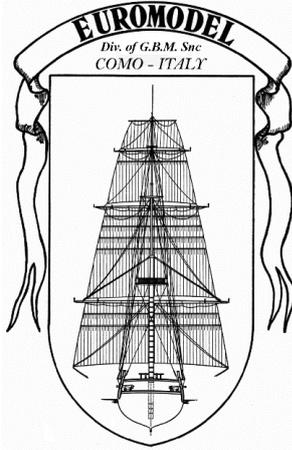


TRANSLATION LINKS

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



An *interpretive* review
of the
Euromodel Kit

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

**Checked the
Essential Resource
Information File ?**

11.MAST CONSTRUCTION

September 2021

This paper is based on the supplied drawings, external references, kit material – and an amount of extra material. It serves to *illustrate 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 MSW member piratepete007. [Additional & exceptional support was gratefully received from another MSW member **marktiedens**. My sincere thanks to him and other MSW members.]

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.

This is **not** an instructional manual but is a collaboration amongst a number of MSW members 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.



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

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Plan Sheet Translations (11 – 15)

Plan Sheet 11 – Standing Rigging

particolare B – **detail B**

landra da realizzarsi a cura del modellista – **chain plate to be produced by the builder**

fanno dormiente a due anelli sulla coffa di bompresso – **must be linked to two rings on the bowsprit**

N.B. per le bigotte, bozzellie, galloce e moche di ragna vedere Tavola No. 10 – **for the deadeyes, blocks, cleats and crowsfeet blocks, refer to Plan Sheet 10**

Plan Sheet 12 – Staysails

prima sartia prodiera di destra e sinistra – **seized to first shroud on both sides**

bozzella tipo F1 su faccia opposta – **block type F1 on the opposite side**

per i riferimenti numerici degli alberi e delle coffe vedi tav. 3 – per le bandiere vedi tav. 10 –

per le vele vedi tav. 1 - **for the numerical references of the masts and of the tops see Plan Sheet 3; for the flags see Plan Sheet 10; for sails see Plan Sheet 1**

Plan Sheet 13 – Foremast

fuori scala – **not to scale**

come bracci di destra – **on the right side (starboard)**

faccia poppiera – **looking towards the stern**

Fig. opposite passa per la cavatoia sull serpa e da volta sul parapetto di prora – **line passes over the Prow Deck, through the ornamentation between the middle rails of the bowsprit and back to the Foc'sle railing.**

al paranco come per il pennone di trinchetto – **as for the tackle for the fore yard of the foremast**

alla ringhiera del castello – **to rail on the foc'sle deck**

faccia prodiera – **looking towards the bow**

come braccio di parrochetto – **to the fore topsail yard**



Plan Sheet 14 – Main Mast

fuori scala – **not to scale**

faccia poppiera – **facing aft**

faccia prodiera – **facing forwards**

ad anelli sulla coffa – **to rings on the topmast top**

legare alla ringhiera di sinistra – **tie to the railing on the left**

legare alla ringhiera di destra – **tie to the railing on the right**

per I riferimenti dei pennoni vedi tav. 3 – **for flag pole references, see Plan Sheet 3**

paranco come per pennone di maestra – **hoist as for the main lower yard**

Plan Sheet 15 – Mizzen Mast

faccia poppiera – **looking towards the stern**

faccia prodiera – **looking towards the bow**

fa dormiente sull ‘ultima sartia poppiera dell ‘ albero di maestra a destra e a sinistra – **the line is fixed on the last shroud of the Main Mast on both the right and left**

danne volta a 2 anelli sulla coffa – **allow for two rings on the top**

fanno dormienti sullo stroppo delle bigotte della coffa di bompresso – **make fixed onto the deadeye strop of the bowsprit top**

Il pennone di mezzana ha la sold funzione di poter tesdre la vela di belvedere - **mizzen flagpole has the only function of being able to tension the mizzen topsail.**

particolare dell’attacco della vela al pennone (inferitura) – **detail of the sail attachment to the flagpole**

Post-Construction Reflections

Any range of modifications can be made to the construction of the masts and the drawings certainly suggest some of these. As this area is researched, then many more possible changes will become obvious. The following points cover some of the things that were reflected upon after the masts had been completed.

Using Timber Rods

The rods supplied are easy to work with and can be left natural or stained; it is that timber commonly used in kits by other manufacturers so no reflection on Euromodel. In this build, they were replaced with walnut and the photographs reflect this change, but that was an added expense. Tapering the mast sections is ideally completed on a small lathe but not everybody has this equipment, so for many this all-important work will need to be done by hand.

Squared Sections

The upper portion of each mast section typically has a square section with an upper square tenon that fits into a mast cap. Some of the drawings used a symbol suggesting a dimensions as a 'diameter' implying a circle but square tenons were produced – a rounded tenon was used for the uppermost – and smallest - mast cap.

Continental ships did not have that squared upper section to the mast but continued the rounded form to the top. Things like the cheeks were supported against the rounded surface by specially shaped chocks.

The squared section of the mast foot also poses a problem. Using the supplied rod, it is difficult (impossible) to create the off-set squared section of the specified dimensions without resorting to some alternative method. Things that I considered – and used – were pinning on a separate squared piece to the bottom of the mast or using a larger diameter rod to start off with. As a complete alternative, you could choose to ignore the finer detail of the mast foot and simply utilize the rounded form right through to the bottom of the mast section!

Starting with Squared Timber

After reading the following pdf file by Elia Gianopulos on the NRG website, it was obvious that all of the above commentary could be successfully covered by creating the masts from squared timber pieces. He used Southern Mongolia timber. This method should be strongly considered as an alternative. http://modelshipworldforum.com/resources/Mats_and_Yards/Mast-making.pdf

fid Holes

Often ignored, the 'fid' holes are an integral part of the upper mast section supports where they are seated in the tops & crosstrees and should definitely be considered.

In summary, this model aims to be authentic in its construction but how far the drawings are developed to a higher level is up to the individual.

Chapter 1: MAST BACKGROUND

The first step was to produce each mast section, each with its square tenon at the upper end (excluding the flagstaffs) which then will determine the size of the squared hole required for the applicable mast cap.

Components

12 x 500 mm. (1), 10 x 800 mm. (1) ; 10 x 720 mm. (1) ; 8 x 500 mm. (1); 6 x 700 (2); 5 x 700 mm. (1); 5 x 810 mm. (1); 5 x 640 mm. (1); 4 x 300 mm. (1); 3 x 830 mm. (2); 2 x 800 mm. (2); 2 x 500mm. (1)

Explanatory Note

Where the size below is described as ‘ 7 – i.e. 8 mm.’, this indicates that the drawing diameter is 7 mm. and that 8 mm. has been provided in the kit to allow the builder to reduce the size down to 7 mm.

A: Bowsprit

- 21: Bowsprit Mast – Albero di bompresso (10.5 – i.e. 10 mm.)
- 22: Jibboom – Asta di fiocco (5 mm.)
- 23: Sprit Topmast - Alberetto di civada - (5 mm.)
- 24: Sprit Topmast Flagpole - Asta di bandiera di civada (2 mm.)

B: Foremast

- 25:Foremast – Albero di trinchetto (10 mm.)
- 26:Fore Topmast- Albero di parrochetto (7 – i.e. 8 mm.)
- 27:Fore Topgallant Mast – Albero di velaccino (4 mm.)
- 28: Flagstaff – Asta per bandiera (2.5 – i.e. 3 mm.)

C: Main Mast

- 29:Main Mast - Albero di maestra (12 mm.)
- 30:Main Topmast – Albero di gabbia (8 mm.)
- 31:Main Topgallant Mast – Albero di velaccio (5 mm.)
- 32: Flagstaff – Asta per bandiera (2.5 – i.e. 3 mm.)

D: Mizzen Mast

- 33:Mizzen Mast – Albero di mezzana (8 mm.)
- 34:Mizzen Topmast – Albero di contromezzana (6 mm.)
- 35: Flagstaff – Asta per bandiera (2.5 – i.e. 3 mm.)

Construction

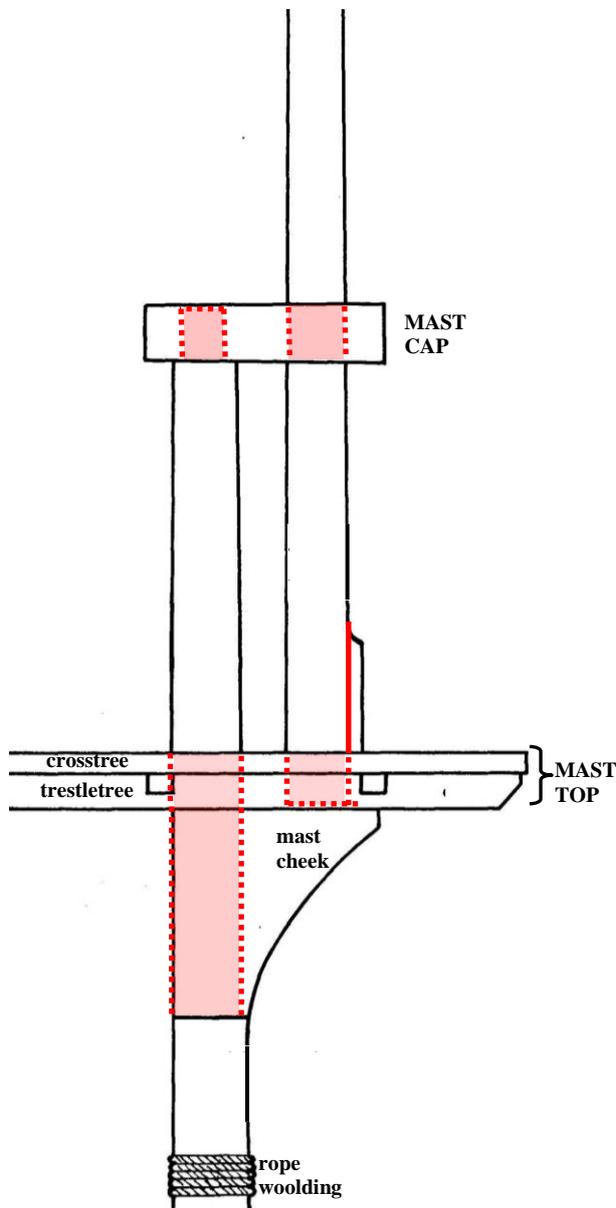


Figure 1: Mast General Configuration

Mast Cap

The diameter of the topmast passing *through the mast cap* will determine the diameter of the round hole.

The finished width of the square tenon passing *into* the mast cap will determine the size of the square hole.

The mast cap material supplied in the kit is fairly basic and some pieces will need modifying. Taking the diagrams of mast caps literally at the bottom of Plan Sheet 11, it is apparent that ALL caps have one round hole and *one square hole*. Examination of the drawings immediately above them in the drawings show the tenon at one end of most masts have a dimension quoted as, e.g., 4.5 ... meaning a 'diameter' of 4.5 mm. In actual fact, this seems to be referring to the *width* of the square tenon !

Modification of Mast Caps

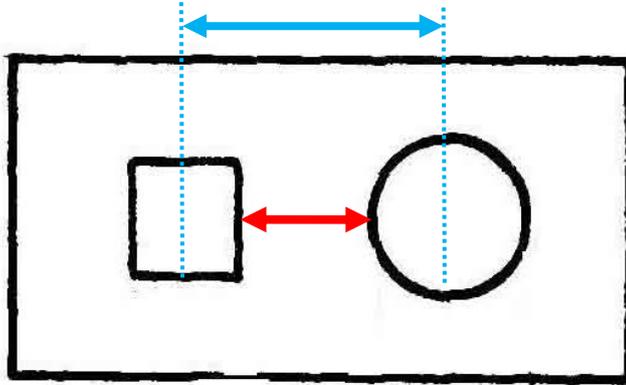


Figure 2: Keeping the Mast Holes

Some modification was necessary to the cap pieces supplied but generally their dimensions conformed to what was needed. The following descriptions for each of the mast sections includes a comment about any perceived adjustment to the cap size. The kit supplied **13 pieces but only 10 were required.**

In making the two holes in the blank pieces, it was essential to take measurements from the drawings, particularly Plan Sheet 11 to keep the correct separation between the two holes (shown by the red arrow in Fig. 4). This was achieved by measuring the distance between the centre lines of the two masts (broken blue lines). N.B. The timber supplied was not of great strength so care was needed when carving out the holes.

Until 1820, the corners of the mast caps were slightly rounded.

The final hole sizes can only be determined once the mast sections have been finished (i.e. there will be variations in the final width of masts produced by individual builders)

Rope Wooldings

- According to the authoritative text by James Lee (1984), the rope woolding width on all masts was 12 inches which on this model equates to 4.23 mm. However, Mondfeld (1989) suggests that the woolding width was the same as the mast diameter. Another reference found suggested ‘half the mast diameter’. This latter comment somewhat confirms Lee’s guidance.
- Mondfeld suggests that the rope used was 1 inch diameter (i.e. 0.35 mm. on this scale). The drawings in this kit state 1 mm. rope 0.8 mm. black rope was used – sizes are variable out there in the market so your choice could be different. This comment and the previous one highlight how research can be useful, distracting and confusing.
- The wooldings were evenly spaced along the mast length.
- When serving the woolding on an actual ship, the beginning of the rope was attached to the mast with three nails with a leather button under each. For this kit build, the following method was used ...

One end of the rope is bent into an extended loop and then served over as shown in Fig. 3.

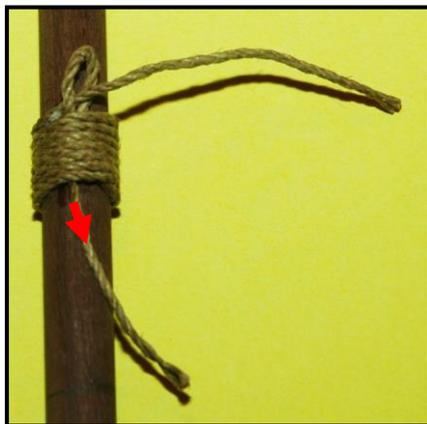


Figure 4: Finishing Woolding Serving



Figure 3: Beginning Woolding Serving

After creating the correct number of turns, the end is inserted through the loop and pulled tightly underneath the top few turns (Fig. 6). Any conspicuous bulge is then gently tapped down with a hammer. The ends are then cut off.

- The number of wooldings on the foremast is one less (five) than on the Main Mast (six).
- Wooden hoops (1.5 inches equating to approx. 0.5 mm. on this model) were nailed above and below each rope woolding. This is something extra that *could* be incorporated.

fid hole

At various stages the ‘fid’ hole needed to be created in the masts. A fid (wooden or metal peg) is fitted into this hole and its projections from the hole rest on the trestletrees to stop the topmast from sliding through. That is used for the Royal William although another common approach was to match up two similar holes in the two adjacent masts and then slide the fid through both.



Figure 5: The Mast ‘fid’ Hole

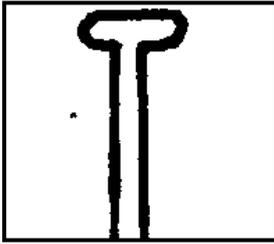


Figure 6: Truck

Trucks

The ‘truck’ is a protective covering in the shape of a rounded wooden disc that protects the mast end grain from weathering. These can easily be fashioned out of scrap timber or purchased commercially.

Partners

The masts passing through the deck were held in position by a circular series of mast wedges or partners (sometimes collectively referred to as the *mast heel*) between the decking and the mast itself and frequently covered by a canvas fairing called the *mast coat*.



