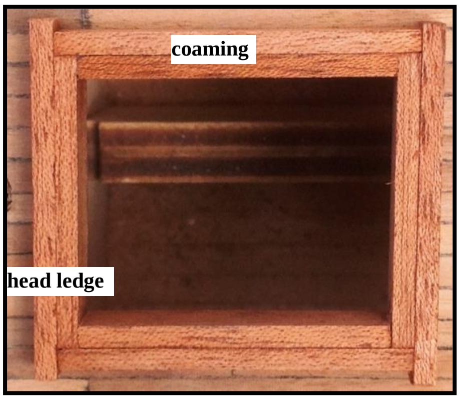

Figure 8: Starting Point for Hatchways

Coamings & Head Ledges

Plan Sheet 2 presents an illusion of a wide, flat surrounds for the hatchways. In reality, it is a plan view of tapered edges.

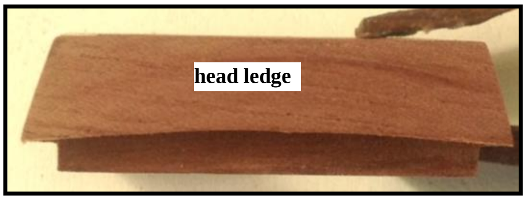

Figure 9: Side View

Figure 10: Completed Main Deck Hatchway Surrounds

Hatchway Covers

Main hatchway, being the entry point for loading goods, logically has a cover for protection. However, covers are not shown for the other hatchways.

Figure 11: Main Deck Hatchway Covers

Cover items to be blackened …

- 4 x eye pins
- 4 x rings

Chapter 2: WALES

Figure 12:Wale vs Strakes

Wale Overview

Historically, it was the usual practice in shipbuilding (Fig. 12) to ***fix the wales onto the frames first.*** (Mondel 1986, 92). The normal strakes were then built up either side of the wale.

Many builders add the wales *over the top of the second planking* – and this simplistic approach is evident in Fig. 13… but for the traditionalists, this produces too much thickness projecting out above the strake surface (see following notes).

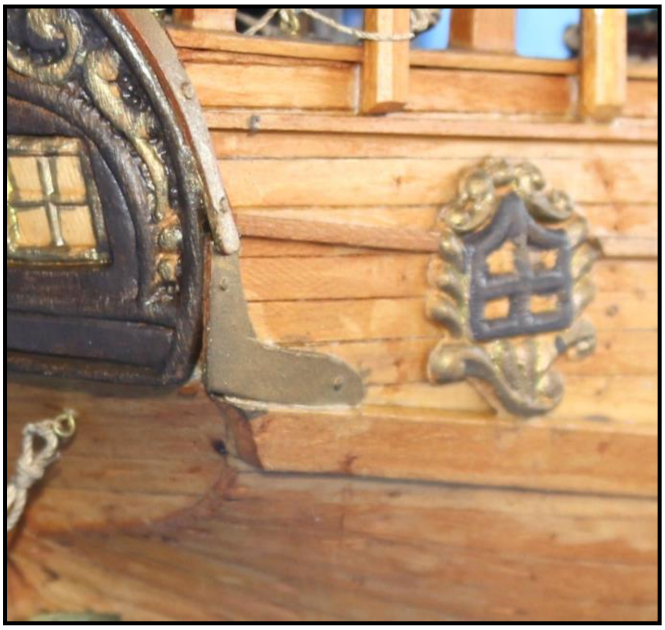

Figure 13: Wales Added Over the Strakes

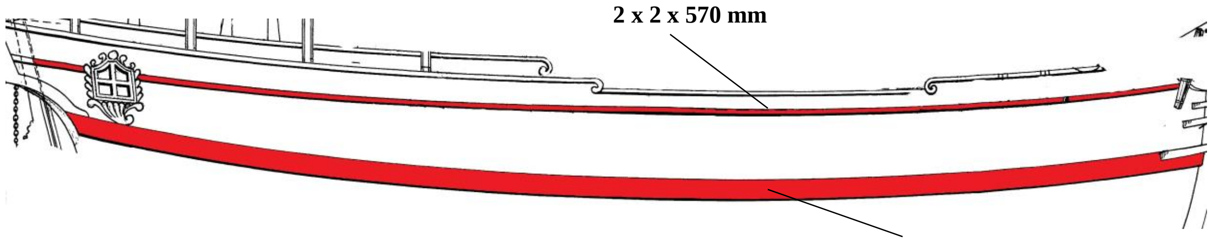

Figure 14: 'Middle' and Lower Wales

Fig. 14 shows the two obvious wales included in the drawings; some might interpret another aft wale above but the view was taken that this was simply decorative and therefore easily ignored. There is no direct reference to a third wale in the Euromodel Component List.

It is easier to fix the wales in place first and utilize whatever clamps, etc, are required. These fixing devices can be screwed into the first planking without any concerns.

Wales at this time generally projected above the straking surface by 2 – 3 inches (at this scale, this would be approx. 0.8 – 1.1 mm.). Adopting the historical method will conform to the correct dimension.

