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 Friedrich Wilhelm zu Pferde

17th. Century German Frigate

Launched 1684

Scale 1:48

Checked the *Essential* Resource Information File ?

08.SPAR CONSTRUCTION

February 2023

My *interpretive* review 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.

*This is **NOT** an instructional manual but illustrates my own interpretation based on the drawings and the supplied kit.*

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

Reference Texts

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).

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Contents

P.T.O.

Illustrations

[The figures below are not hyperlinked]

Chapter 1: MATERIAL

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**.

Kit Components

14 x 710mm. (1), 12 x 357mm. (1), 10 x 720 mm. (1) ; 8 x 570 mm. (1); 6 x 700 mm. (1); 6 x 580 mm. (1); 5 x 360 mm. (1); 4 x 650 mm. (1); 3 x 610mm. (1); 3 x 200mm. (1); 2 x 70mm. (1)

N.B. Euromodel have always correctly supplied the 14 mm. rod described above, but have only recently discovered a 'typo' (editing error) incorrectly showing that to be 12 mm. That is why I have shown it in a bold red colour.

Explanatory Note

Where the size 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

A1: **Bowsprit Mast** – Albero di bompresso **(14 mm.)**
A5: **Sprit Topmast -** Alberetto di parrochetto di bompressa **(5 – i.e. 6 mm.)**
A8: **Jackstaff -** Freccia di parrocchetto di bompressa **(2 mm.)**

B: FOREMAST

B1:**Fore Lower Mast** – Albero di trinchetto/ Albero maggiore di trinchetto **(12 mm.)**
B4:**Fore Topmast-** Albero di parrocchetto **(8 mm.)**
B7:**Fore Topgallant Mast** – Alberetto di pappafico di trinchetto **(4 mm.)**
B10:**Fore Royal Mast** – Freccia di pappafico di trinchetto **(3 mm.)**

C: MAIN MAST

C1:**Main Mast -** Albero maggiore di maestra **(14 mm.)**
C4:**Main Topmast** – Albero di gabbia **(10 mm.)**
C7:**Main Topgallant Mast** – Albero di pappafico di maestro / Alberetto n gran velaccio **(6 mm.)**
C10:**Main Royal Mast** – Freccia dell'a di pappafico di maestro **(3.5 – i.e. 4 mm.)**

D: MIZZEN MAST

D1:**Mizzen Lower Mast** – Albero di mezzano/ Albero maggiore di mezzana **(8 mm.)**
D4:**Mizzen Topsail Mast** – Albero di contromezzano/ Albero di belvedere **(5 mm.)**
D7: **Flagstaff** – Freccia dell'albero di belvedere / Asta per bandiera **(3 mm.)**

E: ENSIGN STAFF

E:**Ensign Staff Flag Pole** – Asta bandiera di poppa **(4 mm.)**
E1:**Supporting Mast for Staff Pole** - Maschio dell'a di bandiera **(8 mm.)**

Diameters & Lengths

- Individual mast section lengths will need to be cut from the supplied longer lengths in the kit.
- These lengths (and their diameters) are shown in the table below. The kit lengths (which allow a small excess) are indicated by the **grouped shading**. Example: Bowsprit Mast 21 and Foremast 25 have finished lengths of 295 and 385 mm. respectively and will be cut from a kit length that is 700 mm. long.
- The mast lengths (each indicated by an asterisk '*') in the table below are the correct lengths and represent a correction made to an error in the drawings. This has been remedied in Euromodel's production but in my kit, the lengths provided were shorter. Some modification may be necessary T

MASTS		Diameters								
		14	12	10	8	6	5	4	3	2
BOWSPRIT	No.			Lengths						
	A1	340								
	A5							101.5		
	A8									58
	A9					246				
	A10							111		
FOREMAST	B1		350							
	B4				234					
	B7							110		
	B10								73	
	B11			335					276	
	B12					213				
	B13							97		
MAIN	C1	362								
	C4			245						
	C7					120				
	C10							85		
	C11			375					314	
	C12					226				
	C13							108		
MIZZEN	D1				331					
	D4						136			
	D7								80	
	D8					336				
	D9						217			
	D10							109		
ENSIGN	E							144		
	E1				36					

* Those lengths shaded in red need to be checked carefully against the drawings in Plan Sheet 6 – both the 'stated' lengths and the 'drawn' lengths.

Chapter 2: MAST INTRODUCTION

Any range of modifications can be made to the construction of the masts and the drawings certainly suggest some of these. If you choose to do some research, then more bewildering changes will become obvious. This is a file of the mast construction in this build and is not a prescription for all builders !

Mast Generalisations

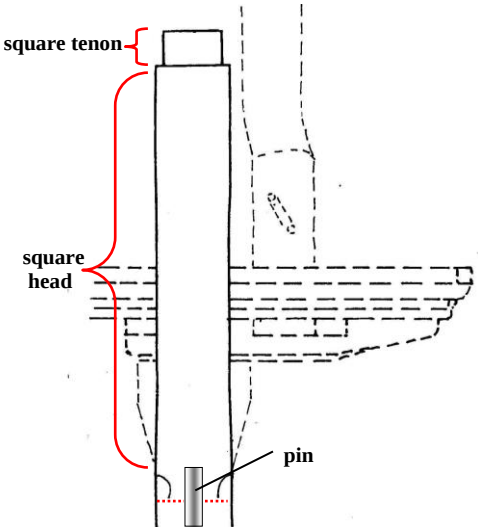


Figure 1: Foremast Head

There were two ways to tackle the fore, main and mizzen lower mast. It could have been entirely made from a tapered round rod, in which case the space between the trestletrees beneath the top may need to be reduced slightly. Using only the rod, the square head cannot be produced since there is insufficient cross-sectional material (based on Pythagoras's Theorem).

More exactly, the mast can be made from a shorter slightly tapered rod as described ***and*** a square section at the head (Fig. 1) which is the method used but it did require more work and more material. It was planned to paint this top, cap and associated mast sections black so different coloured timbers would not be a problem. Both approaches required a tenon on top.

The topmast typically has an off-set square cross-section and if this is to be incorporated in the mast, it will have to be made from a separate piece and added on.

Figure 2: Advanced Topmast Heel

Figure 3: Circular Top

Tops & Crosstrees

In this time period, platforms known as tops were fitted on the lower masts. They were to be found on the bowsprit as well as each of the lower masts.

There was a supporting trestle underneath the top consisting of a pair of …

- trestletrees (running fore and aft)
- crosstrees (running athwartships)

Collectively, this structure was called the crosstree !

Figure 4: Crosstree

The central opening – termed the '*lubber's hole*' – allowed for both rigging and masting to pass through the top.

There are also to be found a number of crosstrees (without the overlying tops) on the upper masts

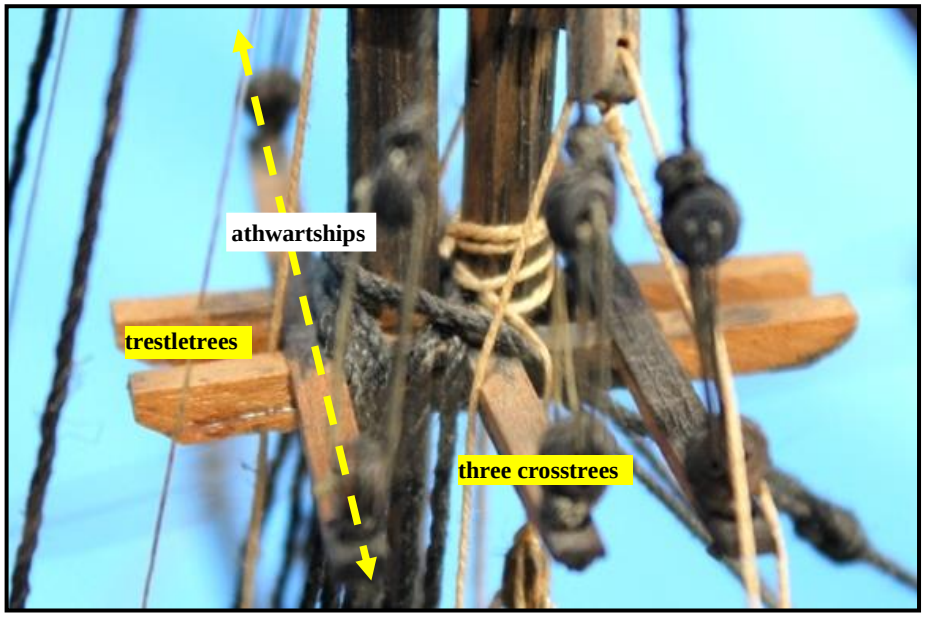


Figure 5: Typical Crosstrees

Figure 6: fid (different ship)

fid hole

In the heel of the two topmasts and topgallants (fore and main), the *'fid' hole* is shown. A fid (wooden or metal peg) is fitted into this hole and its projections from the hole rested on the trestletrees to stop the mast from sliding through. Not all builders include them.

Bands

Each mast section was usually made up from a number of timber lengths held together by rope or metal. Somewhere in the mid to late eighteenth century rope wooldings gave way to metal bandings. There is conjecture about exactly when that happened. The drawings for this 1774 ship show metal bandings with a width of ***1 mm.*** (3 inches on this scale).

Friederich Wilhelm model vary with either ...