Figure 7: Typical Crosstree

Crosstrees

- The main crosstrees were two horizontal pieces spreading the upper shrouds to support the mast.
- Topmast crosstrees were similar but consisted of three pieces to support the topgallant and royal shrouds.
- At the head of lower masts, crosstrees were used to support platforms (i.e. tops)

Tops

Platforms known as tops were fitted on the lower crosstrees, Up till the 17th. century they were circular but by the beginning of the 18th. century, the rear edge began to be straightened out such as is seen in the Royal William. From the middle of the 17th. century onwards, the tops were all painted black.



Figure 8: Typical Mast Top

Raking

According to Goodwin (1987) ...

- the foremast and main mast were generally set at an *angle of 90° to the keel* although they sometimes inclined aft at an angle of 1°.
- the mizzen mast was **inclined aft somewhere between 4 - 5°**.

In reality, the situation was a little more complicated with the ship’s master adjusting the rakes to his own wishes in order to gain a small advantage in speed and manoeuvrability.

Using the very bottom edge ruled margin on the plan sheet (11) as a guide to the line of the keel, the foremast and main mast were determined as above (i.e. 90°, no inclination).

Likewise, the mizzen mast was inclined aft at 3°.

Chapter 2: MAST CONSTRUCTION

Bowsprit Mast

Since it was decided to reduce the diameter down to **10.5 mm.** (but could have left it at 12 mm.), the decision was taken to digress a little further and construct the first part [#21] of the mast.

There is a disparity between the stated length (**235 mm.**) projecting out from the hull and the drawing length (**216 mm.**). I settled on using the stated length for the following reason: Admiralty charts around this era show 69 – 87 feet for a bowsprit on a first-rate ship which on a scale of 1:72 used for the RW, the length would be 292 – 368 mm. Now 216 mm. would only represent 51 feet which I felt was a little on the short side!

The **12 mm.** diameter rod was turned down to **10.5mm** at one end and the second half tapered down to **5.5 mm.** The finishing of the bowsprit is discussed later.



Figure 9: Bowsprit Cleats



Figure 10: Bowsprit Saddles

Jibboom

6 mm. rod was used– whilst the end diameter is indicated as 5 mm., the boom enlarges slightly to 5.5 mm before tapering down to 4 mm. (the plan sheet indicates 3 mm. but measurement off the drawing shows 4 mm. tapering back to 3 mm. – this would be better than 3 mm. tapering back to something like 2 mm.).

The saddles are better added *after the bowsprit top is in place*. This then allows the correct depth to be determined for the saddles in order that the attached jibboom will pass neatly through the opening in the top.

Sprit Topmast

The foot of the mast is clearly shown in Plan Sheet 3 as having a length of 11 mm. The **length is 22 mm.** when measured. Also, the stated length (102

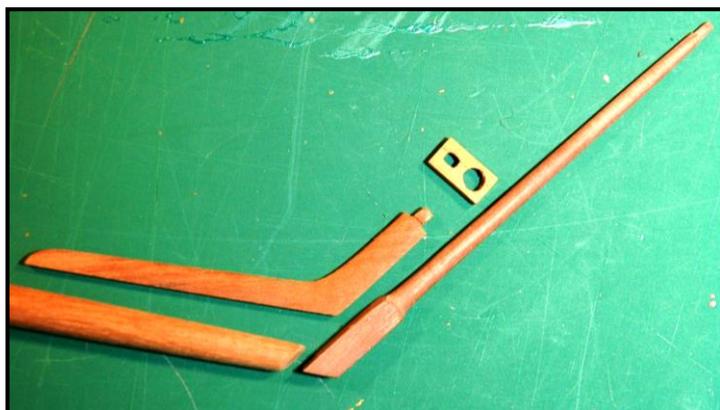


Figure 11: Sprit Topmast & Knee

mm.) is *less* than the drawn length (107 mm.). The *drawn length* was used.

[Reason: Admiralty Charts around this era show 26 – 28 feet for a sprit topmast on a first-rate ship. On a scale of 1:72 used for the RW, that length would be 110 – 118 mm. So, 107 mm. seems to be better than 102 mm. (24 feet real measurement)]

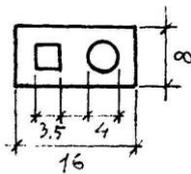
Sprit Topmast Knee

[Lees, 1984] states that the width of the knee is half that of the bowsprit. So ... using some scrap walnut, a knee was constructed as one piece with a maximum cross-section of 5 x 3 mm. The sides were slightly chamfered and the top edge slightly rounded. The surface of the bowsprit taking this knee was carefully flattened.

Topmast can be fixed in position – but not the mast cap until the crosstrees/ trestletrees are put on.

Mast Caps

The following caps are required ...



Drawing shows a 12.5 x 6.5 x 3 mm. size – create from a 16 mm. piece as shown here or leave as same.

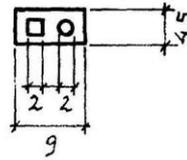


Figure 12: Bowsprit Cap Sizes

Top [47]

A supporting base (41 mm. diameter, 1 mm. thick plywood) was cut out and then covered with 3 x 1 mm. strips of walnut. The raised edge was made from 2 x 2 mm. 'very flexible' beech – there are much cheaper alternatives to this timber but there was some in the scrap box and it was just so easy to bend. After this was glued on, the edge thickness was sanded down so that it was then 2 x 1 mm.

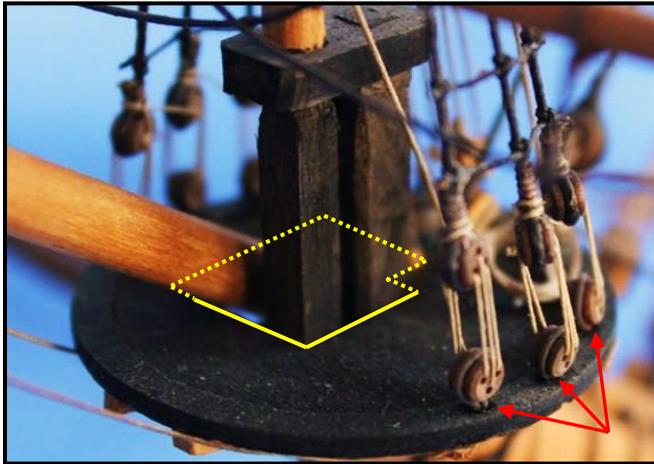


Figure 13: Orientation of Top Cut-Out

Battens (2 x 0.5 mm.) were fixed in place radially on the top upper surface. Two sets of three holes (red arrows in Fig. 13) needed to be drilled through the raised edge to allow the 'chain plates' to pass through.

The whole assembly was then painted black.

There were no specific drawings for the trestletree & crosstree construction but it is illustrated in Fig. 13 and their dimensions are given below.

Crosstree & Trestletrees

The crosstrees supporting the top (and the trestletrees underneath that supported the crosstrees) were constructed and pieced together taking care that the distance between the trestletrees is the same as the width of the square base of the topmast.

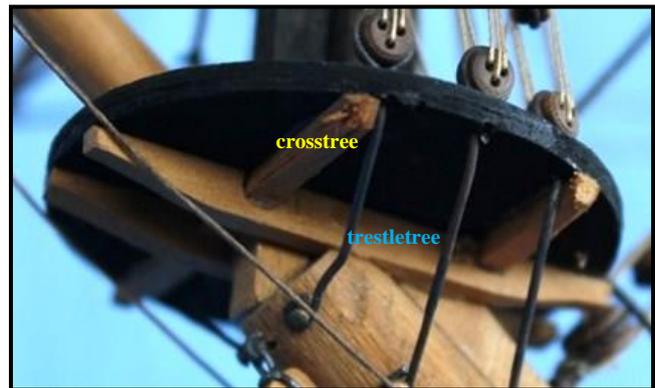


Figure 14: Bowsprit Crosstrees & Trestletrees

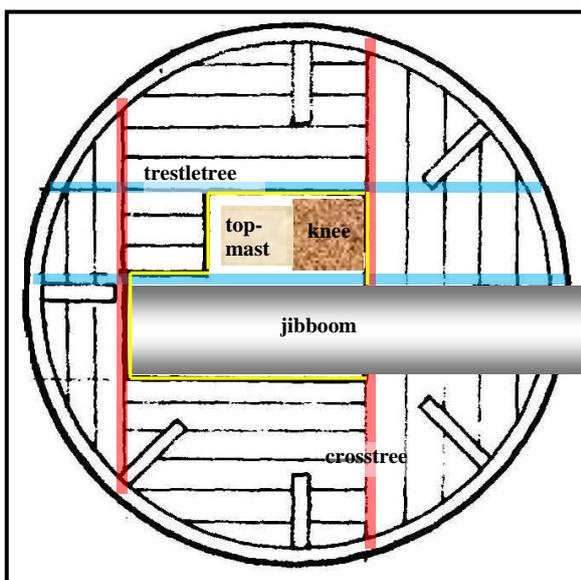


Figure 15: Bowsprit Top Arrangement

Support Dimensions

Trestletrees : 1 x 3 x 38 mm. ;
1 x 3 x 33 mm.

Crosstrees: 1 x 3 x 34 mm. ;
1 x 3 x 27 mm.

With the bowsprit temporarily in position in the hull, this supporting assembly was carefully aligned in a horizontal position and glued onto the bowsprit mast.

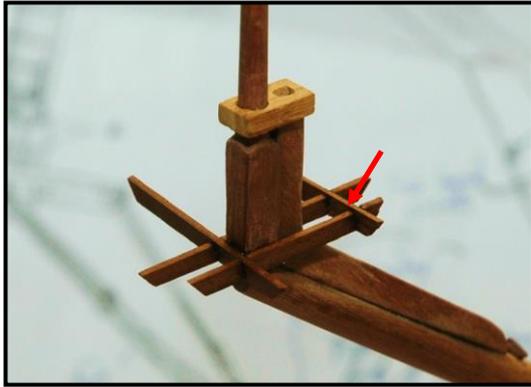


Figure 16: Trestletrees & Crosstrees in Position

From Plan Sheet 12, the aft crosstree appears to be passing through (or abutting) the jibboom but as Fig. 14 shows (with red arrow), that did not occur in this build.

Deadeye Attachment

The chain plates were made from *0.8mm* brass wire wrapped around the 3 mm. deadeyes & soldered shut. The lower end was flattened in vice jaws and small holes drilled for the nails. They were then attached underneath to the mast.



Figure 17: Chain Plate

Crosstree [48]



Figure 18: Sprit Topmast Crosstree

Because of their small size, the crosstrees at this point were difficult to cut – it proved easier to work from a much greater length and then trim back to final shape and length after the joints were formed.

Support Dimensions

Trestletrees : 1.0 x 2.0 x 12 mm.

Crosstrees: 1.0 x 1.5 x 13.5 mm.

In hindsight, the spacing between the two crosstrees should have been 7.0 mm. rather than the 6.2 mm. shown.

A mastcap measuring 9 x 4.5 x 2 mm. was constructed with two circular holes – carving out square holes was a little too difficult. *The holes needed to be only a maximum of 1.5 mm. apart.* To avoid splitting, the holes were first drilled in a larger piece of timber which was then reduced down to the final size. The flagstaff with truck was then fixed in position.

Fig. 16 also shows the approx. positions of five eye-pins required for rigging.

● = eye pin (refer to Fig. 46)

Foremast

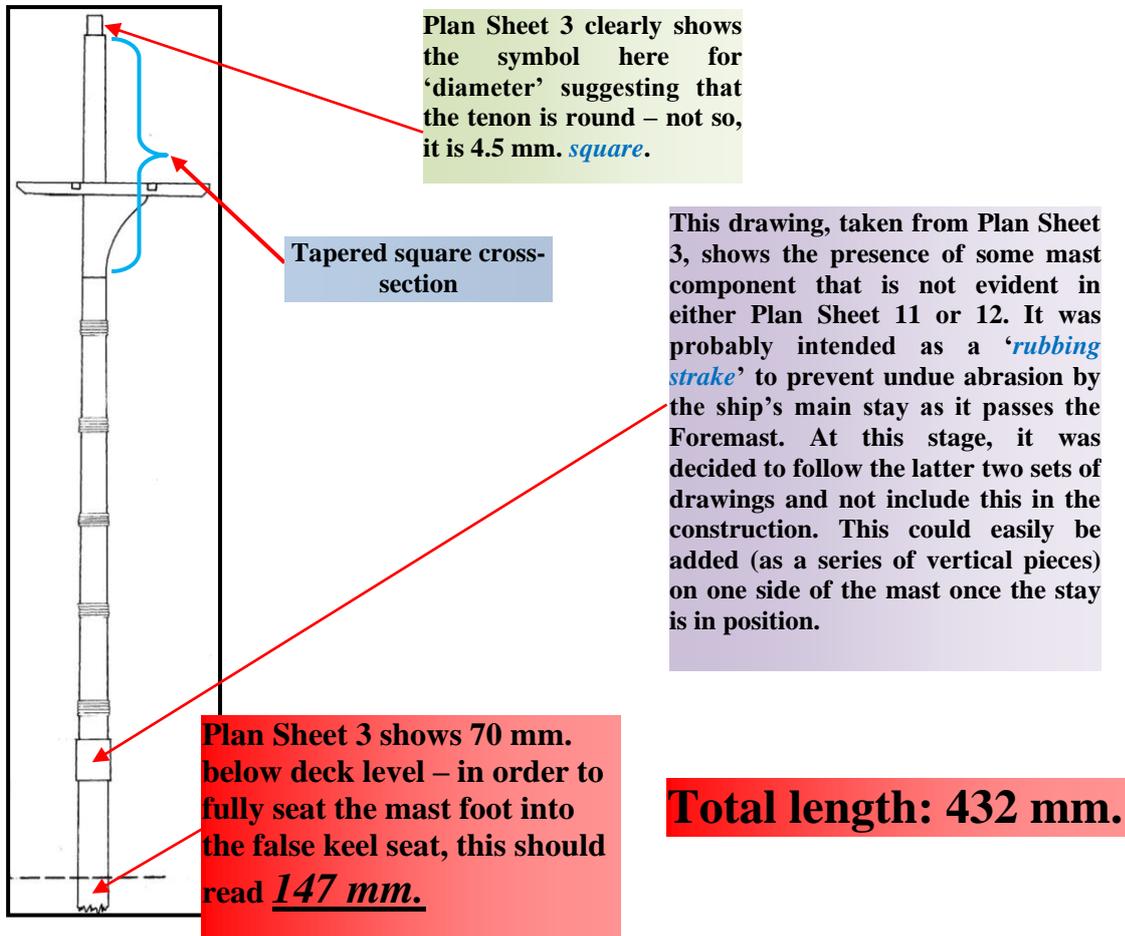


Figure 19: Foremast Addendums

Mast Cheeks

These two (and the other four) were cut from the supplied timber in the kit - walnut, 3 x 25 x 200 mm. The drawings used for these cheeks were easily visible in Plan Sheet 12. The cheeks for the foremast and mainmast were positioned at 90° to the mast axis whereas the mizzen mast cheeks were offset by 3°. As an English ship, the cheeks were an integral part of the mast. The mast square section was extended down to include the cheeks. If it were Continental, the cheeks would most likely be against the rounded mast and supported by chocks between the round mast and the flat cheeks.

The drawings of the cheeks are clear but it was decided to introduce a couple of extra historical accuracies. The square lower edge was slightly rounded as well as being slightly carved. Also, the thickness of the cheeks were tapered downwards to make them appear to merge with the mast.



Figure 20: Modified Cheek

Rope Wooldings

From Plan Sheet 11, each of the five wooldings had a width of approx. **5.50 mm.** which converts to **15.59 inches** on the actual ship.

Six turns of **0.8 mm.** rope were used which when tightly compressed, gave approx. **4.8 mm.** (i.e. 13.61 inches). Not too far off the 12 inches that Lee suggested.