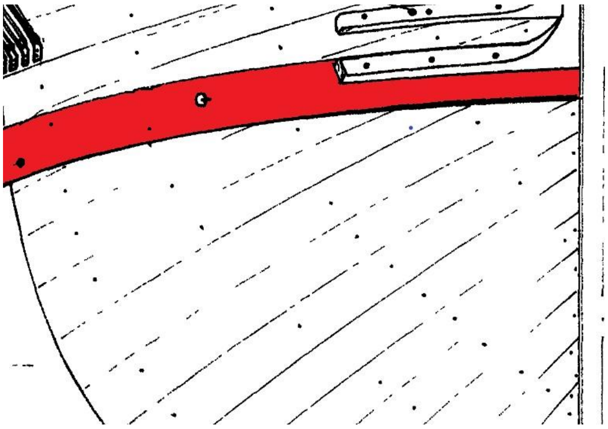

Figure 15: Wale and Planking at the Bow

Adding the 2 mm. thick wale *over* the planks produces too much projection.

Fig 4 (from Plan Sheet 4), given the style of planking, could suggest that the wale has been added over the normal strakes.

Even so, ***this approach was ignored*** in the face of normal ship-building practice.

Ship designs generally show a large number of bolt or metal spike heads visible on the wale and these were simulated by using brass nails – an ***optional step*** , as the nails are not supplied in the kit. After final curving of the wale and the timber had dried, holes were drilled so that the brass nails could easily be inserted along the wale length. The top and bottom outer edges of the wales were rounded.

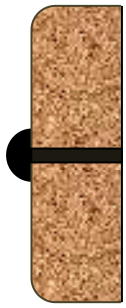

Figure 16: Wale Cross-Section

In summary, the approach was to fix the lower wale, add four strakes above this (as discussed a little further on), and then add the 'middle' wale. Using the main deck as a reference, this wale could also be referred to as the sheer rail.

Lower Wale Positioning

Experience has shown time and again that the wale positioning in a kit is quite variable and in spite of the best intentions, it may well not exactly occupy the intended position.

To achieve the best possible outcome, two different sets of measures were made, either of which could be used alone but in this instance, the two were used in combination.

Measure 1: Upper Edge of Wale upwards to Uncapped Bulwark (mm.)

Frame Number	Measure 1
1	34.8
2	36.8
3	33.5
4	34.3
5	37.5
6	44.8
7	42.9
8	40.4
9	38.4

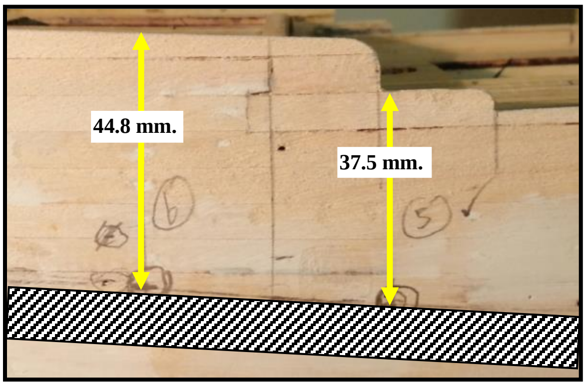

Figure 17: Lower Wale Position Measurement 1

All data for Measure 1 and Measure 2 were taken by laying paper strips flat onto the hull surface.

By way of comparison, a second measure was performed …

Measure 2: Lower Edge of Wale downwards to False Keel (mm.)

Frame No.	Measure 2
1	64
2	102
3	108
4	110
5	110
6	107
7	101
8	103

Fig. 18 also affords a check on the lower wale positioning

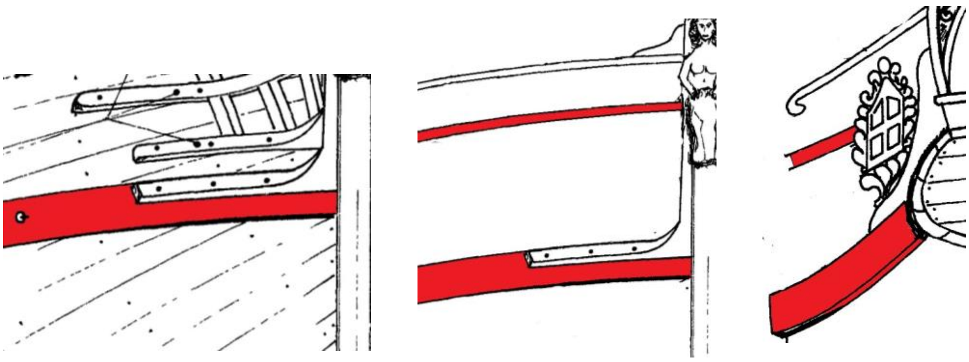

Figure 18: Bow and Stern Lower Wale

Figure 19: Soaking in Ammonia

Wale Soaking

Since there was a significant bend around the bow, the wale strips were soaked in dilute ammonia solution ('household ammonia' or 'cloudy ammonia') for at least 5 days – maybe excessive but by this time, the timber was ***very*** pliable. The diagram opposite shows a short section of PVC pipe sealed at the bottom end. The timber strips were inserted into the ammonia-filled tube and the open end closed over with a tight-fitting plastic drink bottle – I could have used another plastic cap as for the base.