- *plain round masts* with no wooldings or banding,
- *addition of rope wooldings*, or
- *metal bandings* as shown.

With the three choices listed above, all have been utilised in producing some beautiful models. Rope wooldings are commonly utilised but banding was used in this build.

If Adding Wooldings

- 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 a kit build, I would use the following method …

Figure 7: Beginning Woolding Serving

One end of the rope is bent into an extended loop and then served over as shown in Fig. 8.

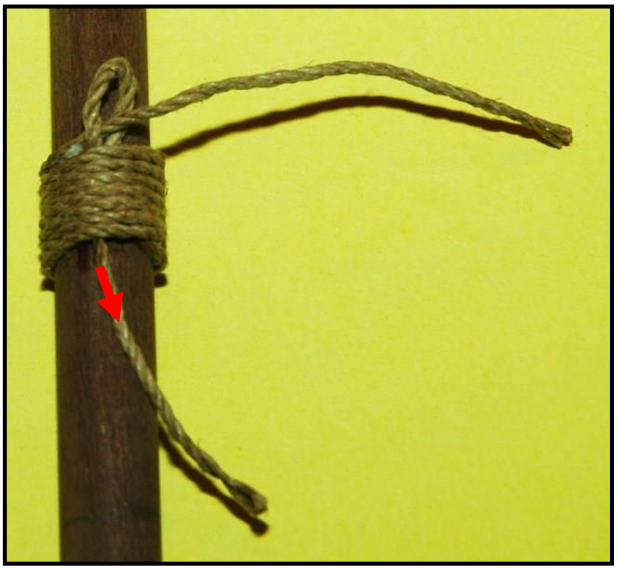


Figure 8: Finishing Woolding Serving

After creating the correct number of turns, the end is inserted through the loop and pulled tightly underneath the top few turns (Fig. 9). Any conspicuous bulge is gently tapped down with a hammer. The ends are cut off.

- The number of wooldings is left to the builder.

Mast Cap Tenon

Figure 9: Simplifying Mast Cap Construction

A ***square tenon on the mast head*** was selected as per the drawings and the work involved in producing a square mortise hole in the mast cap is significant. Most builders will opt for a round hole as a more simple process. Figure 10 shows this very basic approach – although the portion projecting above the mast cap should have been cut off.

Figure 10: Mast Wedges

Partners

The masts were held in position by a circular series of mast wedges or partners between the decking and the mast itself and frequently covered by a canvas fairing called the ***mast coat***.

Photos, both of the ***Batavia***, were copied from MSW and reproduced by courtesy of Tadeusz43.

Figure 11: Mast Coat

Figure 12: No Mast Collar

Even though mast collars were an essential part of ship construction, the photo opposite illustrates a very common approach – no mast collar. It almost appears that some glue was run in around the mast ?

Mast Raking

According to Goodwin (1987) …

- foremast & main mast generally set at 90^{o} ***to the keel*** but sometimes inclined aft at angle of 1^{0}.
- mizzen mast was inclined aft somewhere between 4 - 5^{0}.

> 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.

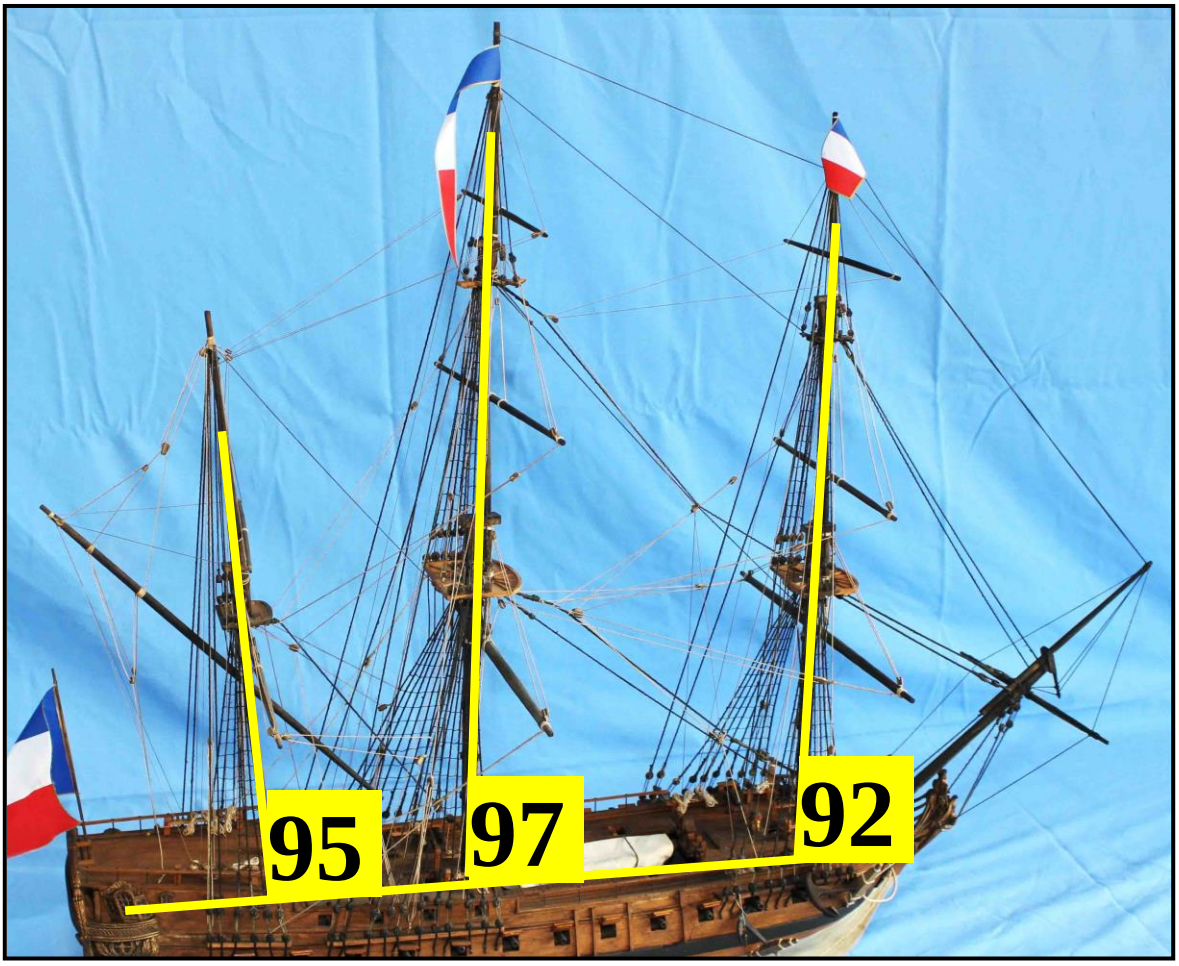


Figure 13: Raking Relative to Main Deck

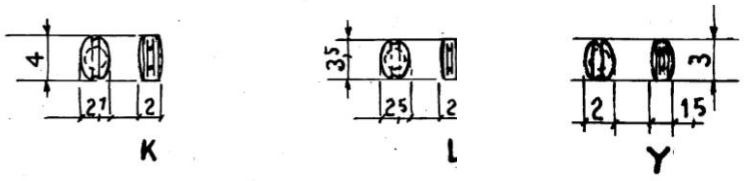
Chapter 3: BLOCK INTRODUCTION

This information is included here since some pre-installation of blocks on the masts is necessary.

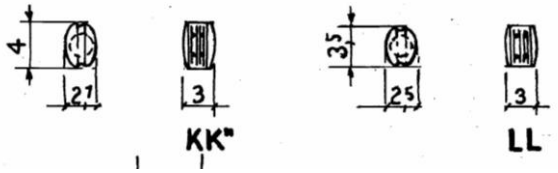
Supplied Blocks

N.B. The plan sheet shows a larger variation of block sizes than that provided in the kit. This kit has amalgamated a number of blocks with similar sizes together – e.g. Y, L and K all use the same sized block.