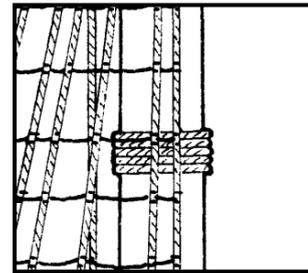


Figure 21: Woolding

Mast Cap

A **28 x 15 x 7 mm.** size is indicated – could use the **29 x 14 x 5.7 mm.** However, it was decided to create another piece that conformed to the drawing dimensions.

REMEMBER ... the final hole sizes can only be determined once the mast sections have been finished

Foremast Top [49]

The drawings show the platform as consisting of '2 x 4' mm. timbers. 0.6 mm. plywood was used as a base and then covered that with **1 x 5 mm.** planking strips on top and **0.5 x 1.0 mm.** underneath. Both surfaces were sanded to form a mast top of **2.1 mm.** thickness. Nominally, then, the platform consisted of '2 x 5' mm. timbers.

Top Support

Making up the mast top supporting framework are four timbers:

- trestletrees** – two pieces **3 x 5 mm.**, and
- crosstrees** - two pieces **3 x 3 mm.**

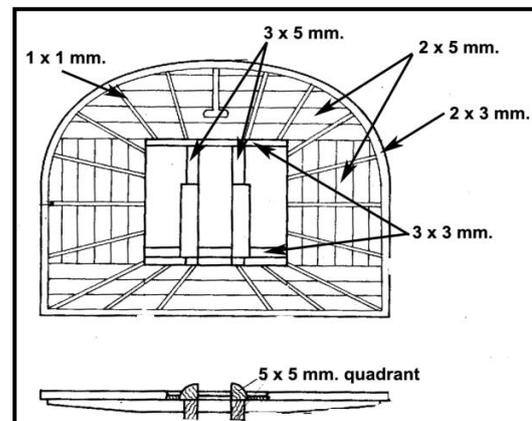


Figure 22: Foremast Top Timbers

Figs. 21 & 22 are not drawn to scale, but using these along with the table of data and drawings, the four pieces were constructed.



Figure 24: Foremast Top Lower Surface (unpainted)



Figure 23: Foremast Top Upper Surface (unpainted)

STEP 1: Trestletrees (3 x 5 mm.)

	Dimension (mm.)
A	59
B	17
C	25
D	11
E	3
F	40
G	12
H	7
J	1.5
K	2

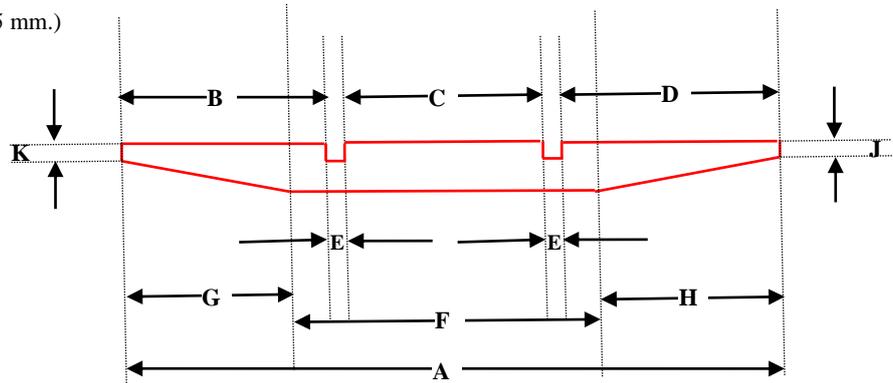


Figure 25: Foremast Trestletree Dimensions

STEP 2: Crosstrees (3 x 3 mm.)

Two different length crosstrees are required due to the curved edge.

	Length-1 (mm.)	Length-2 (mm.)
A	80	70
B & D, each	*33	*28
C	*8	*8
E	3	3
F	24	24
G & H, each	28	23
J	1.5	1.5
K	2	2

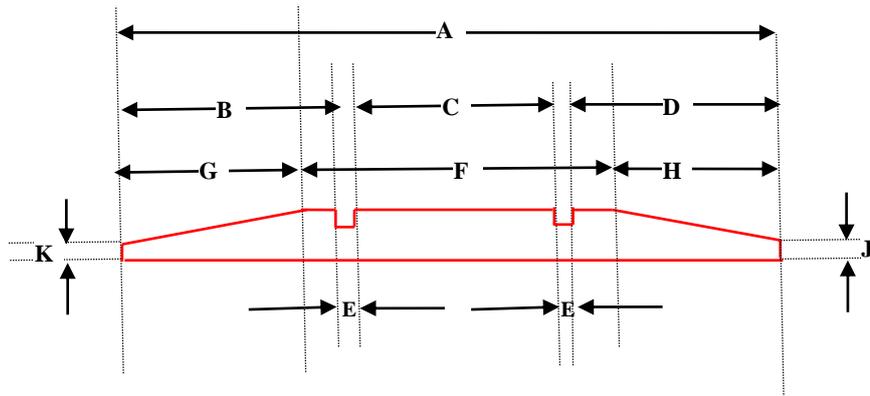


Figure 26: Foremast Crosstree Dimensions

* ...dependent on finished width of square mast tenon

Edges

The continuous 2 x 3 mm. strip that goes around the edge of the top (except for the aft piece), can be soaked in water and then using an electric plank bender to create the required bends. Some ‘flexible beech’ was used to make life easy (but expensive).

Bolsters

The bolsters that are glued onto the top of the trestletrees are created from 5 x 5 mm. timber and sanded to create a quadrant shape and over which the shrouds will be ultimately pulled down. The plan sheet seems to suggest that these quadrants are 5 x 10 mm but in reality the quadrants are made from 5 x 5 mm. and so the total depth of them plus the trestletrees is the 10 mm. indicated.

Top Rigging Holes

- Holes for the deadeyes were drilled along each side as shown by the red arrows in Fig. 25.
- Holes were also drilled on the front face of the curved edge of the mast top to take the crowsfeet ropes (blue arrows indicate just a few of the rope positions in Fig. 25).



Figure 27: Drilling Holes in the Foremast Top

Plan Sheet 11 could be a little misleading as to the number of ropes passing through the top edge. Fig. 25 shows 12 rope holes for the foremast top which is a number frequently used. It comes down to how accurately you might wish to follow the historically-correct method of rigging – in that case, the number of holes will be different. Spacing between the holes was determined by first establishing the outer holes and then working inwards. Mark Tiedens from MSW suggested approx. **4 mm.** as a suitable separation between the holes.

Topmast [26]

The following illustration of the topmast construction centres around the fact that the mast heel at the bottom is of square cross-section and because of its size could not be made from the **8 mm.** rod supplied. There are two choices ...

1. **Ignore the square mast heel** altogether and simply utilize the round mast at the base. This ignores a basic part of the mast structure but does make the construction much easier and appearance-wise is satisfactory.
2. **Create the mast heel from other timber** and then glue + pin to the round mast. More work but the procedure is not too difficult. However, the **foot dimensions of 9.5 x 9.5 mm.** is intriguing when the width between the trestletrees is only **8 mm.** It was assumed that the larger measurement was only approximate and would be adjusted to fit into the '8 mm.' space. Refer to Fig. 26.

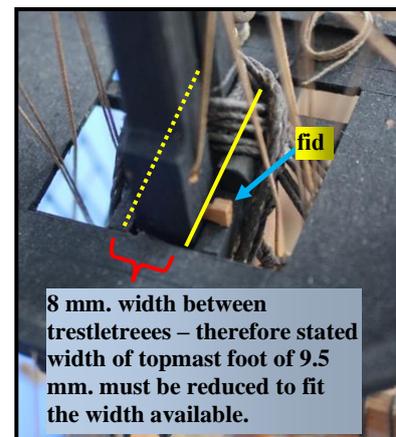


Figure 28: Fitting the Topmast

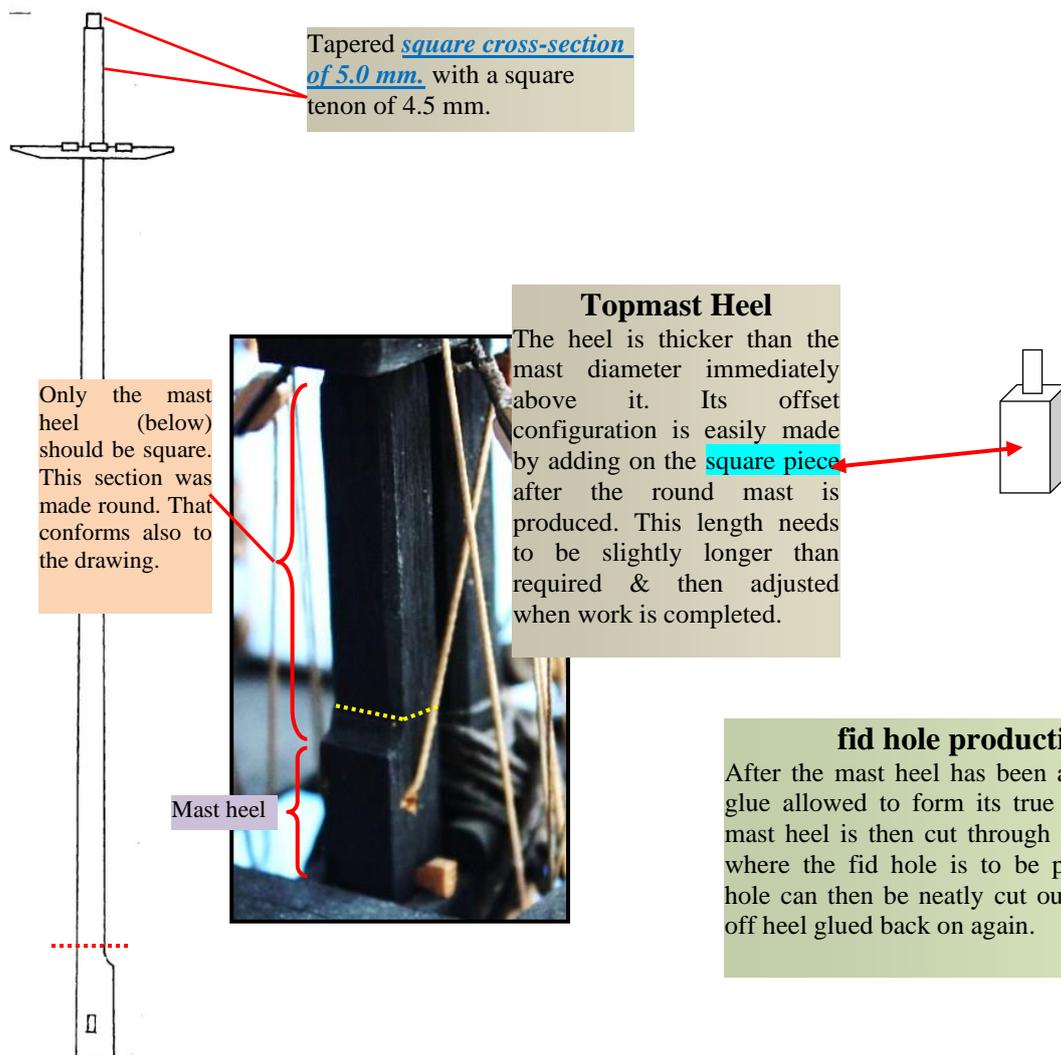


Figure 29: Topmast Addendums

Mast Cap

Drawing shows a 15 x 6.5 x 2.5 mm. size – could use the 16 x 8 x 4 mm. supplied or reduce the size down. The latter was chosen.

Topmast Crosstree [50]

Making up the framework are four timbers:

- trestletrees** – two pieces 2 x 3 mm., and
- crosstrees** - two pieces 1.5 x 3 mm.

The curves were readily created by soaking in water and then using an electric plank bender.

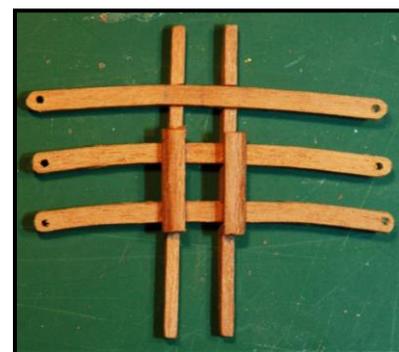
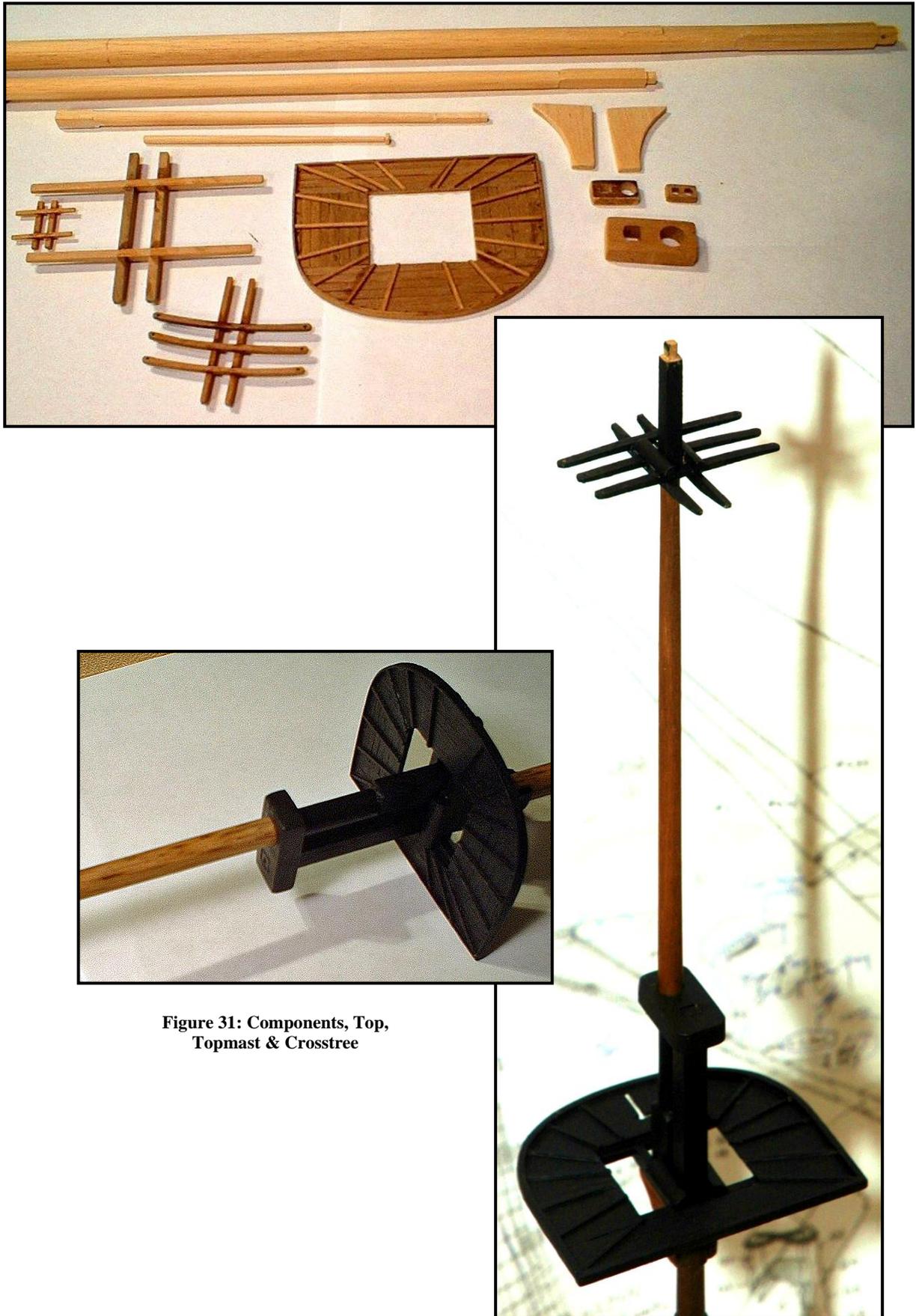


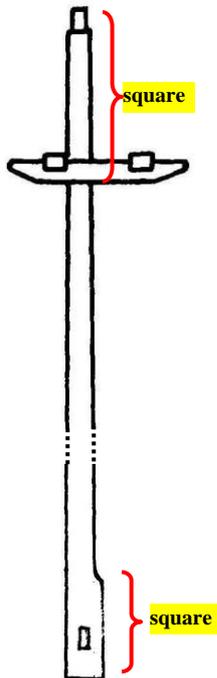
Figure 30: Typical Crosstree

The only joints were in the trestletrees to a depth of 1 mm. so the crosstrees were slightly above the top of the trestletrees. The underside surface of the crosstree was tapered upwards as were the trestletrees. Holes were drilled at the ends of the crosstrees – not sure if they are needed for the rigging of this ship but crosstrees historically for this time in history DID have the holes. The bolsters were quadrant-shaped from 3 x 3 mm.