Lower Wale Bending

Small blocks of timber were temporarily glued onto the hull (Fig. 20) to form a guide against which the 'ammoniated' lower wale could be placed and allowed to dry. [It was sufficient to strongly wipe the wet timber with a dry cloth before placing onto the hull].

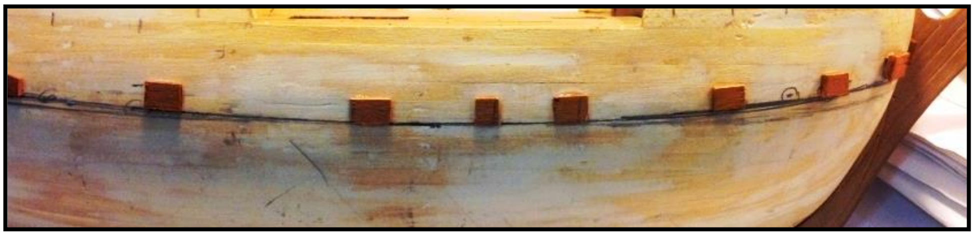

Figure 20: Positioning the Blocks for Lower Wale Curvature

Fixed against the blocks, the wale was left to thoroughly dry in a warm environment for approximately five days.

Figure 21: 'Ammoniated' Lower Wale in Drying Position

- supporting blocks on the hull surface were easily removed by twisting with a pair of pliers and then sanding the hull surface,
- outer top and bottom edges of the wales were rounded off,
- wale then glued back in position – requiring a large number of small clamps to ensure the wale was tightly sitting against the hull surface.

Unfortunately, Fig. 22 shows that in this build the lower wales were *not* in a horizontal line as viewed from the front and that required some adaptation.

Figure 22: Poor Alignment of Lower Wale

Chapter 3: SECOND PLANKING ABOVE MAIN WALE

Historical Overview

The following comments will largely be of interest only to the typical kit builder and are not suggestive of what should be done.

Strake Lengths

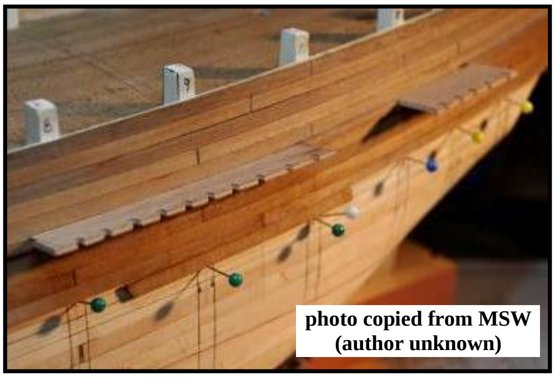

Figure 23: More Accurate Plank Lengths … not the Lyde

- historically, strakes were formed from ***shorter lengths*** (Fig. 23) - an approach that could be considered with around 90mm. being an appropriate sizing. However, most builders resort to ***full lengths*** being added along the hull from bow to stern. Some will take into account the tapering of each plank both aft and forwards. For this build, ***tapering*** of full lengths was utilized.

- others will just add the planks (i.e. the strakes) and ***hope for the best*** and that is not an unusual approach.

Treenailing

This was a method of securing planks to the underlying beams by the use of specialized timber plugs but most builders ignore this aspect altogether, especially if building a kit rather than a scratch build.

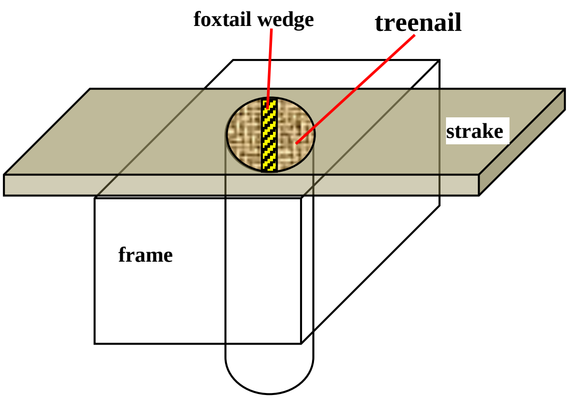

Figure 24: Diagrammatic View of Treenail

Some add the treenailing 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. 24).