K + L + Y : **3mm., 1 hole(132) -** Bozzelli da mm. 3 a 1 foro (Art.22/026)

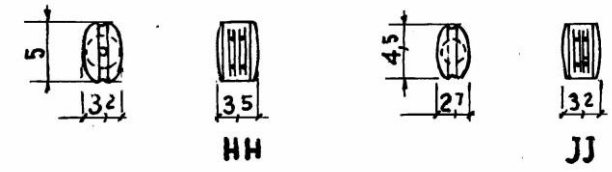


KK + LL : **3mm., 2 hole(20)** - Bozzelli da mm. 3 a 2 foro (Art.22/031)

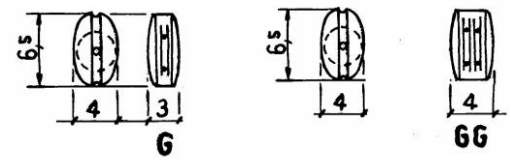


H + J : 5mm., 1 hole (50) - Bozzelli da mm. 5 a 1 foro (Art.22/028)

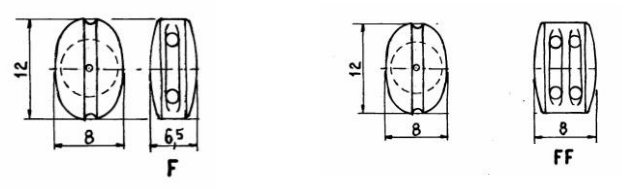
HH + JJ : **5mm., 2 hole (15)** - Bozzelli da mm. 5 a 2 fori (Art.22/032)



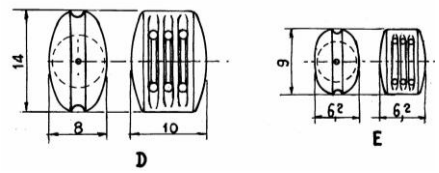
G : **7mm., 1 hole (15)** - Bozzelli da mm. 7 a1 fori (Art.22/030)
GG : **7mm., 2 hole (5)** - Bozzelli da mm. 7 a 2 fori (Art.22/034)



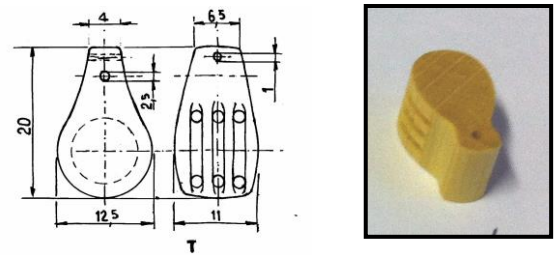
F : **10mm., 1 hole (5) -** Bozzelli da mm. 10 a 1 fori (Art.22/116)
FF : **10mm., 2 hole (5) -** Bozzelli da mm. 10 a 2 fori (Art.22/115)



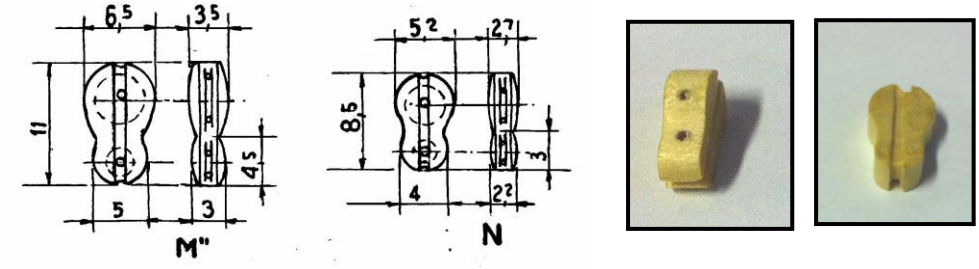
D + E : **10mm., 3 hole (5) -** Bozzelli da mm. 10 a 3 fori (Art.22/114)



T : **Viol, 16 mm. (2) -** Bozzelli a violino da mm. 16 (Art.22/129)



M : **Heart, 11 mm.(20) -** Bozzelli a cuore da mm. 11 (Art.22/084)
N : **Heart, 7 mm. (12) -** Bozzelli a cuore da mm. 7 (Art.22/083)



N.B. Euromodel supplies M & N as heart blocks; technically they are fiddle blocks but commercially difficult to source and the heart blocks can be rigged in a ‘similar’ manner.

Non-Supplied Blocks P,Q,R,S & U

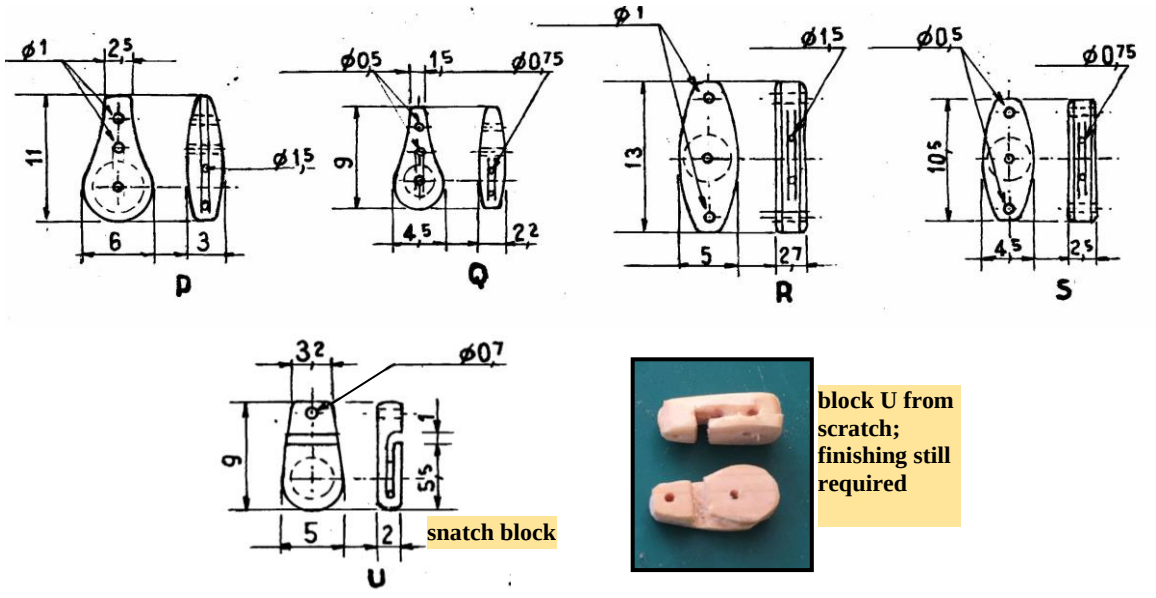
Euromodel drawings are renowned for their depth of detail and it is here that the ship builder may sense some frustration. The blocks are rather unique for this time period and in producing this kit, it was not possible for Euromodel to replicate these blocks as the cost of their exact production would be prohibitive. It is important to remember that the kit is only the basis for building a ship but the drawings show far more detail in many areas than would normally be expected.

The block drawings are a classic example – the detail is there for the enthusiasts to build their own blocks from scratch but alternative supplied blocks (**M**) that are physically quite different in shape *could* be used.

To the builder, this may seem a compromise but in the overall build, it will not be observed.

In this build there was no hesitation in creating blocks that were a replication of those shown in the drawings. This was not a difficult exercise but simply one that consumed much time and patience (many blocks were broken during this time). The exercise created an awarendess that production of such blocks would not be commercially viable.

P (4), Q (6), R (4), S (6) & U (4)



block U from scratch; finishing still required

N.B. Close-up with the camera produces ‘unkind’ images showing flaws not normally observed. There are distinct variations between the block produced and the drawing – not deliberate but they occurred during production. A hole has been drilled for the spindle going through the ‘sheave’.

Chapter 4: BOWSPRIT

Bowsprit Mast – Albero di bompresso

Sprit Topmast - Alberetto di parrochetto di bompressa

Jackstaff/ Flagpole- Freccia di parrocchetto di bompressa

During this build, you might like to come back to this photo and ***identify a number of errors***

The following pages include both ***detailed spar construction*** and ***rigging information*** that would allow a significant amount of pre-installation of blocks, deadeyes, cleats, etc. to occur before the space around each spar becomes constricted.

Bowsprit Mast

bompresso

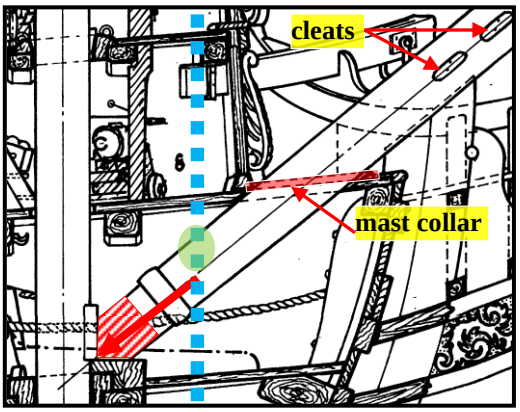


Figure 14: Bowsprit Seating

The bowsprit extends through a mast collar on the deck and down to touch the foremast (Fig. 14). All dimensions are measured from the mast forward end. The final length from the mast collar down to the aft end will depend on your construction. In this build the final length started off at 345 mm. but was reduced in length to allow for the ***vertical alignment of the aft-most metal cleat over the stem post***. This alignment is a critical factor.

Frame 2 (broken blue line) needs to have the underside surface of its top beam chamfered (shaded green area) to allow the bowsprit to pass underneath (Fig. 17 on the next page shows more detail).