**Figure 31: Components, Top,
Topmast & Crosstree**

Topgallant Mast [27]



The foot of this mast is again of a square cross-section but a different procedure to that for the topmast was utilised. Given the smaller size, it was decided to work from some scrap **8 mm.** rod and carefully turned this down to size on a lathe. This allowed enough material to form the square mast foot without resorting to joining a square piece on as was done before. The top section also is of a square cross-section along with a square tenon. All dimensions are shown in Plan Sheet 3.

Without a lathe, a rounded mast would have been resorted to throughout and again this would have been a satisfactory alternative.

Topgallant Crosstree [51]

As for [50] above, but this time the trestletrees were **2 x 2 mm.** and the crosstrees were **1.5 x 1.5 mm.** The bolsters were quadrant-shaped from **2 x 2 mm.**

Figure 32:
Topgallant Mast

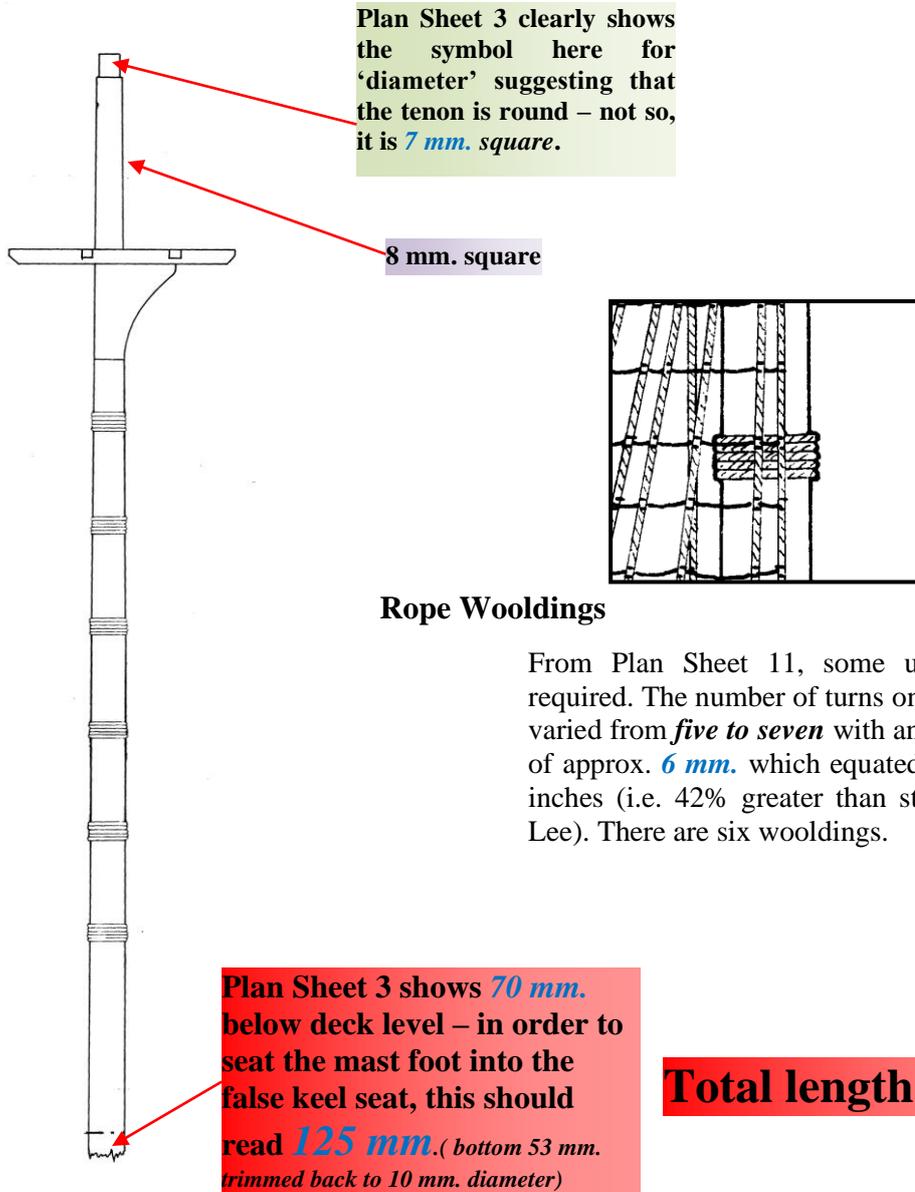
Mast Cap

Drawing shows a **10 x 6 x 2.5 mm.** size – could use the **12 x 6 x 3 mm.** supplied or reduce the size down. The latter was chosen.

Flagstaff

The truck is easily made from scrap timber but is also readily available commercially.

Main Mast

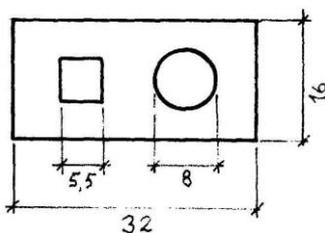


Rope Woodings

From Plan Sheet 11, some uniformity was required. The number of turns on the main mast varied from *five to seven* with an average width of approx. *6 mm.* which equated back to 17.00 inches (i.e. 42% greater than stated by James Lee). There are six woodings.

Figure 33: Main Mast Addendums

Mast Cap



Not sure why, but this block (measuring 7 mm. thick) was missing from the kit. However, it was soon produced from some scrap timber.

REMEMBER ... the final hole sizes can only be determined once the mast sections have been finished

Top

The drawings show the platform as consisting of ‘2 x 4’ mm. timbers. 1 mm. plywood as a base was used and then covered with 1 x 5 mm. planking strips. Nominally, then, the platform consisted of ‘2 x 5’ mm. timbers.

Top Support

Making up the mast top supporting framework are four timbers:

- trestletrees** – two pieces 3 x 5 mm., and
- crossrees** - two pieces 3 x 3 mm.

Figs. 33 & 34 are not drawn to scale, but using this along with the table of data and drawings, the four pieces were constructed.

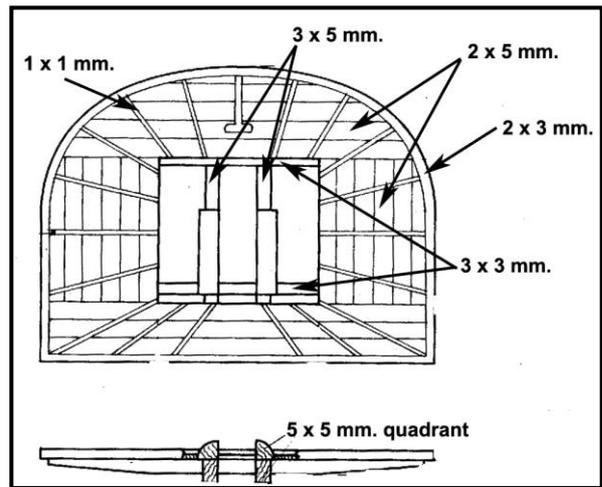


Figure 34: Main Mast Top Timbers

STEP 1: Trestletrees (3 x 5 mm.)

	Dimensions (mm.)
A	68
B	20
C	28
D	14
E	3
F	44
G	15
H	9
J	1.5
K	2

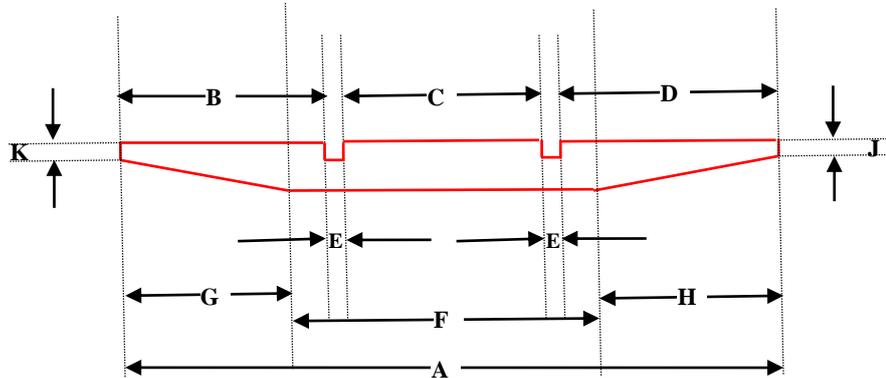


Figure 35: Main Mast Trestletree Dimensions

STEP 2: Crosstrees (3 x 3 mm.)

	Dimensions (mm.)
A	92
B & D, each	*39
C	*8
E	3
F	12
G & H, each	34
J	1.5
K	2

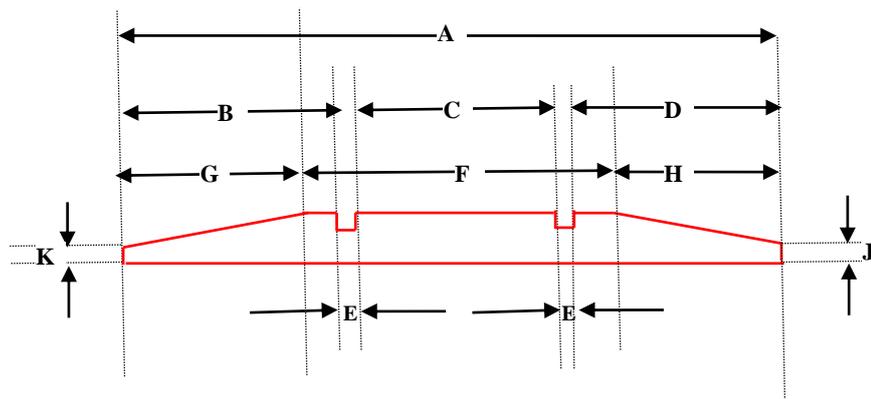


Figure 36: Main Mast Crosstree Dimensions

* ...dependent on finished width of square mast tenon

Edges

The continuous **2 x 3 mm.** strip that goes around the edge of the top (except for the aft piece), can be soaked in water and then using an electric plank bender to create the required bends. Again, some 'flexible beech' was used to make life easy (but expensive).

Bolsters

The bolsters that are glued onto the top of the trestletrees were created from **5 x 5 mm.** timber and sanded to create a quadrant shape and over which the shrouds will be ultimately pulled down. The plan sheet suggests that these quadrants are **5 x 10 mm** but in reality the quadrants are made from **5 x 5 mm.** and so the *total depth of them plus the trestletrees* is the **10 mm.** indicated.

Top Rigging Holes

- Holes for the deadeyes were drilled along each side as for the Foremast.
- Holes were also drilled on the front face of the curved edge of the mast top to take the crowsfeet ropes.

Plan Sheet 11 could be a little misleading as to the number of ropes passing through the top edge. There is a photo of the Main Mast top with 14 rope holes shown in Manual 6. This is the number of holes most frequently used.

It comes down to how accurately you might wish to follow the historically-correct method of rigging. But the basic guide for the 'let's not get complicated version' then, is ... **Main Mast – 14 holes**

Main Topmast & Topgallant Mast

The same principles of construction apply here as they did to the *Topmast [26] & Topgallant Mast [27]*.

However, there was a discrepancy between Plan Sheets 3 and 11 with respect to the topmast length – a stated **289 mm.** and an actual **285 mm.** respectively. Given the overall drawing in Plan Sheet 11, it seemed appropriate to go with the shorter length. Your decision!

Flagstaff [32]

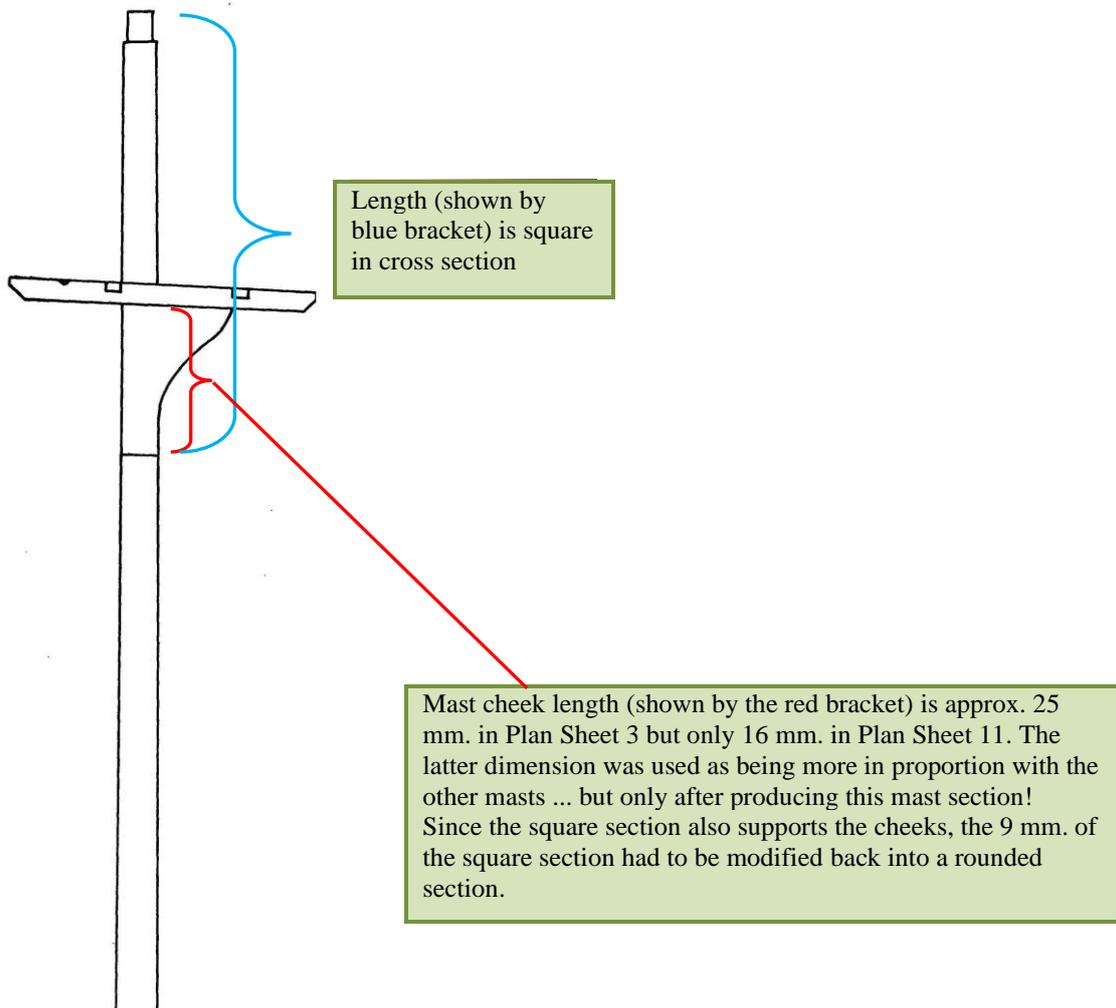
The truck is easily made from scrap timber but is also readily available commercially.