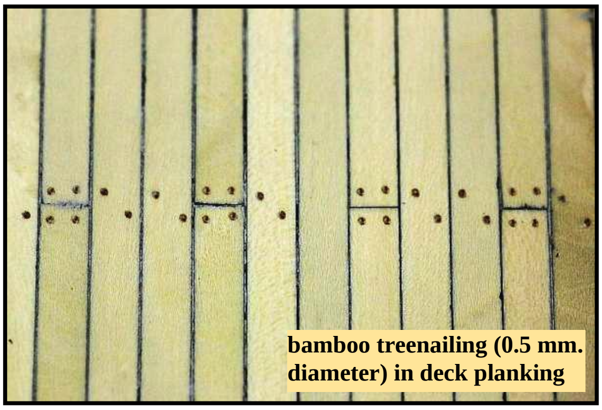

Figure 25: Partial Treenailing

The rows of treenails historically 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 forgo the arduous task of drilling so many holes, let alone the production of a large number of treenails and their insertion !

Fig. 26 (typical of many ships but not the Lyde) shows the closeness of the frames and hence the treenailing that *could* be undertaken.

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.

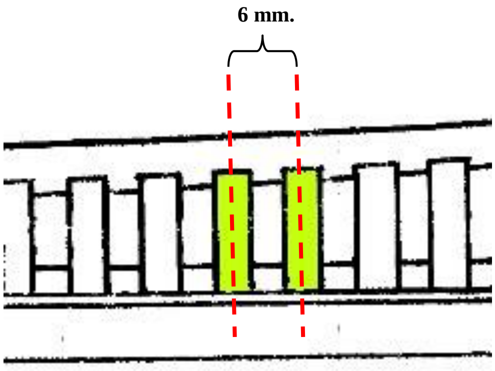

Figure 26: Closeness of Frames

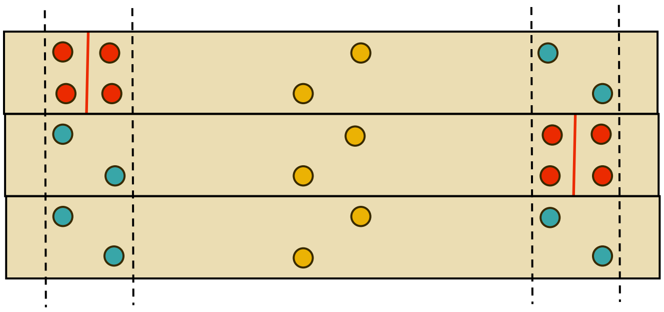

Figure 27: Treenailing Holes on Aiax

For the Lyde, Fig. 27 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.

In ship modelling, it is common to manufacture these treenails from bamboo barbeque sticks by splitting them along their length and then passing them through a draw plate to create a specific diameter.

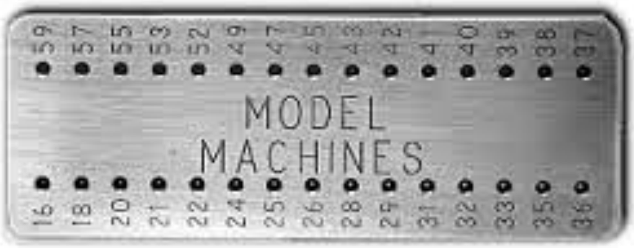

Figure 28: Byrne's Draw Plate

Figure 29: Treenailing Examples

Fig. 29 show the extreme version of scratch building where a mass of treenails are inserted (and cut down and sanded off).

In a typical kit build, the ardent builders may drill holes to represent the treenails in a simplistic form but even that would be a long and drawn-out process.

In summary, this is one area that would be largely ignored.

The combined height of **four strakes** was used to fill the space between the wale shaded red and the sheer rail shaded yellow (Fig. 19). In this build, the central section was ***24.8 mm*** wide but that *will depend on each individual build*. This measure was a constant factor between frames 3 and 5 but aft of frame 5 and forward of frame 3, the height diminished as shown requiring some subtle tapering.

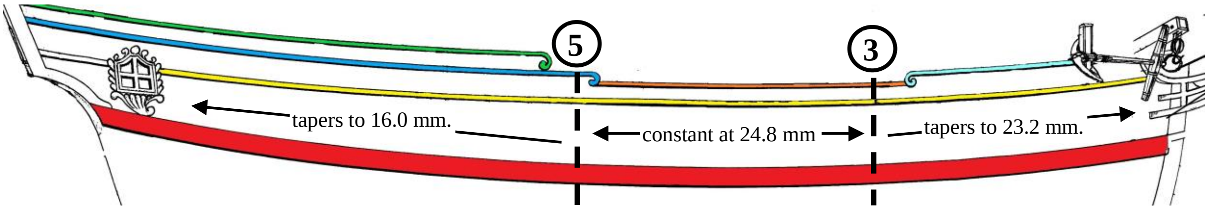

Figure 30: Strake Tapering Between Wale and Sheer Rail

aft tapering – the usual rule in reducing the strake width is to taper the ***top edge only***. With the goal of reducing the aft section to 16.0 mm, each of the four strakes will taper to ***4.0 mm.*** width. It is generally accepted that a slight chamfer on the top edge would allow a tighter fit between the strakes.

forward tapering - reducing the forward section to 23.2 mm, each of the four strakes tapered to ***5.8 mm.*** width.