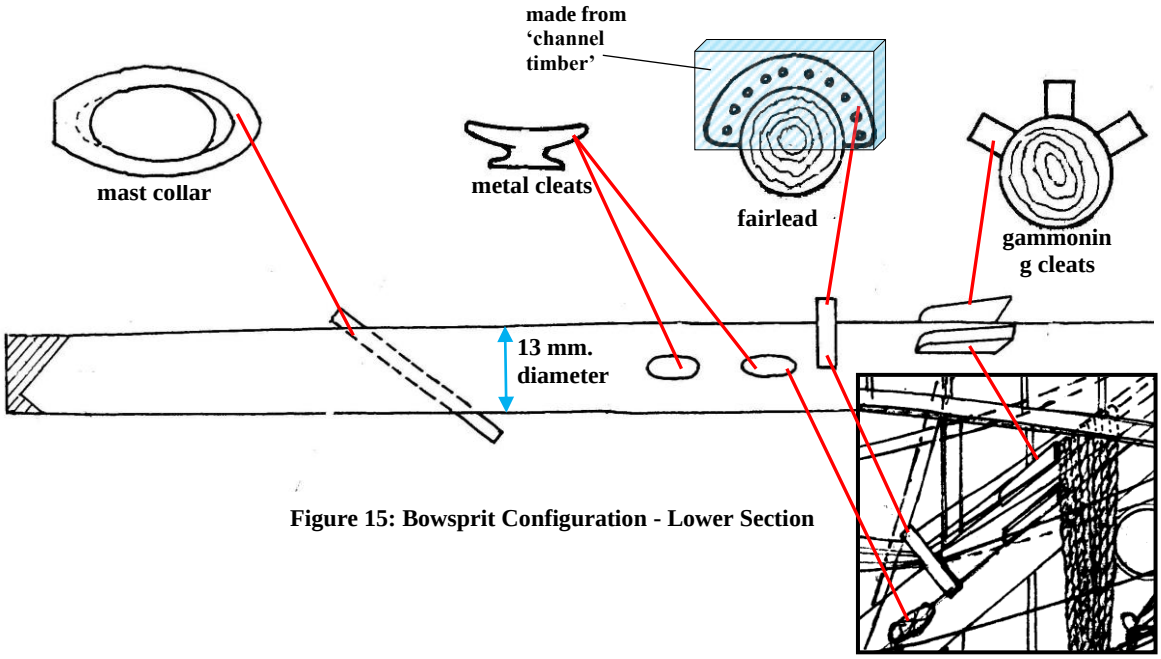


Figure 15: Bowsprit Configuration - Lower Section

Figure 16: Example of Bowsprit Mast Collar

The fairlead is produced from the ***3 x 15 x 400 mm***. timber supplied for the channels (blue shaded area above).

Figure 16 illustrates an interpretation of the bowsprit 'collar' on another build for this ship. Timber is not supplied in the kit and so must be made from scrap. I was not surprised at this as production of an inetgral thin collar would have been difficult.

Adjustments

In order to fit the bowsprit mast in position, three adjustments are required:

- forming a ***concave channel*** in the sloping top edge of the false keel lying beneath the bowsprit,
- creating a ***curved opening*** into Frame 2 that will then allow the bowsprit to pass through, and
- forming a ***concave surface*** at the end of the bowsprit that will allow it to fit against and partially around the foremast.

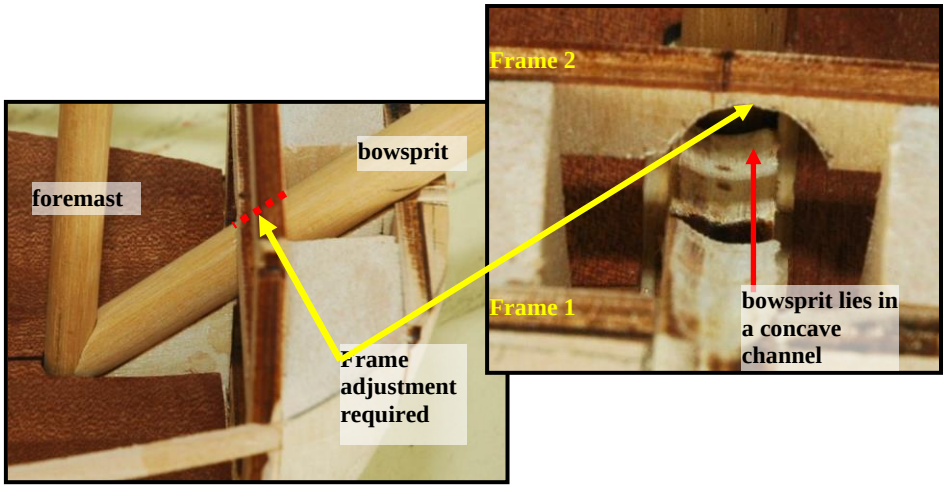


Figure 17: Adjustments Required to Fit Bowsprit

Mast Completion

- three eye pins were added at the forward end as per the drawing.
- wood staining to be carried out after sprit topmast is fixed in position.

Sprit Topmast Knee

maschio della scassa

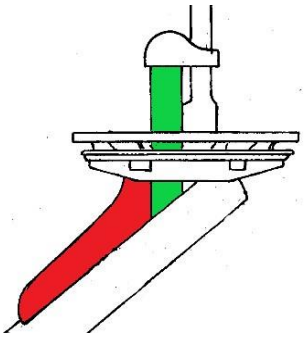


Figure 18: Sprit Topmast Knee (drawing & another model)

[Lees, 1984] states that the width of the knee is half that of the bowsprit. So … the lower curved section (red) in Fig. 18 made from ***6 mm.*** scrap walnut conforms closely to that figure. The under surface of the knee was made concave to fit the bowsprit. The vertical upright section (green) was made from ***6 x 6 mm.*** timber.

Figure 20 : Spritmast Knee

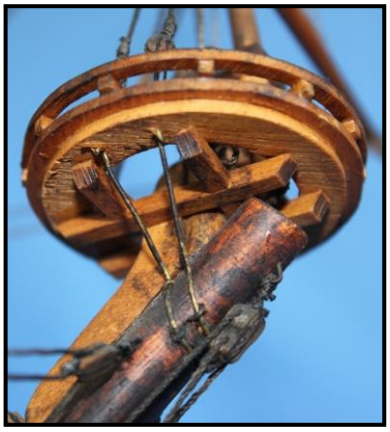


Figure 19: Another Build Knee

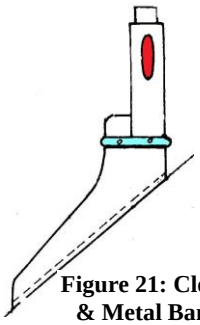


Figure 21: Cleats & Metal Band

- two metal cleats added after top is fixed in position
- wood staining to be carried out after sprit topmast is fixed in position.

testa di moro

Mast Cap

Supplied: ***10 x 16 mm***.
Drawing: ***8 x 14.5 mm***. Some modification is required.

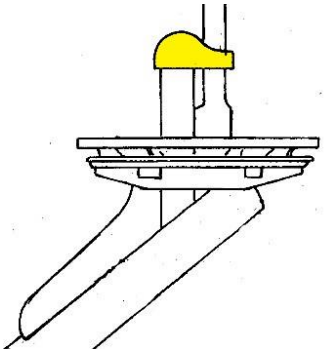


Figure 22: Mast Cap

Sprit Topmast

alberetto di parrocchetto di bompresso

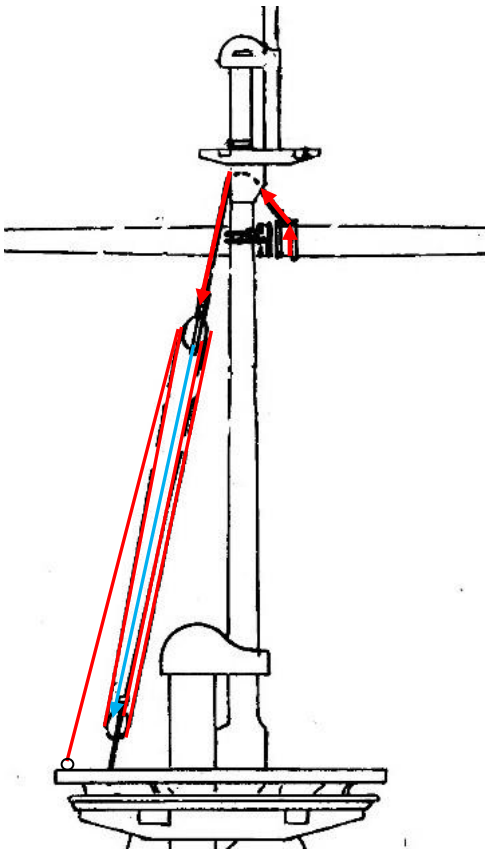


Figure 23: Halliard Tackle for Topmast

- topmast was made from 4 mm. rod limewood supplied, but ....
- the ***6 x 6 mm.*** square heel was produced from scrap walnut,
- the topmast was tapered upwards. A ***4 mm.*** hole was drilled into the heel and topmast glued into it. The drawings show that the top portion is ***3 mm.*** square and so a square section was created from scrap limewood rod and pinned & glued that onto the rounded section (Fig. 24 below). (a number of models have been seen with only using the rounded mast),
- most builds seen do not have a sheave built into the topmast. It should be there because it *is* part of the drawings and *is* used for the halliard tackle (Fig. 23 opposite). The sheave opening was estimated to be only ***3.0 x 0.7 mm.*** so the easiest way of simulating the sheave was to drill two holes – one top and one bottom and cut out a small sliver between them on each side.