Mizzen Mast

The same principles of construction apply here as they did to the *Foremast* – the length will need to be adjusted/added to in order to create a total of 372 mm.

The drawing shows a length above deck of 255 mm. but the drawing size is approximately 250 mm. ... the latter measurement was used.

Mast Cheek Correction



Top [55]

The same principles of construction apply here as they did to the *Foremast Top [49]*.

However, to account for the mast raking, the top is inclined at 87° to the axis of the mast (instead of the 90° for the other two masts).

STEP 1: Trestletrees (3 x 5 mm.)

	Dimensions (mm.)
A	50
B	13
C	21
D	10
E	3
F	37
G	8
H	5
J	1.5
K	2

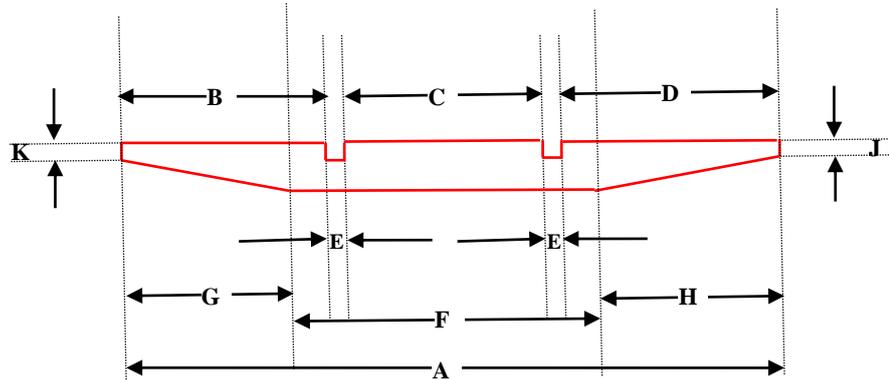


Figure 37: Mizzen Trestletree Dimensions

STEP 2: Crosstrees (3 x 3 mm.)

	Dimensions (mm.)
A	68
B & D, each	*28
C	*6
E	3
F	22
G & H, each	23
J	1.5
K	2

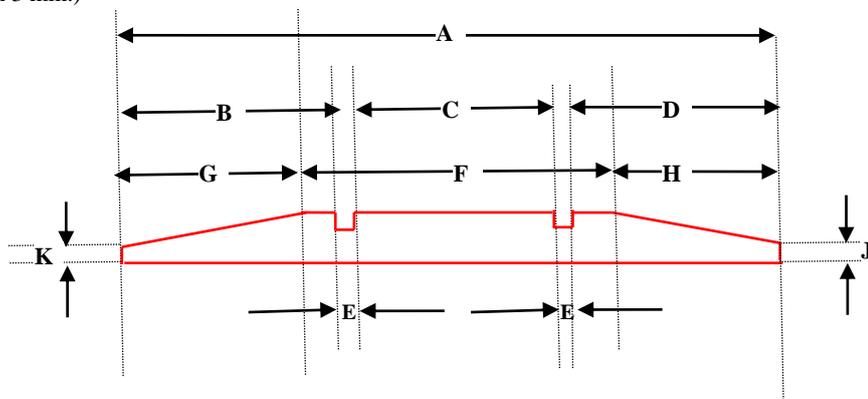


Figure 38: Mizzen Crosstree Dimensions

* ...dependent on finished width of square mast tenon

Edges

The continuous **2 x 3 mm.** strip that goes around the edge of the top (except for the aft piece), can be soaked in water and then using an electric plank bender to create the required bends. Again ... 'flexible beech'.

Bolsters

The bolsters that are glued onto the top of the trestletrees are created from **4 x 4 mm.** timber and sanded to create a quadrant shape and over which the shrouds will be ultimately pulled down. The plan sheet suggests that these quadrants are **4 x 8 mm** but in reality the quadrants are made from **4 x 4 mm.** and so the *total depth of them plus the trestletrees* is the **10 mm.** indicated.

Top Rigging Holes

- Holes for the deadeyes were drilled along each side.
- Holes were also drilled on the front face of the curved edge of the mast top to take the crowsfeet ropes.

Plan Sheet 11 could be a little misleading as to the number of ropes passing through the top edge. It comes down to how accurately you might wish to follow the historically-correct method of rigging. But the basic guide for the 'let's not get complicated version' then, is ...' **mizzen mast – 10 holes**'

Topmast

The same principles of construction apply here as they did to the main topmast. A 'sheave' for the topsail yard tye needs to be created just below the crosstree.

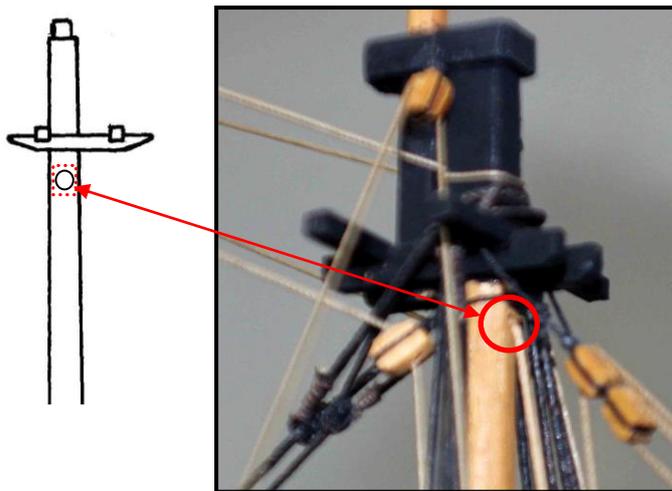


Figure 39: Mizzen Topmast Sheave

Flagstaff [35]

The truck is easily made from scrap timber but is also readily available commercially.

Chapter 3: INITIAL MAST RIGGING

Ropes and Lines

Q: When is a rope not a rope?

A: When it is taken onboard a vessel.

Whatever their function onboard ship, most ‘ropes’ were then termed ‘lines’.

Ropes

However, the term ‘rope’ was still applied to the following seven functions ...

1. *Horse* (or ‘foot’) rope: underneath yards or bowsprit, also the bottom edge of a sail.
2. *Bolt* rope: sewn around a sail, or lowering a top-mast or a topgallant and royal mast
3. *Man* rope: hanging over the side of a ship as sea ladders.
4. *Mast* rope: is used in hoisting, or lowering a top mast, or a topgallant and royal mast.
5. *Buoy* rope: attached to a buoy.
6. *Yard* rope: used in lifting or lowering yards.
7. *Wheel* ropes: leading from the drum of a hand wheel to the tiller purchase.

Lines

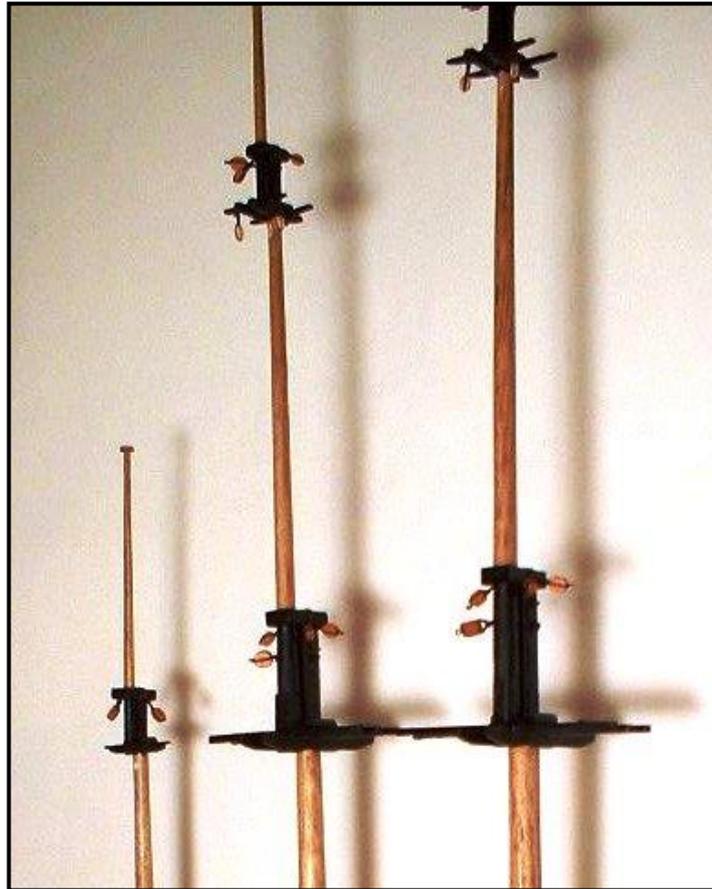
- *Standing rigging* were lines of a fixed nature such as shrouds, stays, foot ropes and all hauling ropes.
 - **Shrouds** ran athwartships and were tightened using dead eye blocks.
 - **Stays** usually ran fore and aft collectively holding the masts in position.
- *Running rigging* were the lines that moved the sails, directly or indirectly.
 - **Braces** moved the spars connected to the sails.
 - **Sheet lines** were used to haul the sails to the spars.

There could be more than 60 different running rigging lines, all anchored at different locations about the vessel.

The Importance of Rigging Blocks Before Mast Installation

The two following images illustrates the all-important concept of the installation of blocks early in the construction – before the masts are installed.

The actual *detail is difficult to determine in these images* but they do give an indication of what has to be done.



Bowsprit

Bowsprit Mast – Albero di bompresso

Jibboom – Asta di fiocco

Sprit Topmast - Alberetto di civada

Sprit Topmast Flagpole - Asta di bandiera di civada

It is useful to read the next few pages to attain an understanding of those blocks and deadeyes that could be usefully added before the bowsprit is installed.



Pre-installation Rigging of Bowsprit

Bowsprit Mast

Spritsail Halliard Rigging

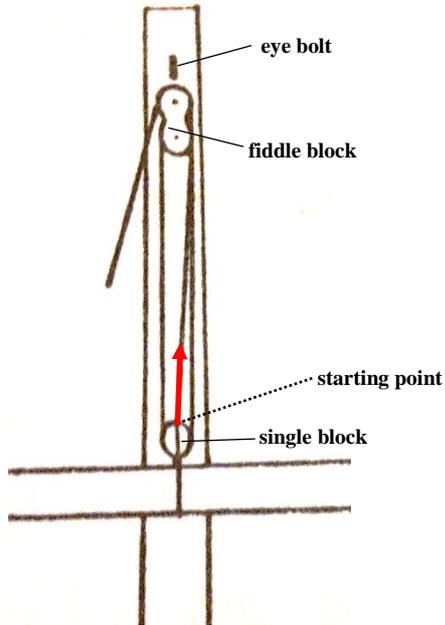


Figure 40: Underside View of Bowsprit

Towards the end of the 17C, the spritsail halliard ran in three parts; there was a *fiddle block* under the bowsprit near the end and a *single block* on the yard. This differs a little from Plan Sheet 1 but The halliard started from the strop of this block and tied off just past the end of the inner gammon. This three-part halliard was reputed to be in use as early as 1640.

In preparation for the spritsail yard addition at a later stage, the following are added...

- eye bolt,
- fiddle block



Figure 41: Fiddle/ Double Block Added

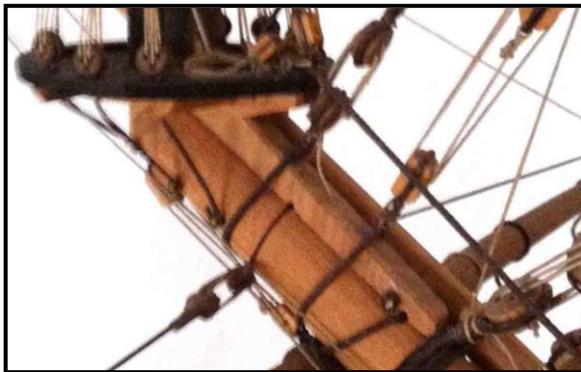


Figure 42: Bowsprit Halliard

The historical tying-off of the halliard line aft of the inner gammon is known but in Figs. 40 & 41 it appears to be tied off at or near the single block adjacent to the yard. It should be taken back further aft as described. This would mean the addition of a suitable cleat on the upper side of the bowsprit.

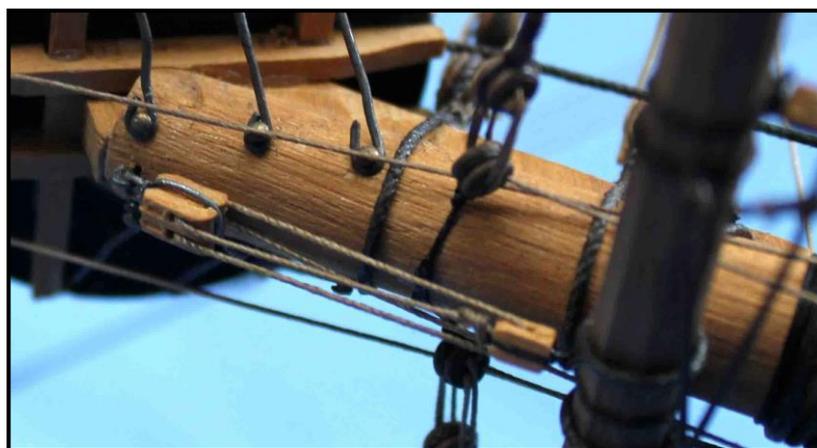


Figure 43: Close-up View of Halliard

Rigging Nomenclature for Blocks/ Lines

In an attempt to simplify the rigging of blocks and lines, the following table was created. The same number is used, where necessary, for a particular block and/or the line it is connected with.

1: fore stay	22: foremast yard lift
2: starboard bobstay	23: main stay block
3: port bobstay	24: main preventer stay tackle
4: starboard bowsprit shroud	25: staysail 10 running rigging block
[4': port bowsprit shroud – hidden]	26: staysail 10 halliard block
5: fore preventer stay	27: staysail 10 running rigging block
6: fore topmast stay halliard line	28: fore backstay
7: inner fore topmast stay	29: fore backstay
8: fore topmast preventer stay	30: fore topgallant shrouds
9: jib stay	31: fore topgallant yard lift
10: fore topgallant stay	32: staysail 9 halliard block
11: outer fore topmast stay	33: topsail yard halliard tackle
12: sprit topmast shrouds	34: mizzen topmast stay block
13: sprit yard collar	35: mizzen topmast preventer stay block
14: starboard spritsail lower yard lift	36: staysail 7 running rigging block
[14': port spritsail lower yard lift - hidden]	
15: staysail 11 running block	
16: backstay pendant to foremast fore stay	
17: halliard tackle for topmast yard	
18: sprit topmast lift	
19: spritsail lower yard brace	
20: spritsail lower yard lift	
21: sprit topmast brace	

Pre-installation Rigging of Bowsprit (continued)

Lines

The topmast stays & preventer stay identification [Mondfeld (1989, 293)] was used for rigging pre-1720.