Figure 31: Plank Tapering

With the taper marked out, each plank was clamped in a portable Dremel workbench (Fig. 31). It was then a simple matter to form the taper using a hand-held plane.

My being a little cavalier in approach, the first strake above the wale was not tapered as it just sat in position with very little bending needed. Subsequent strakes were tapered but of course this all depends on exactly where the main wale was fixed in position on the hull. The sheer rail referred to earlier is shown as a yellow broken line.

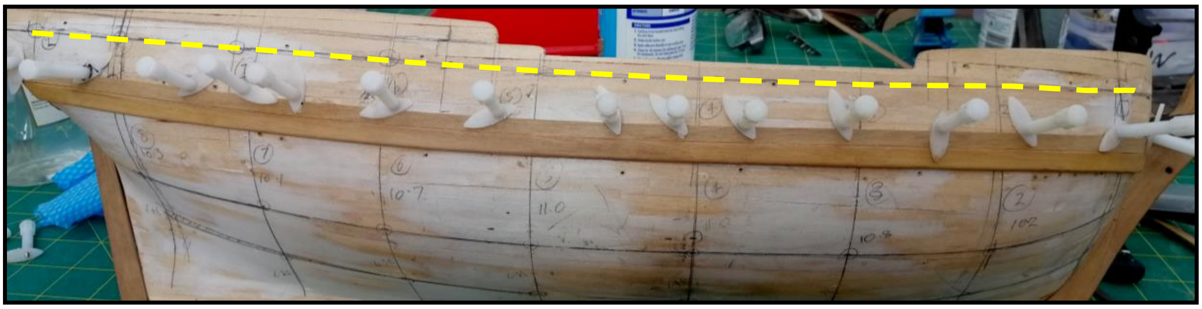

Figure 32: Fixing Strake in Position

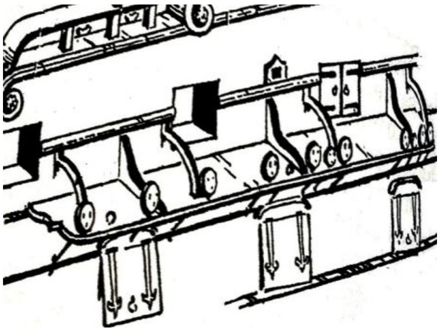

Figure 33: Typical Channel

Chapter 4: CHANNELS

Provided: ***1.5 x 25 x 350 mm*** .

Fig. 33 is an overview of a typical channel (but not on the Lyde). The *channel construction is very much open to interpretation* and there are a number of options to add to the drawings shown …

Figure 34: Timber Strips Forming the Channel

- ***simulated timber widths*** …
  historically, three to four strips would have been used to form the overall width.
- ***spurs and knees*** …
  metallic spurs and timber knees were commonly added to the channel upper surface to provide additional strengthening. They alternated along the channel but their individual positioning depended on other features (such as gunport openings) – **refer to LYDE.04.**

Dimensions

Plan Sheet 4 shows …

- no tapering of the channel thickness (Fig. 35) but tapering *was* the usual practice
- a ***3 mm.*** thickness BUT the kit only provides ***1.5 mm.*** …

Goodwin (1979, 184) suggests some ***typical dimensions (using 1:80)*** for a ship of this size …

- thickness adjacent to hull was approx. ***1.27 mm***. (equivalent to 4 inches in real terms)
- thickness of outer edge was approx. ***0.64 mm***
-

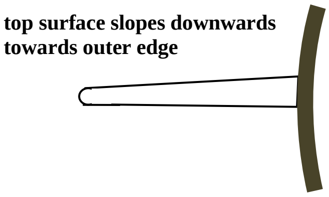

Figure 35: CS Historical Channel

The ***1.5 mm.*** thickness provided at the inner edge would be equivalent to ***4.7 inches*** (still in the historical range); the outer edge would then become ***0.76 mm.*** ***The supplied 1.5 mm. thickness conforms to historical records*** *(drawing suggestion of 3 mm is an exaggeration).*

However, a ***decision was made to work with scrap material of 2.0 mm.*** *thickness material which allowed for larger diameter reinforcing pins along the inside edge (refer to Fig. 39)*… these should only be fixed in position after dry fitting of the channels against the hull.

The channel thickness needs to correspond to the sheer rail thickness. The upper wale provided is ***2 x 2 mm*** and may need to be reduced slightly, depending on what the final channel thickness is.

The inner curve profile for both channels was taken from Plan Sheet 2 but also checked against the first-planked hull.

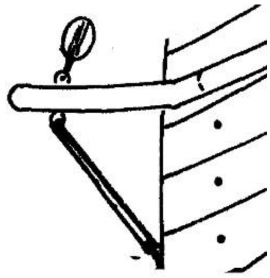

Figure 36: CS Euromodel Channel

Features

1. ***fixing pins*** **-** three ***0.7 mm*** holes drilled into the inboard edge of each channel and pins fixed into them – nails heads cut off and inserted cut-end first. The pointed ends were exposed allowing easy penetration into the first planking.