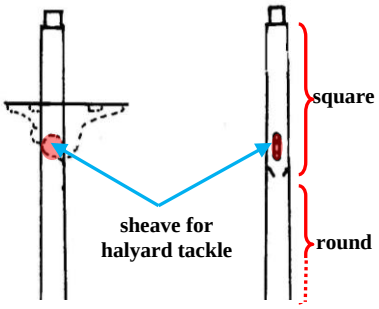


Figure 25 : Sheave Position in Topmast

some builders will ignore making this square heel as a major simplification

Figure 24 : Spritmast

Top

coffa di bompressa

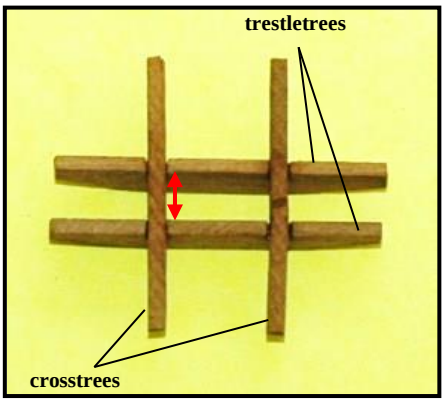


Figure 26: Top Crosstree

In the late 17C and early 18C, tops were fitted to just the lower masts as well as the bowsprit. The tops were supported by a crosstree (Fig. 26). The crosstrees supporting the top (and the trestletrees underneath that support 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.

There are four timbers:

- **trestletrees** – two pieces 2.0 x 4.0 x 35 mm., and
- **crosstrees** - two pieces 2.0 x 2.0 x 35 mm.

Deck Opening

Generally, the construction of the tops remained unchanged through the centuries. In the case of the sprit top, there was only a small opening in the deck of the top just large enough for the bowsprit knee and the topmast heel to fit. The drawing shown in Plan Sheet 6 does not show the opening but in view of the previous comment, the rectangular space between the crosstrees and trestletrees (yellow space in Fig. 27) was used as a guide.

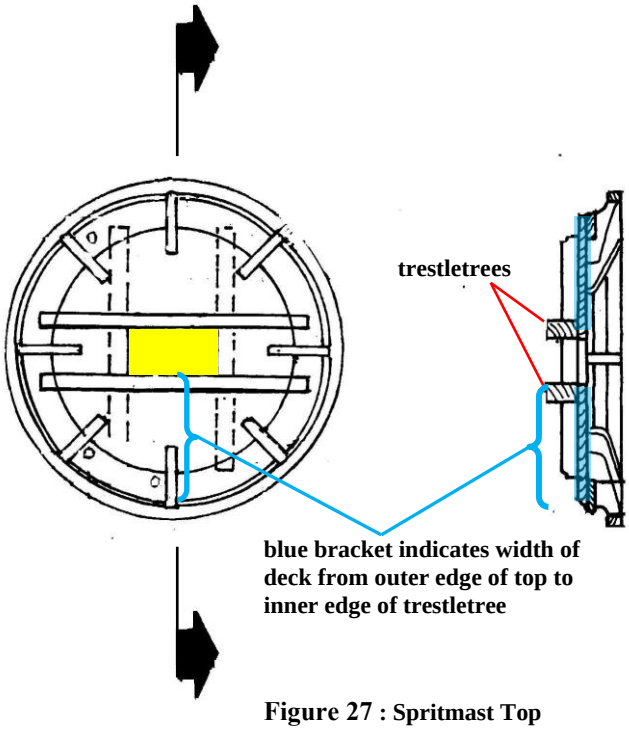


Figure 27 : Spritmast Top

Crosstree Problem

After the crosstree had been constructed as per the drawing dimensions, it was soon realised that the opening was not long enough to accomodate both the bowsprit knee and the topmast heel. The fine point here is that the two crosstrees actually would have passed through the knee and heel. The advice here would be to construct the crosstree as per the drawing and modify it later. This problem was put to one side until starting the constructing of the actual platform and lower ring.

Decking Material

Historically, the top decking was assembled from two layers of timbers (athwartships and fore and aft) but this is getting a little complex and so as a starting point, a base of thin plywood is supplied averaging 0.6 mm thickness. An alternative is to cut the decking from one piece of timber and then scoring the joints with a knife.

Given that the decking averaged between 3 – 4 inches in thickness, at this scale of 1:48 the model deck thickness would be somewhere between 1.6 – 2.1 mm. This parameter allowed me to plank over the plywood with some scrap 1.0 mm. planking strips.

Crosstree Opening Dilemma Explained

As commented previously, the timbers shown with a total width of 18.9 mm. will not fit into the space created in the crosstree.

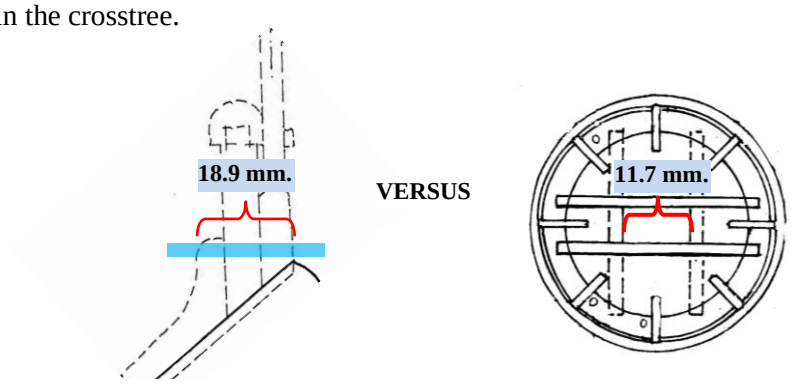


Figure 28: Bowsprit Deck Opening Dilemma

Crosstree Opening Dilemma Resolved

The two crosstree timbers were cut out and the length increased to the required 18.9 mm. The following images show what both a scratch builder and this kit build did.

Figure 29: A Scratch Builder's Solution

Evident here is the rectangular opening surrounding the bowsprit timbers. The heel of the topmast is round rather than the square section shown in the drawings. Also visible is the upper ring fixed over the ribs rather than against the outer rib ends. Further examples of choices that can be made.

Ribs and top ring were yet to be fixed to the top. *The top has not been fixed in position* – needs to be levelled.

Figure 30: My Solution

sprit topmast (cont.)

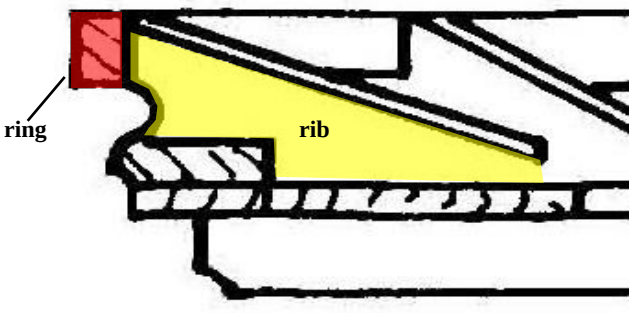


Figure 31: Historical Placement of Top Upper Ring

Ribs

Eight ribs were distributed radially at even spacings around the top to support the upper ring. The rib size was altered a little due to the thickness of the lower ring. The ribs were made from ***1.0 x 5.0 x 8.0 mm***. (except for two which were only ***9.0 mm***. long). An easier, basic approach would have been to use short sections of ***2 x 2 mm***. timber.

Upper Ring Dilemma

The text written by Mondfeld (1989) and the drawings created by Euromodel are greatly valued with both indicating that the upper ring is attached to the ***end*** of the supporting ribs (Fig. 32). The dilemma faced was that the photographs available either showed a flat ring fixed on to the ***upper surface of the ribs*** or a flat strip fixed onto the ***ends of the ribs***. The former approach was ignored.

Figure 32: Completed Bowsprit Top

This upper ring could be made by carefully bending a thin strip. Whilst not indicated in the current Component List, the original list did show that the eight strips of ***2 x 5 x 760 mm***. were to be used to construct this upper circle as well as being used for the wales, cap and pin rails. The ease of bending such a thick strip of wood was questionable.

The solution was to utilise a ***2 x 2 mm***. strip on the ends of the ribs. This material could have been made by carefully bending strips of walnut (cut from the original 2 x 5 x 760 mm.) soaked in ammonia/water with the application of heat.

Located from a model supplier was a timber strip called ‘very flexible beech’ - after soaking it in water for 10 minutes and then using heat from a bending tool, a complete curve was easily produced with such ***ridiculous ease***. With this timber it was best to produce a circle that was too small with the length overlapping. That way, it was then easily opened out and held tightly against the eight ribs without requiring any special clamping whilst gluing. N.B. Before trimming to final size, the timber *must* be allowed to fully dry as there is considerable shrinkage.

Crosstree

crocetta dell'a.tto di parrocchetto di bompressa

Framework timbers: **trestletrees** – two pieces 2 x 2 x 16.5 mm., and
crosstrees - two pieces 1.0 x 2 x 23.5 mm.

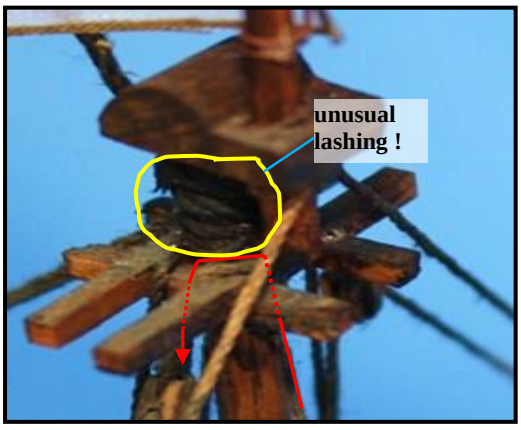


Figure 33: Bowsprit Topmast Crosstree

Because of their small size, the crosstrees at this point were difficult to cut – it proved easier if working from a much greater length and then trimmed to final shape and length after the joints were formed. Crosstrees often had a slight curve aftwards and the drawings perhaps suggest a very slight curve. The curve was ignored.