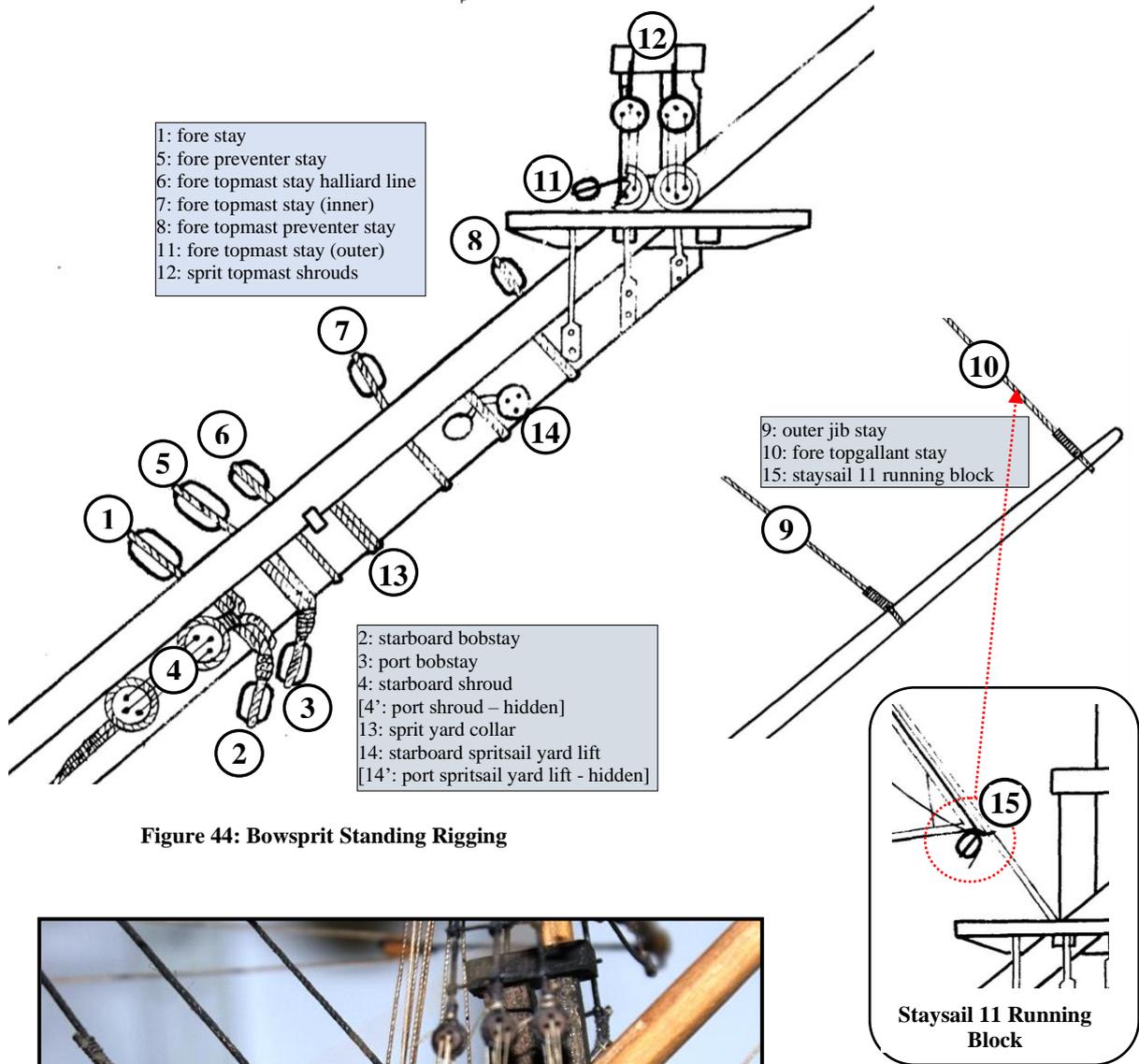


Figure 44: Bowsprit Standing Rigging

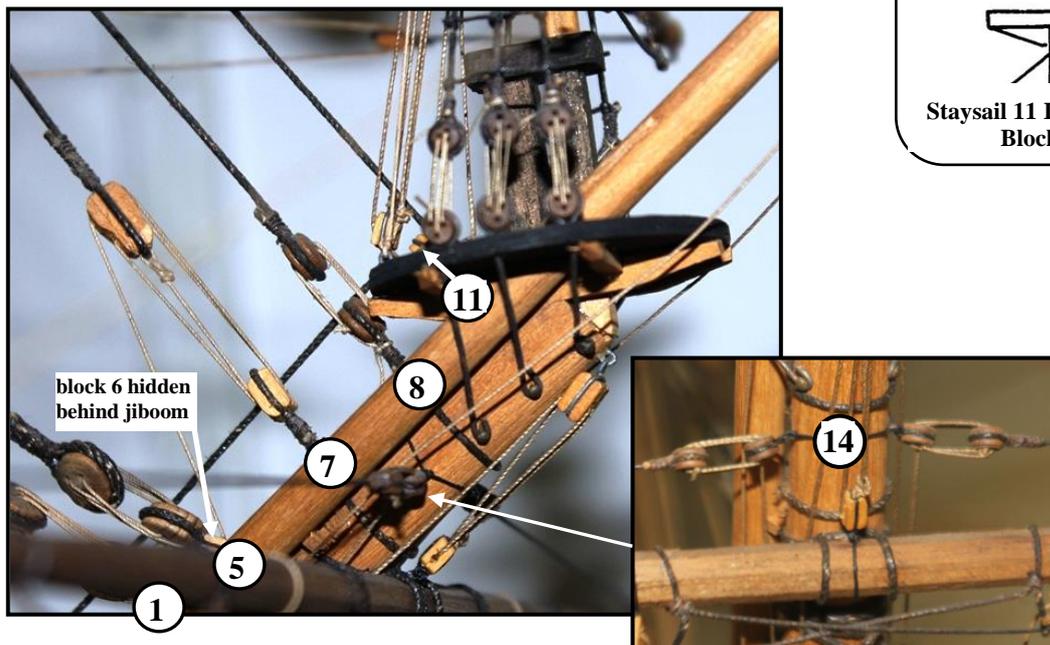


Figure 45: Bowsprit Rigging Points

Pre-installation Rigging of Bowsprit (continued)

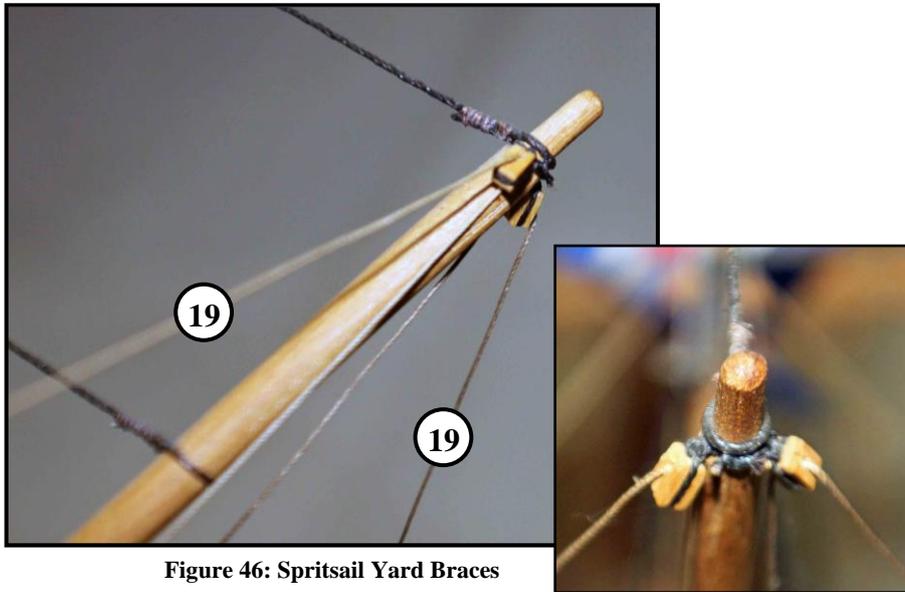


Figure 46: Spritsail Yard Braces

Blocks

- E1/F1: 3mm., 1 hole
- F2: 3mm., 2 hole
- A: Deadeye, 7 mm.
- B: Deadeye, 5 mm.
- C: Deadeye, 3 mm.

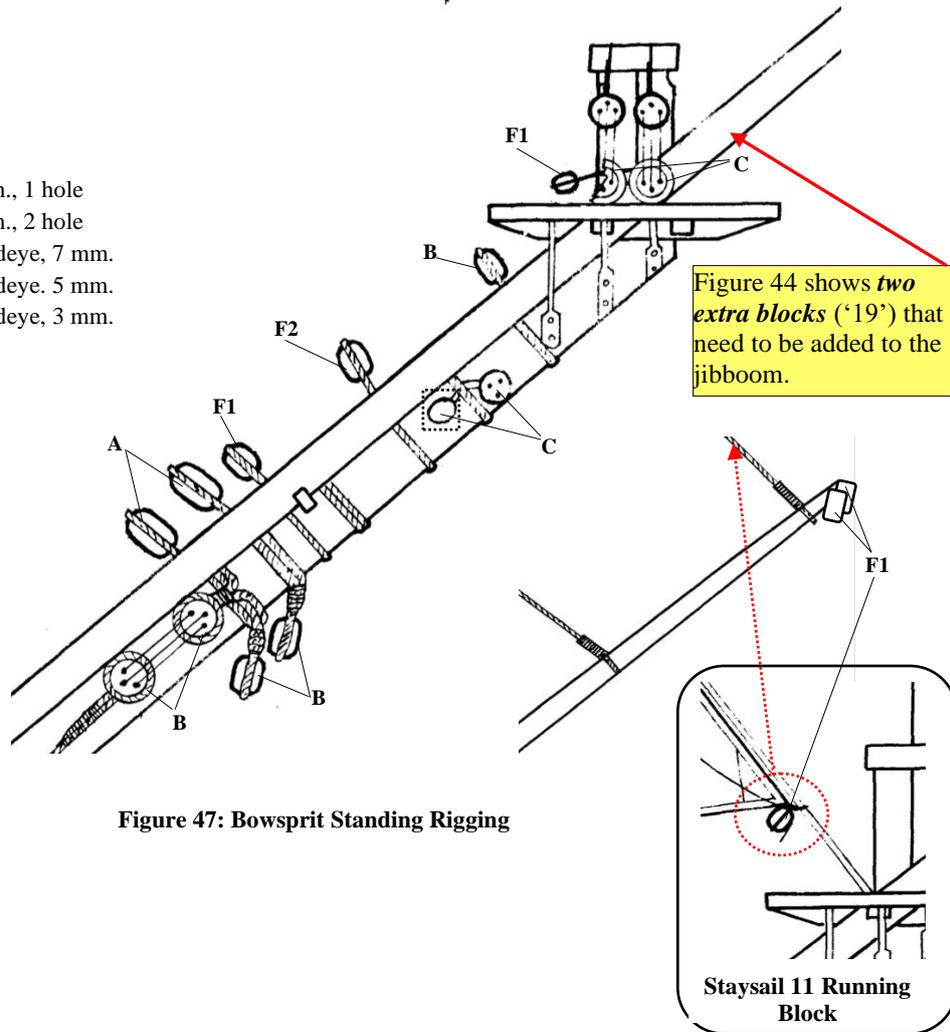
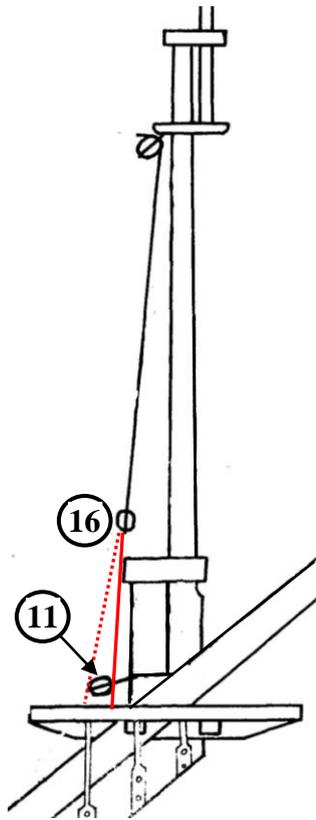


Figure 47: Bowsprit Standing Rigging

Sprit Topmast

Blocks



11: fore topmast stay (outer)
16: backstay pendant to top
17: halliard tackle for topmast yard
18: topmast lifts
19: spritsail lower yard braces

after reeving through block 11, the outer fore topmast stay passes down to knighthead 71

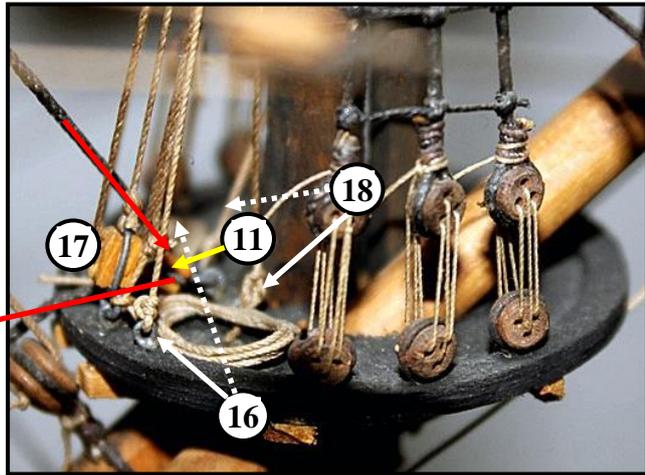


Figure 48: Fixing Points on Sprit Top

- Fig. 46 shows block 11 seized around the knee/topmast in the drawing but the use of an eye-bolt in the photo. The latter is possibly the easier approach ? Builder's choice.
- There is the need for at least FIVE eye-pins on the top.

Sprit Topmast (continued)

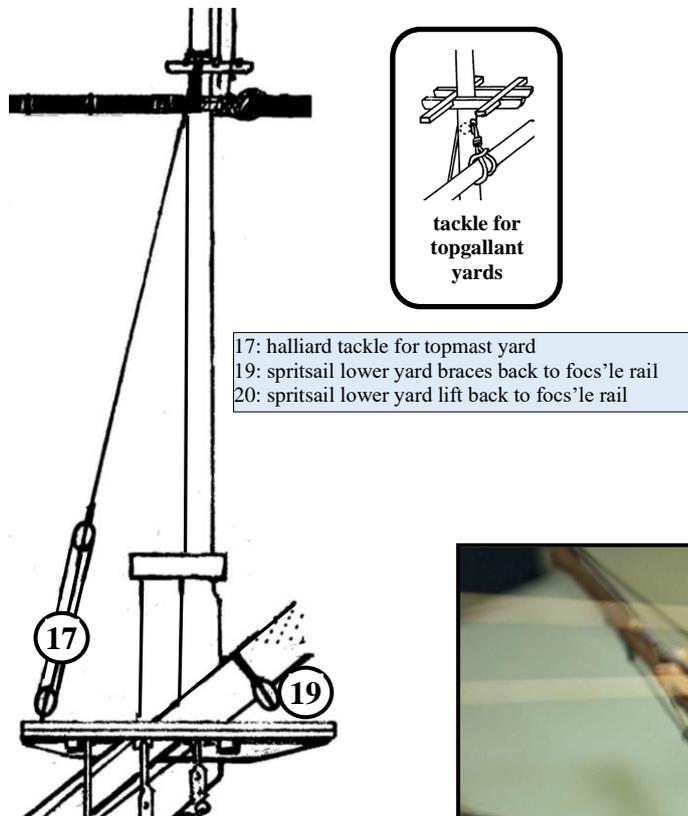
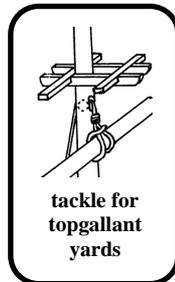


Figure 49: Sprit Topmast Yard Halliard



The complete tackle (17) is shown in Fig. 47 but *only the lower block seized to the top* would be required at this stage.

Blocks 19 (2 x) are associated with the running line back to the ship from the spritsail yard braces.