Figure 37: Starboard Main Channel with Pins

Figure 38: Chain Plate Openings & Ring Bolt

2. ***chain plate openings*** **-** four ***2.0 mm.*** holes were drilled through each channel near the outer edge to accommodate the chain plates.

3. ***ring bolt*** **-** one ***1.0 mm*** hole was drilled through each channel. A small square plate on the underside was made from thin brass shim material; a slightly extended pin is passed through that plate and soldered or glued allowing the ring bolt free to swivel !

Drawing Terminology

(Italian to English)

parasartie Ds e Sn – channel right & left

golfare per calorna – eye bolt for topmast tackle (of backstay)

ostino – kicking strap

(not related to channel itself …of running rigging from the underside of the boom to the deck taking some of the twist out of a sail)

4. ***chain plates*** **-** British ships built during the 18C were commonly equipped with plates rather than chains (Anderson, 1955, 36). The chain plates served to support the shroud lines and secure them to the hull through the use of deadeyes contained in the top end of the plates. They also strengthened the four channels.

   Historically, the plates consisted of three different parts as shown in Fig. 39. Many builders easily construct the *upper link* + *middle link* with very few tools. The preventer link is often over-looked.

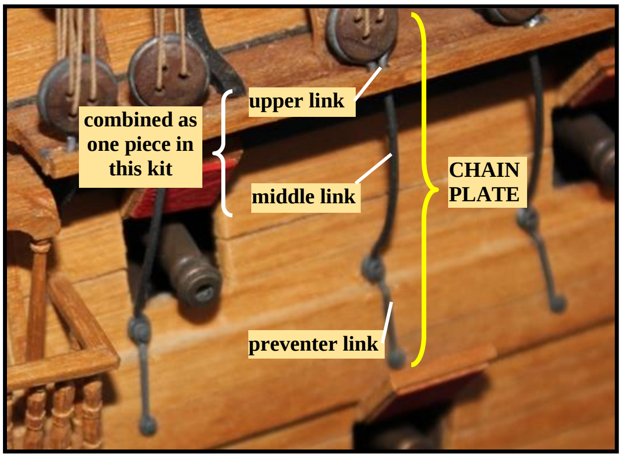

Figure 39: Chains [‘chain plate’]

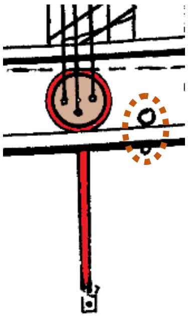

Figure 40: Utilising Single Chain Plate

In this build, chain plates are supplied as one piece (red, Fig. 40) representing the upper and middle links. Also visible in the drawing is a ring bolt (brown dotted oval) projecting through and slightly below the channel.

Positioning

Fore end of both channels (red line) are slightly ahead of the fore edge of the masts and the center of the foremost deadeyes (broken blue line) are approx. abreast of the mast centers.

Upper Wale/ Sheer Rail

Whilst many builders add the channels over the upper wale/ rail, it forms a better fit if they are fitted in between sections.

The supplied ***2 x 2 mm.*** was added in three sections –

- aft of main channel,
- between two channels, and
- forward of fore channel (due to its curvature, this latter section was soaked in aqueous ammonia solution for a week before being temporarily fixed and shaped in position).

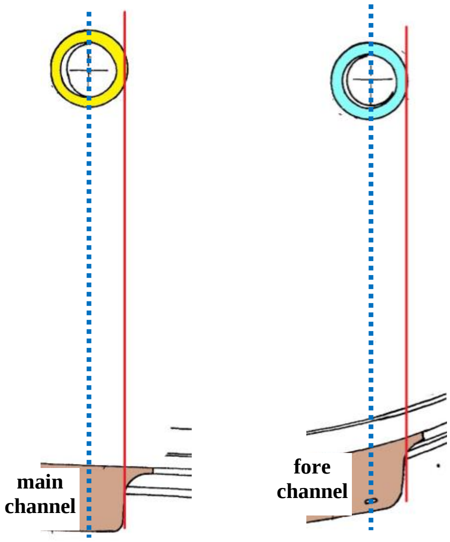

Figure 41: Mast Opening/ Channel Fore Edge

Cutting-in

The division of the rail into three separated sections allows for the second planking to be built *around* the channel – 'cutting-in'. That is implied in the drawings.

Using this approach, each channel should be ***1 mm. wider*** than that shown in Plan Sheet 2 to allow for the second planking thickness. Fig. 42 shows the ***2 x 2 mm.*** wale/ sheer rail leaving a space for the main mast channel to fit in.

Figure 42: Upper Wale/ Sheer Rail Aft of Main Channel

Chapter 5: SECOND PLANKING BELOW MAIN WALE

Planking

The usual approach is to divide the hull surface into horizontal band widths with each covered by planks ***tapering towards each end***. The number of bands is determined as shown in the table below.