The only joints were in the trestletrees to a depth of 1.0 mm. Fig. 33 (not this build) shows all four timbers made from 2 x 2 mm. which goes against what the drawings suggest (see note above).

Also evident is an alternative method for reeving the halliard tackle and not using the topmast sheave. The red lines follow the halyard tackle as it passes up from the yard, over the crosstree and down to a block. In the overall picture, this would most likely not be evident to anyone but the builder.

Mast Cap

testa di moro dell'.tto di parrocchetto di bompresso

Drawing: 5 x 8 mm.
Supplied: 8 x 12 mm.

- Size was reduced.
- Two holes created (topmast knee tenon and for the topmast).

Two eyepins, one each side of the cap, installed as shown in Fig. 34.

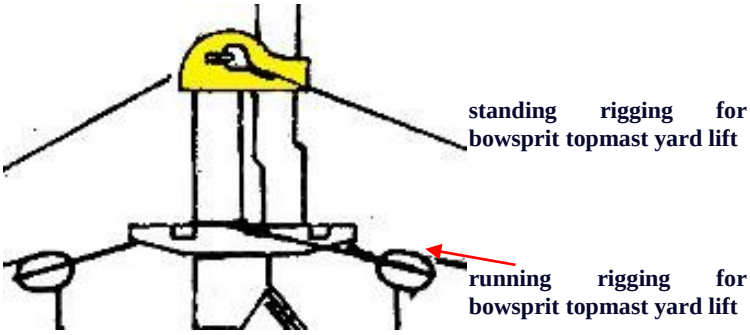


Figure 34: Topmast Cap

Jackstaff

freccia di parrocchetta di bompressa

After tapering the staff from 2 to 1 mm., a small piece of 1 mm. thick walnut planking was glued on top and then shaped into a 3 mm. diameter truck. An fid was inserted into the jackstaff using a small piece of 0.9 mm. diameter brass wire.

Figure 35: Bowsprit Masting Finished Ready to be Part-Painted in Black

Rigging Bowsprit (pre-installation)

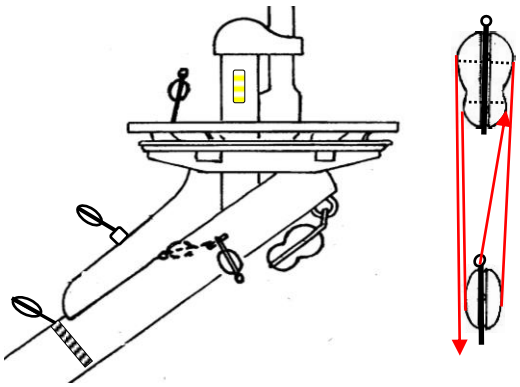


Figure 36: Bowsprit Halliard Tackle

Halliard Tackle

Towards the end of the 17C, the three-part spritsail halliard tackle was used to maintain the yard position on the bowsprit. There was a ***fiddle block*** under the bowsprit near the end and a ***single block (1-hole)*** on the yard. The tackle drawing is *not exactly clear* and some clarification is shown in Fig. 36. The halliard tackle started from the strop of this latter block and tied off on the yard lashing as shown in Fig. 37. 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 eye bolt and fiddle block (*or equivalent*) would be added.

In quite a few builds observed, this lashing is mistakenly taken through to the metal cleats further down, to belaying pins on the focs'le deck or ..... ! The practice shown in Fig. 37 conforms with the fact that the spritsail yard was more or less held in a fixed position as there was little movement possible. Therefore, ease of access was not an issue.

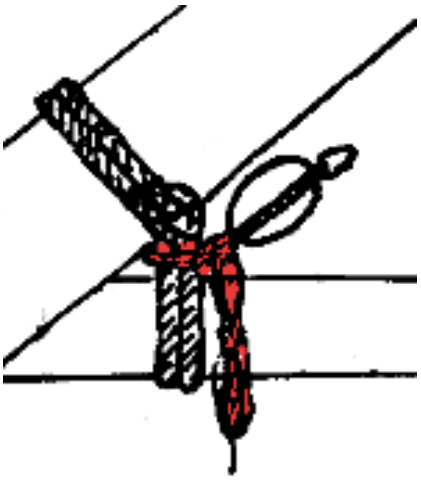


Figure 37: Halliard Tackle Lashing

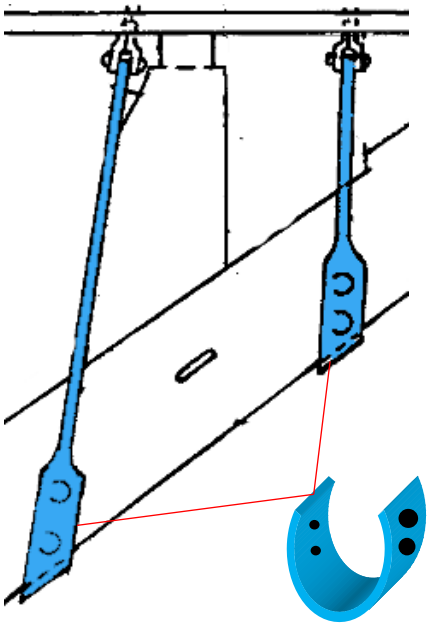


Figure 38: Proposed Interconnecting Chain Plates

Chain Plates

Fig 38 is the Euromodel drawing where the two chain plates wrap around the bowsprit and connect the two plates together. Whilst this is possible to do, the skill demands are rather high so Fig. 39 shows a very simple solution to this feature.

However, the narrow part of the chain plate could be made a little wider and the following is a suggestion (by Mark Tiedens of MSW) that could be utilised.

'The chainplates were made from 0.8 mm brass wire. The ends with the deadeyes were bent around the deadeyes as tight as possible without crushing them and soldered shut. A soft solder with a low melting point was used to prevent the timber from being scorched/ burnt. The wire was flattened in a vice and suitable holes were drilled' How this method is applied to this particular construction is then up to the builder.

Fig. 39 shows the brass wire wrapped around the bowsprit to the other side. In this build, the wire (i.e. chain plate) could just be taken downwards to only partially wrap around the bowsprit.

Figure 39: Simple Chain Plate Solution

Figure 40: Shroud Chainplate

Using A Soldering Gun/ Iron

A higher power (e.g. 100W) soldering gun works better than a low power one. The higher power gun heats the metal very quickly so it just takes a couple of seconds of contact to do the soldering.Using a low power gun may take a minute or two to get the metal hot enough,which actually increases the chance of charring the deadeyes. Also it is important to use a dab of flux so the solder will flow properly.

Metal Cleats

These four cleats need to be fixed in position – their precise function is identified in Fig. 42.

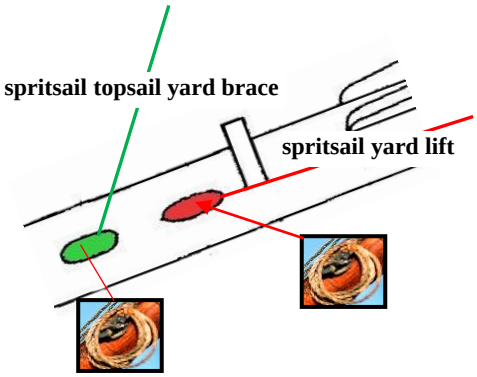


Figure 41: Yard Brace and Lift Rigging Points

Block Summary (excluding the Topmast Top)