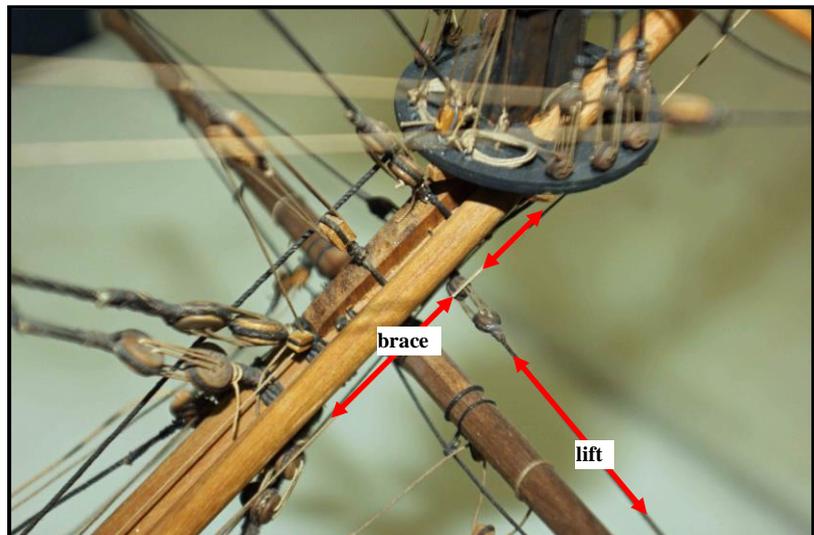


Figure 50: Spritsail Lower Yard Lift and Brace Lines

Sprit Topmast (continued)

Blocks 18 and 21 can be added at this point.

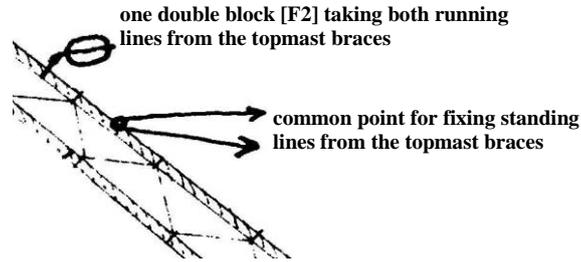
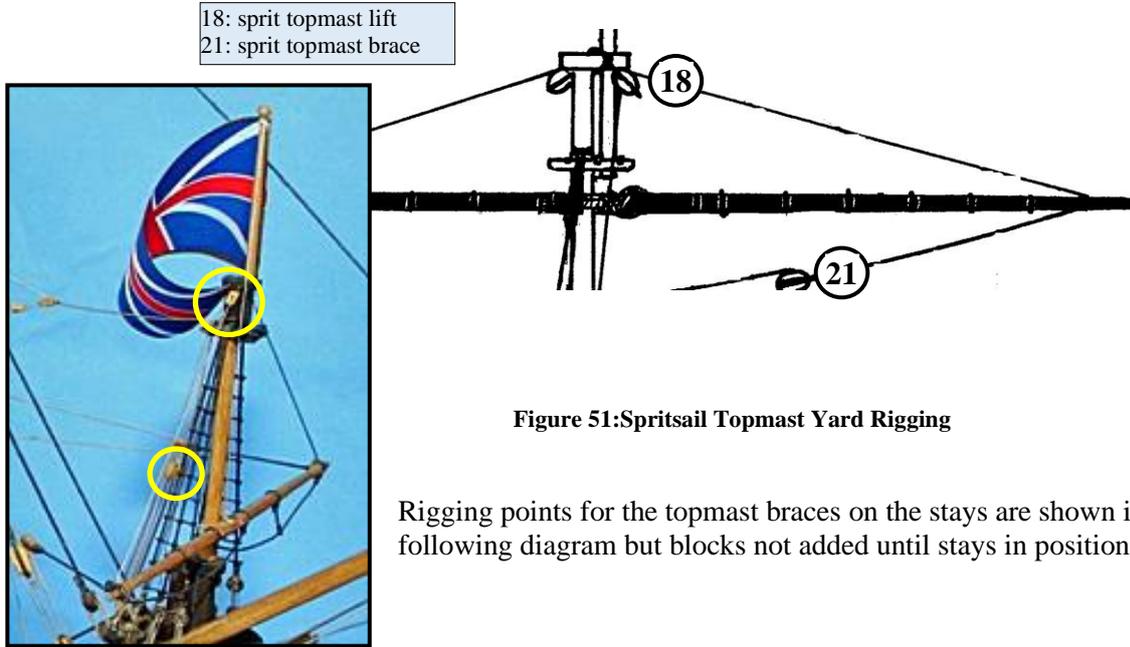


Figure 52: Rigging Points [21] of Braces From Topmast Yard to Foremast Stays

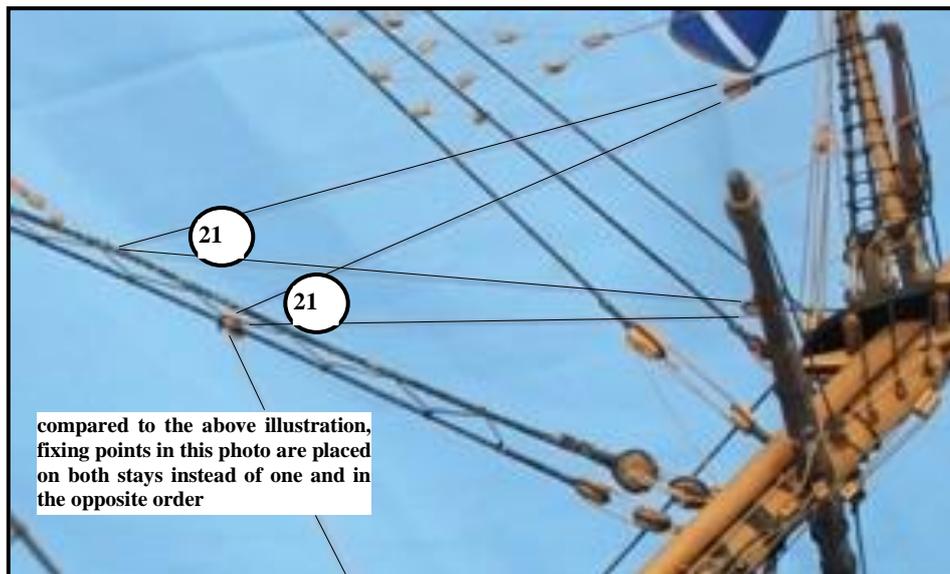


Figure 53: Braces From Topmast Yard to Foremast Stays

Foremast

Foremast – Albero di trinchetto

Fore Yard – Pennone di trinchetto

Studding Sail (stuns'l) Booms

Fore Topmast- Albero di parrocchetto

Topsail Yard – Pennone di parrocchetto

Studding Sail (stuns'l) Booms

Fore Topgallant Mast – Albero di velaccino

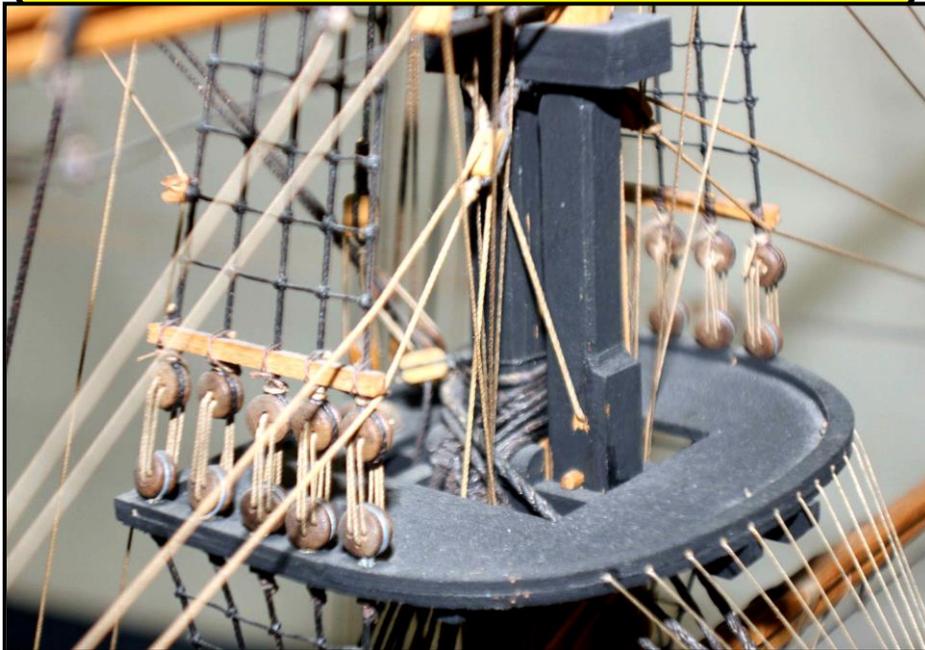
Topgallant Yard – Pennone di velaccio

Flagstaff – Asta per bandiera

After the stays and shrouds, *three* essential areas of rigging to concentrate on (if no sails) are the yard ...

- halliard tackles
- braces
- lifts

Whilst such rigging will not be completed at this stage, the above forms of rigging may be presented in full on the following pages simply to provide an awareness of what will eventually be required. Such presentation will enable the builder to add blocks to various parts of the masting before final installation onto the ship.



Pre-installation of Foremast

Foremast

Blocks 22 are installed before installation of foremast.

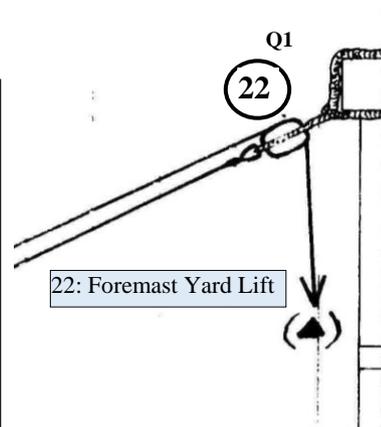
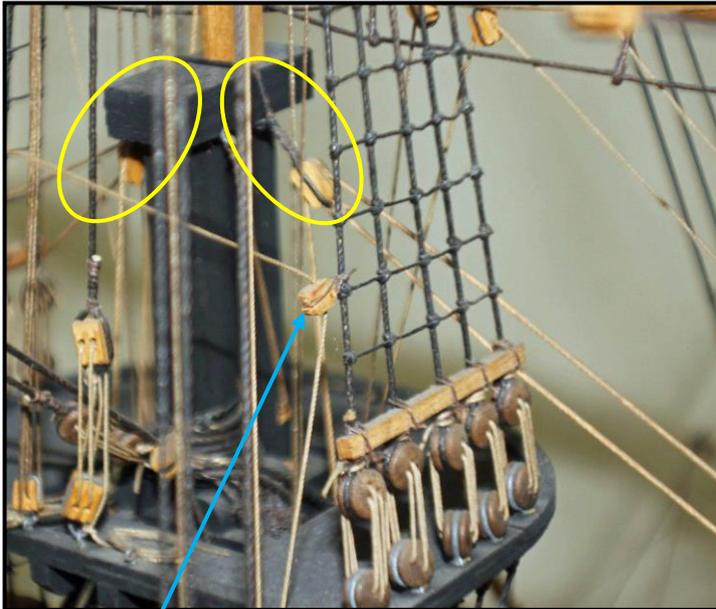


Figure 54: Foremast Yard Lift Block

Blocks To Be Added After Shrouds

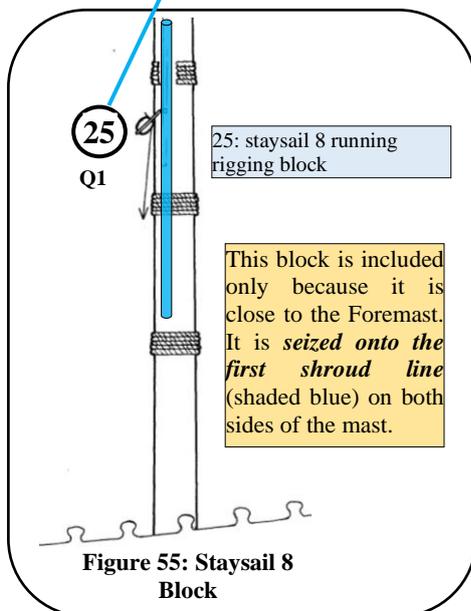


Figure 55: Staysail 8 Block

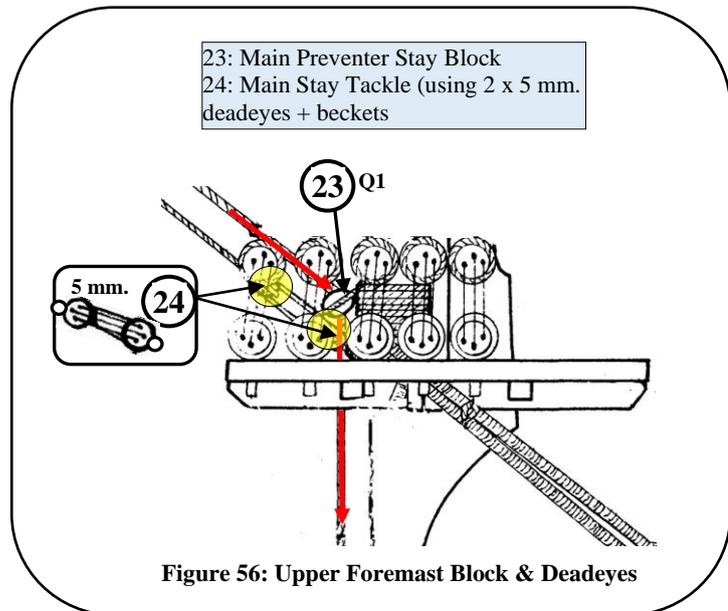


Figure 56: Upper Foremast Block & Deadeyes

Block 25 in the above photo is in a much higher position than indicated in the drawings.

Foremast (continued)

Main Preventer Stay Block



A: Deadeye, 7 mm.

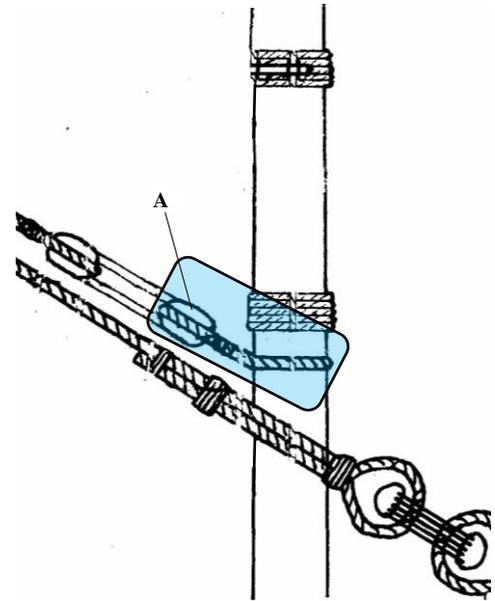


Figure 57: Main Preventer Stay

Topmast

The only block that could be added is that for staysail 10. Many will leave this off the mast.

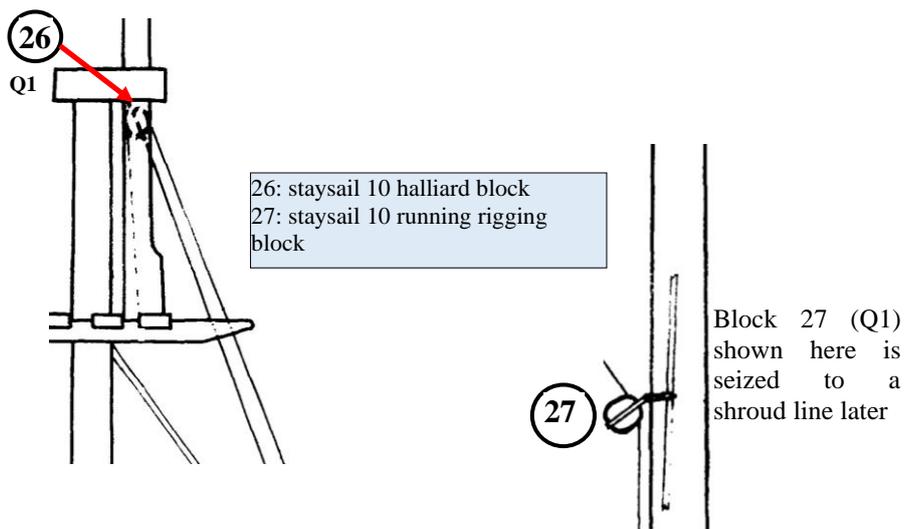


Figure 58: Staysail 8 Rigging

Topgallant Mast

Blocks 31 (F1) are installed before installation of fore mast.