By applying narrow paper strips over the hull surface at each frame position, the width of the hull between the wale and the keel was measured as shown in the table below. The widest section for this build was over Frame 8 (yellow) and was used as the main reference point.

Band Width Theory

- the overall width below the wale was divided into three bands (***110 mm*** approx. accommodated ***18*** strakes, so ***3*** bands each containing ***6*** strakes was a logical choice where each band would be ***36.7 mm*** wide.

- two other reference points were used – one over Frame 2 and the other over Frame 7

Frame	1 (bow)	2	3	4	5	6	7	8 (stern)
Wale to Keel (mm.)	64	102	108	110	110	107	101	103
Band Width (mm.)	21.3	34	36	**36.7**	**36.7**	35.7	33.7	34.3
Strakes (mm.)	4.7	5.2	5.6	6.1	6.1	5.35	5.35	5.35

First Band - Band Width Reality

The three band concept was focused on Frames 4 & 5 using a natural flow of the strakes. The following table illustrates the dimensions actually used …

Frame	2 (bow)	4 & 5	7
Band Width (mm.)	**34**	**36.2**	**33.7**

The band position over Frames 4 & 5 was created as shown in Fig. 43 (taping six short pieces of planking wood together and drawing a pencil line immediately beneath the template bottom edge).

The two other location points for the first band were marked out on the hull over Frames 2 and 7.

Figure 43:Marking Band Width

- The final test … a strake was placed over the hull with its ***bottom edge*** at Frames 4 & 5 marks. Using the bottom edge then places that whole strake *within* the band. With a natural flow of the strake, the forward and aft band width markings at Frames 2 & 7 corresponded with the Frames 4 & 5 markings (yellow, broken line).

Figure 44: Checking Lower Edge of Band 1

The table data and the subsequent marked band lines were good starting points. In the end, it became a matter of 'good judgement' as to how wide the tapered widths would be at each end. Rather than basing widths on mathematics, it became a matter of what was the best width needed for a natural flow of each length. This did cause variation between the tapered widths but that was of no concern.

Note that whilst 'filling in' this first band, the strakes will not extend the full length to the bow but butt up against the wale bottom edge.

Tapering

It will now become clear where the plank runs are, where tapering and stealers are required. Measuring between the lines at any point along the band and dividing by six will give the width of the strake at that point. In this build, an expedient short cut was taken where the individual tapers were judged by the run of each strake leading to a variation in tapering width when it should have been consistent.

Holding/ supporting each plank in some form of clamp such as a Dremel portable work bench allowed the tapering process to be carried out. A small hand-held plane was used to create a rough taper and then finished off with a sanding board.

Tapering should only be carried out on the
upper edge
of each strake.

Figure 45: Mini-Plane + Sanding Board to Taper a Strake

Bevelling

Where the strakes curve over/ around/ along curved parts of the hull, they may well not fit against each other through the whole thickness. This then can create a gap towards the outer surface (Fig. 46). Whilst many builders ignore this aspect altogether, the extra effort of beveling even at least one of the two opposing faces does create a better fit.

Many will argue that the small gap adds to the illusion of caulking.

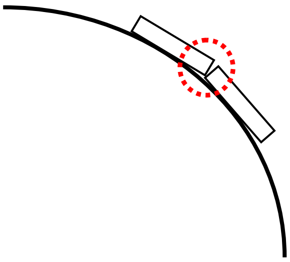

Figure 46: Strake Gap

Placing each strip along the edge of the work area, it is not too difficult to use a file to form some semblance of a bevel without altering the outer edge.

Figure 47: Forming a Bevel

Tools

Figure 48: Forming Each End of Strake

Three useful tools used in this process before fixing a strake in position ….

… in Fig. 48 …

- **Amati Plank Bending Tool**
  essential tool to generate a curve along the full length but especially at each end of the strake

- **Duratech Angle Side Cutter**
  allows for a very clean cut across each end

Figure 49: Spreading Out the Screw Pressure

… in Fig. 49 …

- **Planking Screws**

If a small section of scrap planking is placed under the outer side of the planking screw, then the second planking under pressure will tend to lie more flat against the first planking.

Where there were significant bends towards the stern, cyanoacrylate was used….. but being careful to well ventilate the air space with a fan.