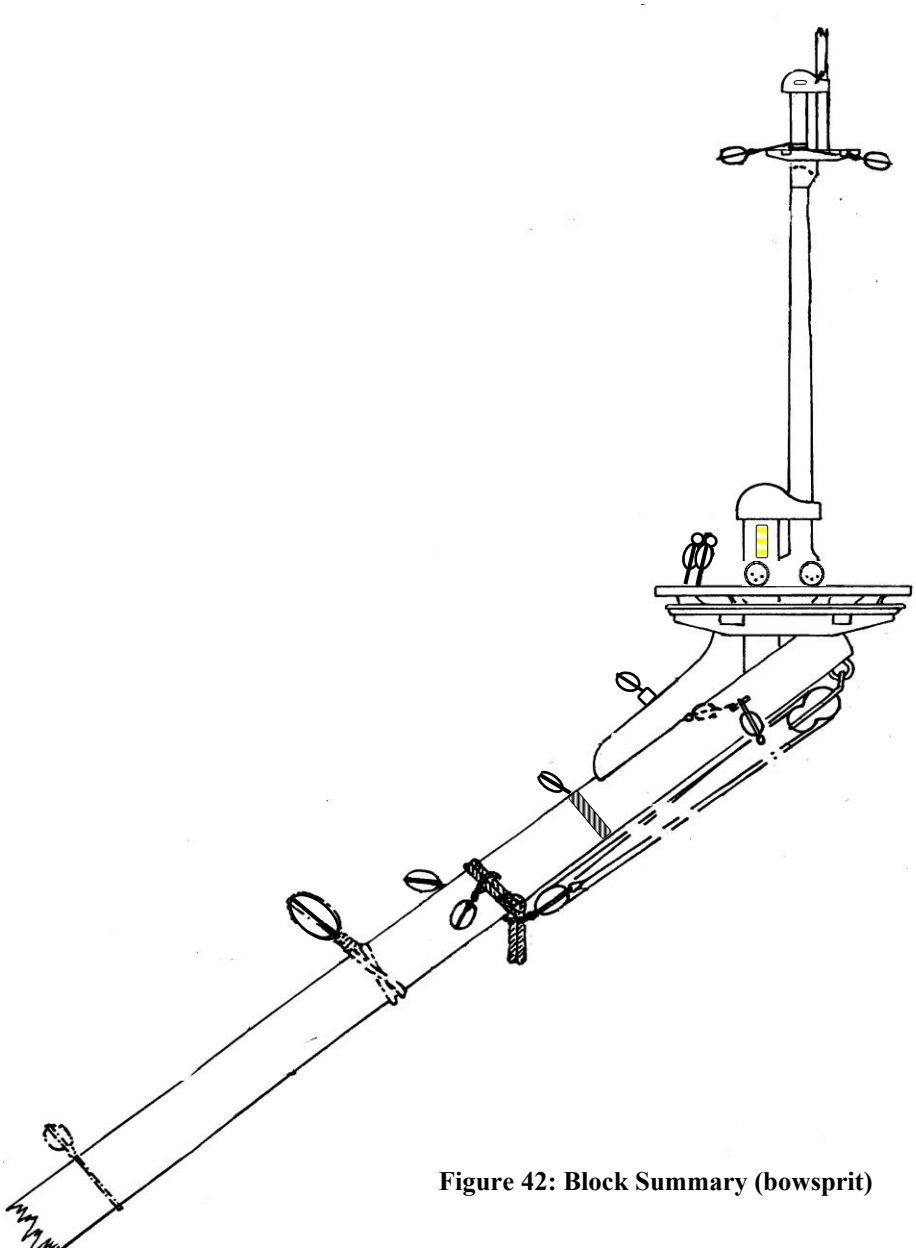


Figure 42: Block Summary (bowsprit)

Rigging Points Summary (Sprit Topmast Top)

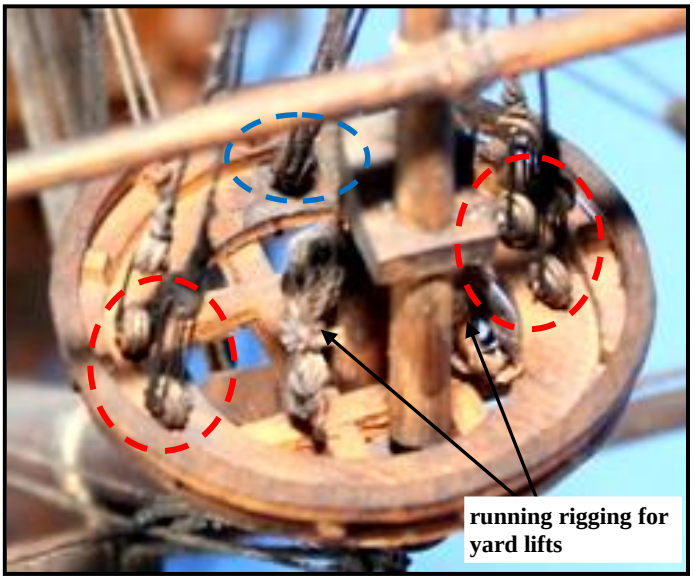


Figure 43: Spritsail Topmast Top Rigging Points

Provision to be made for the following…

- **deadeyes** (four) – two (broken red circles) per side (athwartships) for the topmast shrouds
- **metal cleats** (two) – one per side of the bowsprit knee for the topmast yard running lifts (Fig. 44; Fig. 43 shows coiled up rope)
- **halliard tackle blocks** (two) – (broken blue circle) on the aft side. Only one tackle is shown in Figs. 43 and 44. The topsail halliard tye ran down to a halliard purchase on the top, as does the topgallant stay. Both tackles are important and should be present.

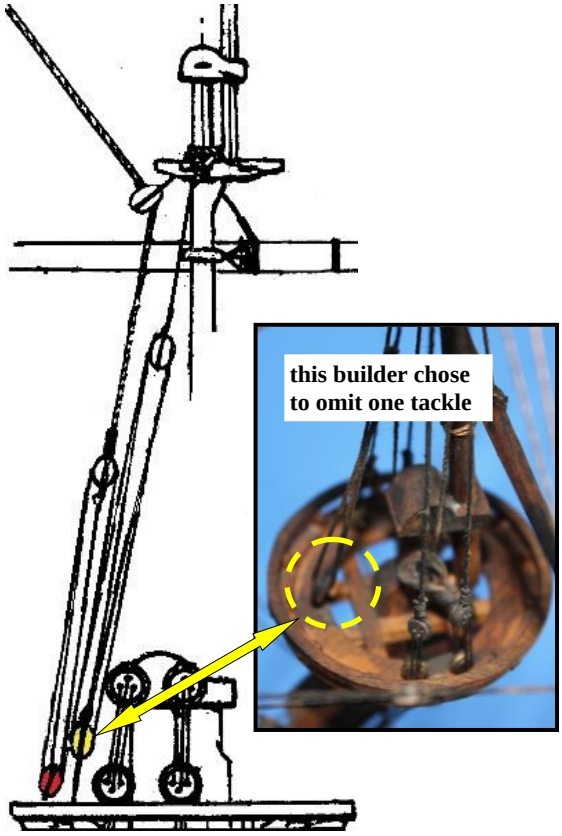


Figure 44: Top Halliard Blocks

The two rigging points are be …

a. topsail halliard (Fig. 44, yellow block)
b. fore topgallant stay (Fig. 44, red block)

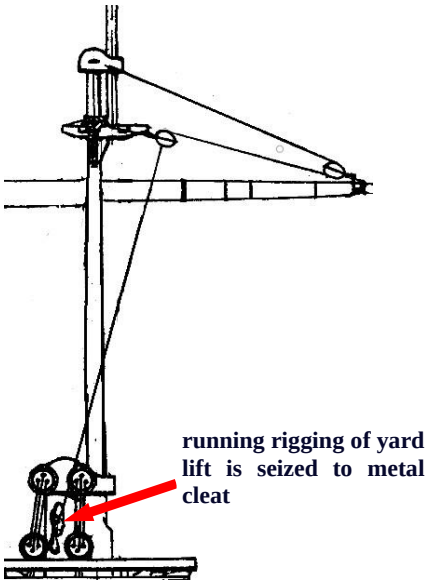


Figure 45:Topmast Yard Lift Running Rigging

Chapter 5: FOREMAST

albero di trinchetto

Foremast

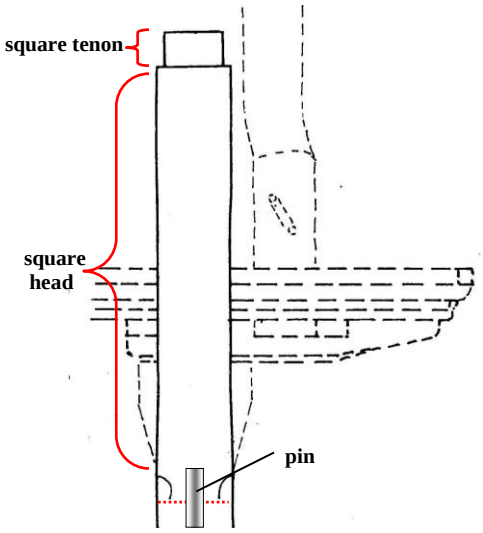


Figure 46: Foremast Head

Composition and Length

There were two ways to tackle this mast. It could have been entirely made from a tapered round rod ranging from 12 – 10 mm. (very straightforward), in which case the space between the trestletrees beneath the top may need to be reduced slightly. Using only the rod, a ***10 x 10 mm.*** square head cannot be produced – insufficient material!

More exactly, the mast can be made from a shorter slightly tapered rod as described ***and*** a 10 mm. square section at the head (Fig. 46) which is the method used but it did require more work and more material. It was planned to paint this top, cap and associated mast sections black so different coloured timbers would not be a problem. Both approaches required an ***8 x 8 mm***. tenon on top.

In either case, the completed length of this mast section will be ***longer*** than in the drawing!!! The length below the forecastle deck in this build was ***84.1 mm***. (Fig. 47). Below the main deck level, the mast will need to be reduced in width across one direction to fit the odd-shaped hole (shaded yellow) provided.

This resulted in an overall length of approx. **350 mm**. (below the square head, ***274 mm.*** of the rounded rod was used). If you are using only the ***12 mm.*** rod, then a short section of 'something' will need to be added to the bottom to increase the length.

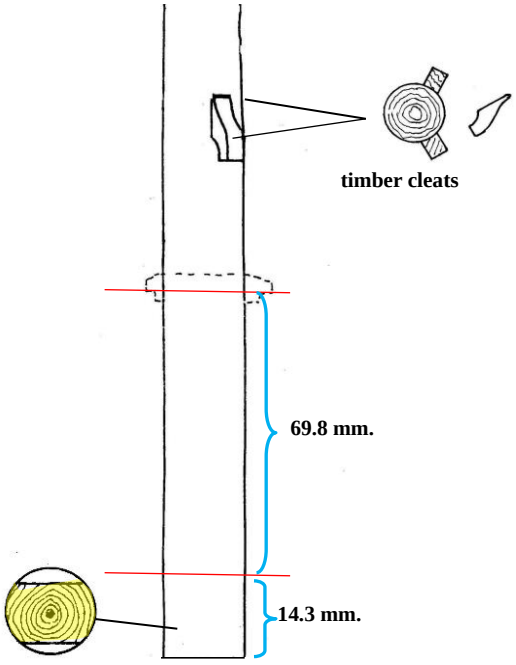


Figure 47: Foremast Heel

foremast (cont.)