Block 32 (F1) (running) could be installed at this point.

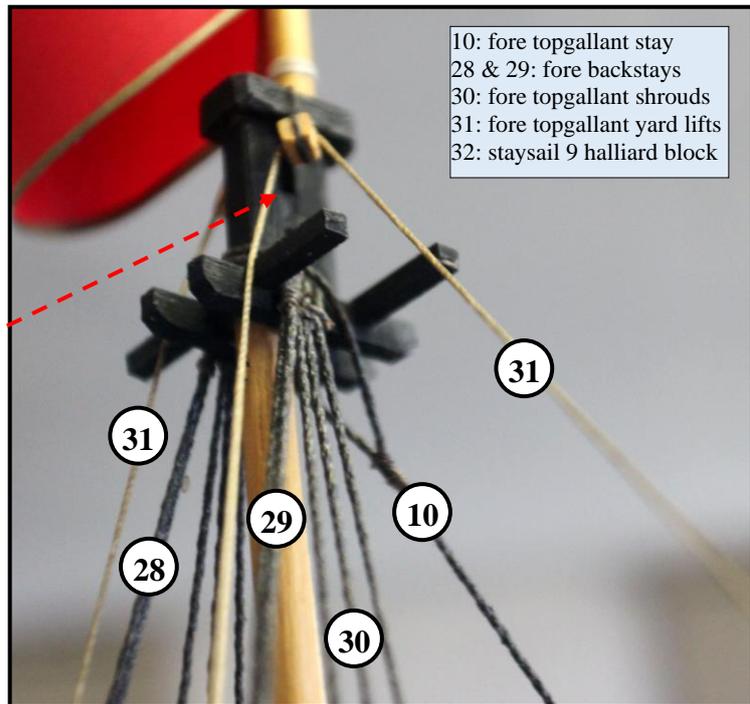
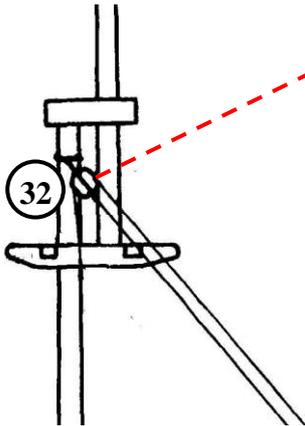
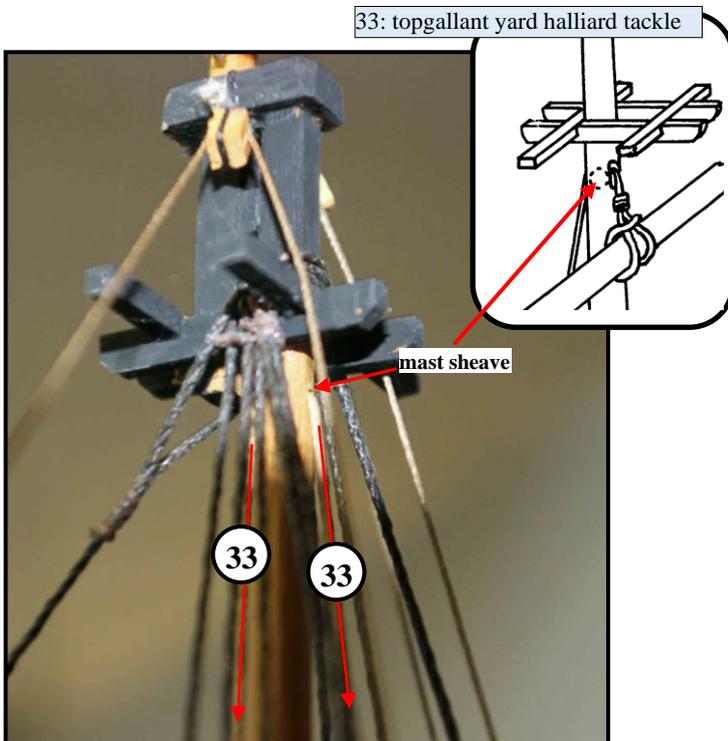


Figure 59: Topgallant Mast Blocks 31 and 32

Topgallant Yard Halliard Tackle



Sheave in topgallant mast should be created before installation of the foremast.

Eye-pin should be installed on topgallant cross tree before installation of the foremast.

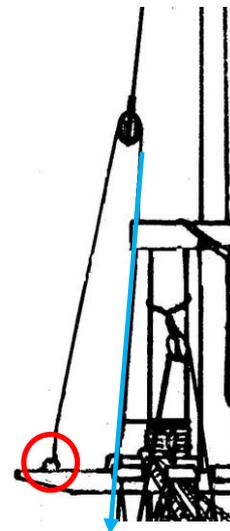


Figure 60: Main Topgallant Halliard Tackle

Main Mast

Main Mast - Albero di maestro

Main Yard – Pennone di maestra

Studding Sail (stuns'l) Booms

Main Topmast – Albero di gabbia

Topsail Yard – Pennone di gabbia

Studding Sail (stuns'l) Booms

Main Topgallant Mast – Albero di velaccio

Topgallant Yard – Pennone di velaccio

Flagstaff – Asta per bandiera

After the stays and shrouds, *three* essential areas of rigging to concentrate on (if no sails) are the yard ...

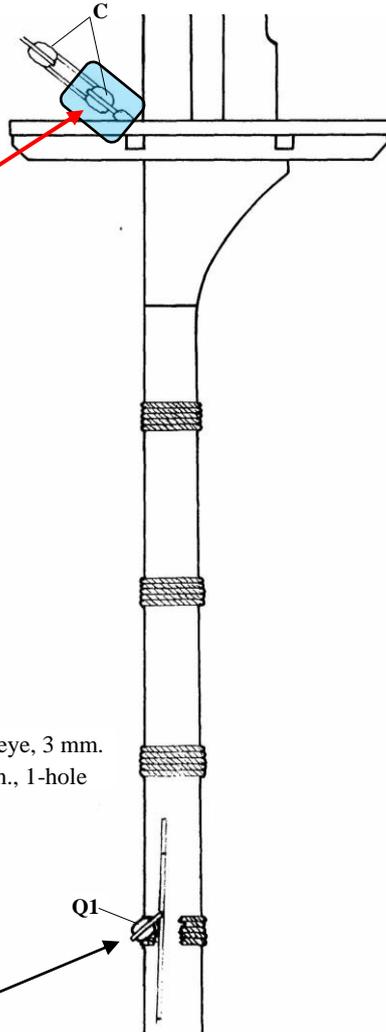
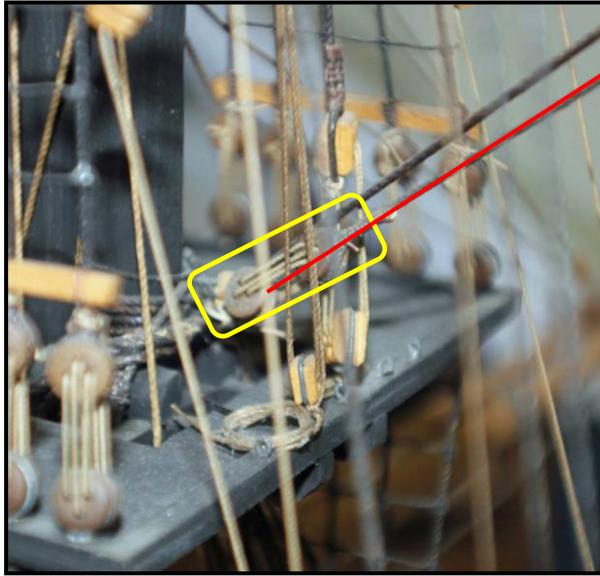
- halliard tackles
- braces
- lifts

Whilst such rigging will not be completed at this stage, the above forms of rigging may be presented in full on the following pages simply to provide an awareness of what will eventually be required. Such presentation will enable the builder to add blocks to various parts of the masting before final installation onto the ship.



Pre-installation of Main Mast

Lower Mast



C: deadeye, 3 mm.
F1: 3 mm., 1-hole

Blocks 34, 35 and 36 after shrouds are in place.

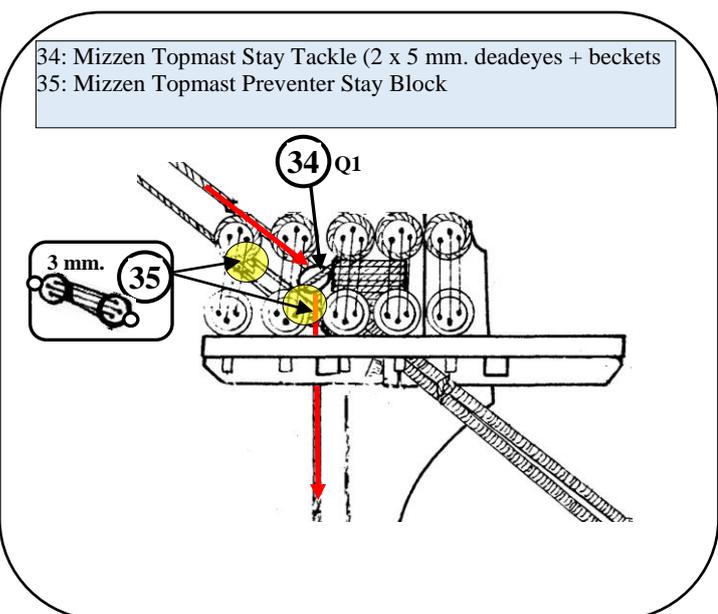
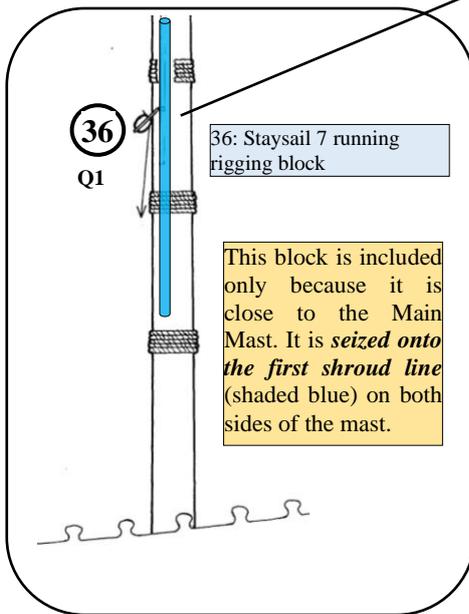


Figure 61: Main Lower Mast Rigging

Main Mast (continued)

Topmast

The only block that could be considered is connected with staysail 8.

Topgallant Mast

Stay tackle for staysail 9 (refer to Sheet 12) but generally omitted.

Lift blocks (F1) – Fig. 59

Leech line blocks (F1) beneath crossreef and only used for rigging with sails. Not shown in photo.



Figure 62: Topgallant Lift Block

Mizzen Mast

Mizzen Mast – Albero di mezzana

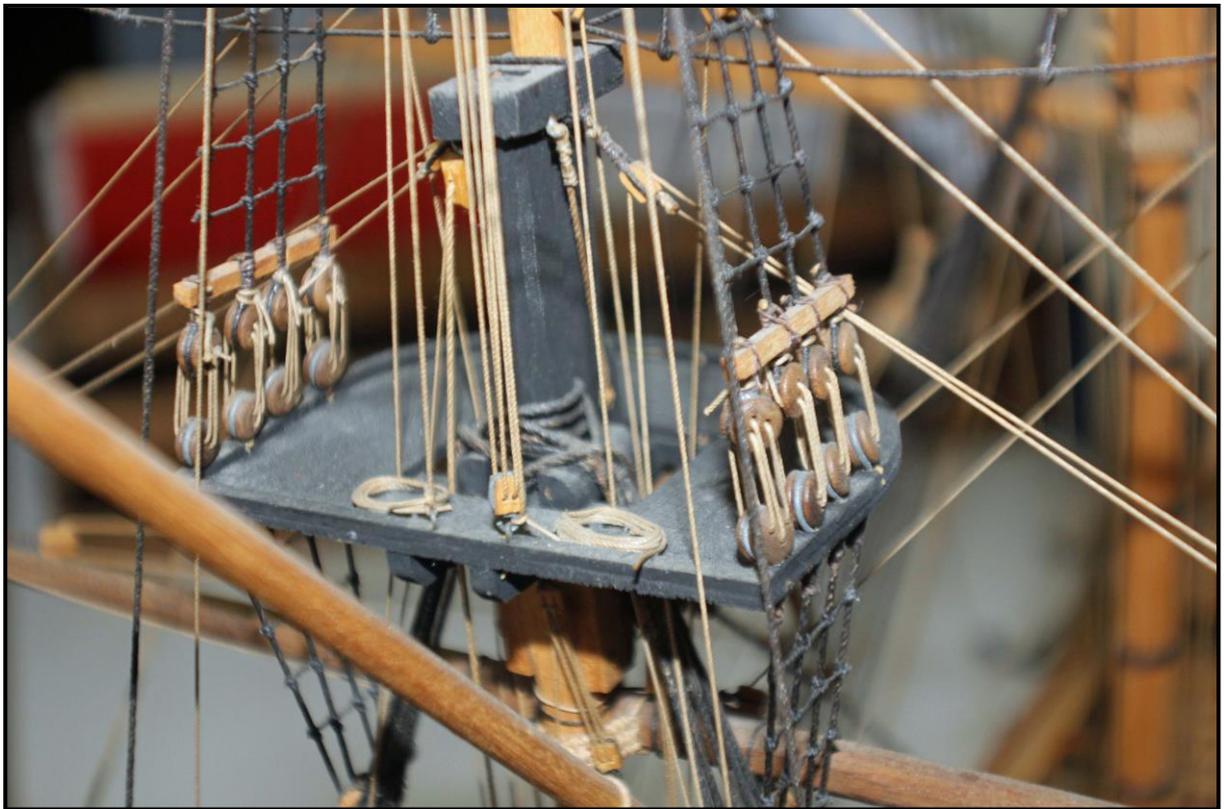
Mizzen Yard – Pennone di mezzana

Topsail Yard– Pennone di belvedere

Mizzen Topmast – Albero di contromezzana

Lateen – Antenna di mezzana

Flagstaff – Asta per bandiera



Pre-installation of Mizzen Mast

Lower Mast Topmast

The preliminary rigging associated with both these masts is straightforward and clearly shown in Plan Sheet 11.

Rigging Nomenclature for Blocks/ Lines

Blocks and lines are numbered according to the following table. The same number is used, where necessary, for a particular block and/or the line it is connected with.

1: fore stay	22: foremast yard lift
2: starboard bobstay	23: main stay block
3: port bobstay	24: main preventer stay tackle
4: starboard bowsprit shroud	25: staysail 10 running rigging block
[4': port bowsprit shroud – hidden]	26: staysail 10 halliard block
5: fore preventer stay	27: staysail 10 running rigging block
6: fore topmast stay halliard line	28: fore backstay
7: inner fore topmast stay	29: fore backstay
8: fore topmast preventer stay	30: fore topgallant shrouds
9: jib stay	31: fore topgallant yard lift
10: fore topgallant stay	32: staysail 9 halliard block
11: outer fore topmast stay	33: topsail yard halliard tackle
12: sprit topmast shrouds	34: mizzen topmast stay block
13: sprit yard collar	35: mizzen topmast preventer stay block
14: starboard spritsail lower yard lift	36: staysail 7 running rigging block
[14': port spritsail lower yard lift - hidden]	
15: staysail 11 running block	
16: backstay pendant to foremast fore stay	
17: halliard tackle for topmast yard	
18: sprit topmast lift	
19: spritsail lower yard brace	
20: spritsail lower yard lift	
21: sprit topmast brace	