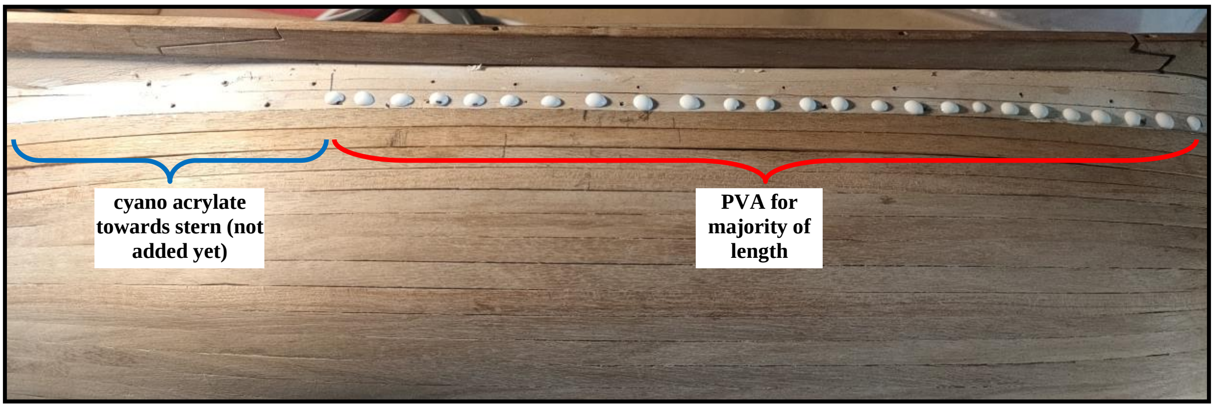

Figure 50: Adding Adhesives

First Strake & Stealers

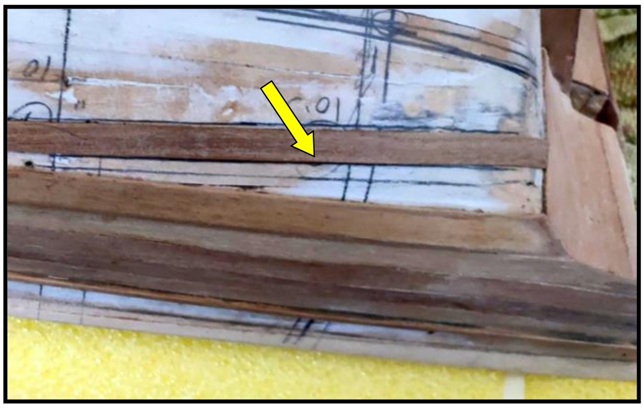

Figure 51: First Strake Flow - Allowance for Stealers

At the aft end of the ship, the wale shows a significant rise upwards creating a classic opportunity to insert two stealers between that wale and the first strake (yellow arrow) underneath it. This is illustrated in Figs. 51 & 52.

The two stealers are depicted by the red and blue broken lines. The strake (and stealers) over the last ***10 mm*** or so had a distinct curve just before meeting the counter planking (broken red line). Here a few drops of an instant/ polyurethane glue was called for but the rest of the lengths were fixed with PVA.

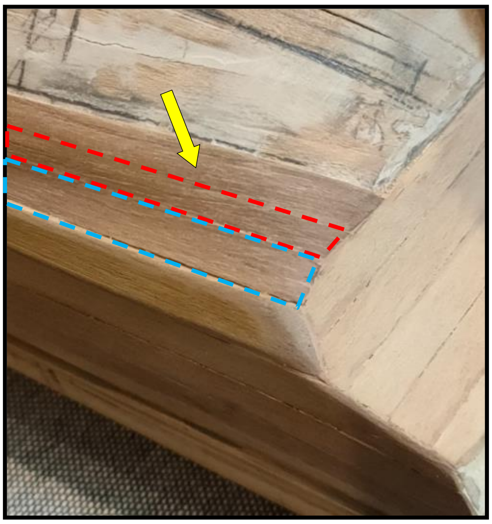

Figure 52: Partial View of Two Stealers

Figure 53: 'Instant' Glue

The gel form of an instant glue is far better to use than the usual thin liquid variety as an applied spot does not spread outwards after application. This adhesive is used sparingly and an **electric fan on the bench was operated to drive any fumes away and *prevent inhalation*.**

Towards the bow, the first two strakes (only first is shown) did not reach the stem post but merged with the wale slightly aft of that post.

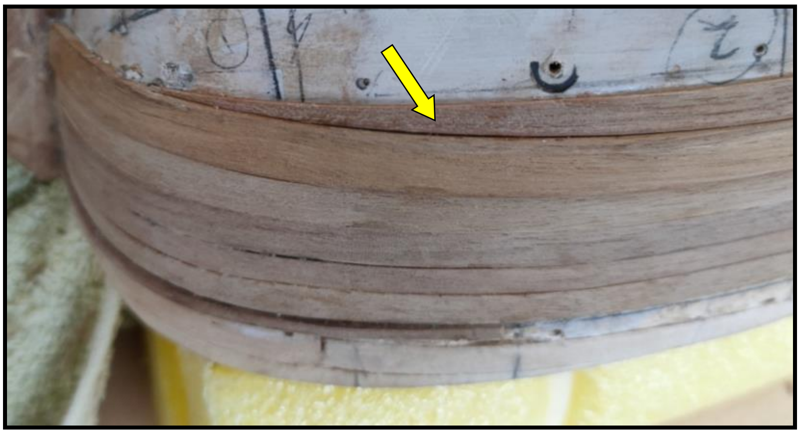

Figure 54: First Strake (of Band 1) Merging with Wale

Second planking is continued in File.04