Mast Cap

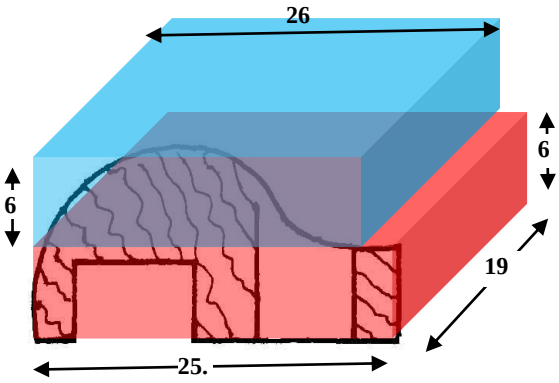


Figure 48: Producing a Cap for the Lower Foremast

According to the drawings, the mast cap supplied was slightly smaller with a base size of ***24.5 x 16.5 mm.*** when it should have been ***25.5 x 19 mm.*** Adding on a ***2 mm.*** thick strip on the 'high' end would have been sufficient to manipulate this block but even so it was felt the width of ***16.5 mm***. was a bit restrictive and so a cap was produced from ***two pieces of scrap*** timber, both ***6 mm.*** thick (refer to Fig. 48). This had the advantage of being able to create a square mortise (hole) right through the pale red block and then covering it with the shaped blue block piece. Euromodel are making the necessary changes to this piece.

N.B. Ensure that holes for the two eye pins are drilled underneath the cap before assembly.

Top

Crosstree Support

Making up the mast top supporting framework are four timbers:

trestletrees – two pieces ***5 x 6 x 62 mm***., and
crosstrees - two pieces ***2.5 x 4 x 60 mm***.

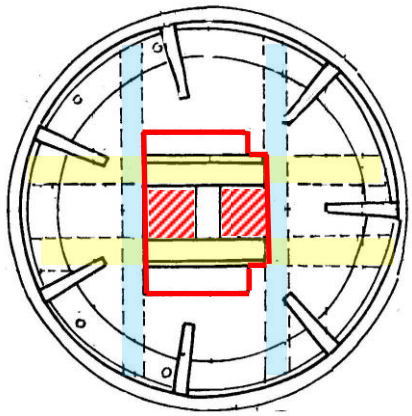


Figure 49:Mizzen Top Showing Lubber's Hole

Deck Opening ('Lubber's Hole')
Generally, the construction of the tops remained unchanged through the centuries. However, looking at the drawings of the three masts (excluding the Bowsprit), the only top drawing that clearly showed a lubber's hole (red line) was the mizzen mast (Fig. 49) . That design was used for the other two masts which conforms to the usual layout – top decking covering the crosstrees (shaded blue) but exposing the trestletrees (shaded yellow) with enough space either side for rigging to pass through.

The top was constructed in the same manner as for the bowsprit top.

However, the deck is different now showing the lubber's hole (refer to text above).

Twelve ribs were distributed radially at even spacings around the top to support the upper ring. The ribs were made from ***2.0 x 6.0 x 13.0 mm***. The ribs were also longitudinally tapered as shown in the drawings. Again, 'very flexible beech' soaked in water for the upper ring was used.

Figure 50: Absence of Bolsters

Bolsters

The bolsters on the top of the trestletrees were created from ***4 x 5 mm.*** scrap timber and sanded to create a quasi-quadrant shape and over which the shrouds will be ultimately pulled down – position shown by yellow arrow in adjacent figure. A number of builds have been observed where this feature has been ignored (Fig. 50). The bolsters were included in this build.

Mast Cheeks

The cheeks were cut from the supplied ***4 x 17 x 150 mm***. and tapered downwards from ***4 to 3 mm.***

Topmast

Figure 51: Advanced Topmast Heel

The following illustration (Fig. 51) of the topmast construction centers around the fact that the mast heel at the bottom is an off-set 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 & head*** 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.

2a. ***Create the off-set square mast heel from other timber*** and then glue + pin to the round mast. More work but it was not consider too difficult. However, it was intriguing to note the ***foot dimensions of 8 x 8 mm.*** when the width between the trestletrees in B2 was ***10 mm.*** It was felt necessary to add a thin piece of packing either side where the heel passes through the trestletrees. A 'sheave' (pulley) needs to be simulated in the mast heel.

2b. ***Creating the mast head from other timber***

A quandary occurs at this point – as it does with other similar mast sections. The rounded mast below the head is finished at ***6.0 mm.*** diameter and so the minimum finished width of the head above it must be ***6.0 mm.*** to fit. Mathematically, it follows that this would be formed from a rod with a minimum diameter of ***8.48 mm***. The original rod diameter in the kit varied considerably from ***7.90 – 8.17 mm***. in diameter.

Solutions :

- form a smaller head size and work around that (too basic?),
- use a thicker piece of timber to start off with (too extreme ?)
- glue and pin a head made from separate scrap timber. This latter method was chosen.

DRAWING INTERPRETATION OF B4

The stated dimension for tapering shows the maximum ***8.0 mm***. at the bottom tapering upwards to a minimum of 6.0 mm. My measurement from the drawing determined a tapering from ***7.8 mm***. upwards to ***6.0 mm***. (these drawings were created before the digital age and CAD…. so your call).

Cheek

Refer to the notes on the main topmast. The ***4 mm.*** thickness provided can be used but was reduced down to the stated ***3 mm.***

Crosstree

Making up the framework are four timbers:

trestletrees – two pieces ***3 x 3.5 x 29 mm***., and
crosstrees - two pieces ***2 x 3 x 30 mm***. **(Component List states 2 x 2 mm. - your call)**

Mast Cap

The supplied piece was not altered (length was correct and the width only 1 mm. wider) but as always the finished diameter for the topgallant mast to fit through must wait until later. For ease of construction, the square hole was made circular – far easier to drill than carve out !!!

Topgallant Mast

This mast could be made simply by tapering the supplied rod from ***4 mm***. up to ***3 mm.***

Having made the small off-set mast heel, it was decided not to produce the mast head as a separate piece due to the following reasons …

- the diameter of the mast is much smaller compared to the other mast sections making pinning difficult, and
- there is a sheave to simulate thus leaving little room for the pin in the mast head.

The mast above the heel & the mast head was produced as one piece from some ***5 mm***. rod and reduced down to the required taper. There was ample material remaining to form the squared mast head (***3 x 3 mm***.).

Crosstree

The drawing specifications are contained within the mizzen mast drawings.

The bowsprit drawings show that B8 and A6 are the same…
…..IGNORE THIS as it is misleading with smaller dimensions.

Making up the crosstree framework are four timbers:

trestletrees - two pieces ***2 x 2.5 x 18 mm***., and
crosstrees - two pieces ***1 x 3 x 22 mm***.

Mast Cap

Supplied piece slightly different in width (***8 mm.***) to the drawing size (***10 mm***.) but not a problem. There are two eye pins, one each side.

Flagstaff

Starting with ***3 mm***. rod, this was tapered to ***2 mm.***

Chapter 6: MAIN MAST

Main Mast

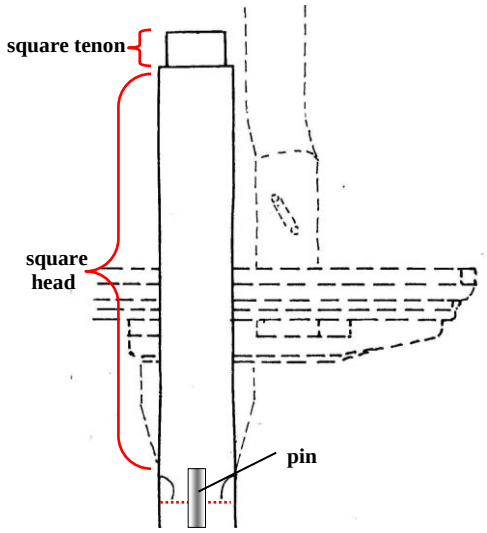


Figure 52: Main Mast Head

Composition and Length

There were two ways to tackle this mast.

- It could have been ***entirely made from a tapered round rod*** ranging from ***14 – 12 mm***. (very straightforward), in which case the space between the trestletrees beneath the top may need to be reduced slightly. Using only the rod, a ***12 x 12 mm.*** square head cannot be produced – insufficient material!

- More exactly, the mast can be made from a shorter slightly tapered rod as described ***and*** a ***12 mm.*** square section at the head (Fig. 52) which was the used but it did require more work and more material. It was planned to paint this top, cap and associated mast sections black so different coloured timbers would not be a problem. Both approaches require a ***10 x 10 mm***. tenon on top.

In this build, the *depth from the quarter deck surface down to the mast step base was **92.14 mm***. (Fig. 54) being approx. ***8 mm***. longer than indicated in the drawing (Fig. 53). Below the square head, ***297.3 mm***. of the rounded rod was used).

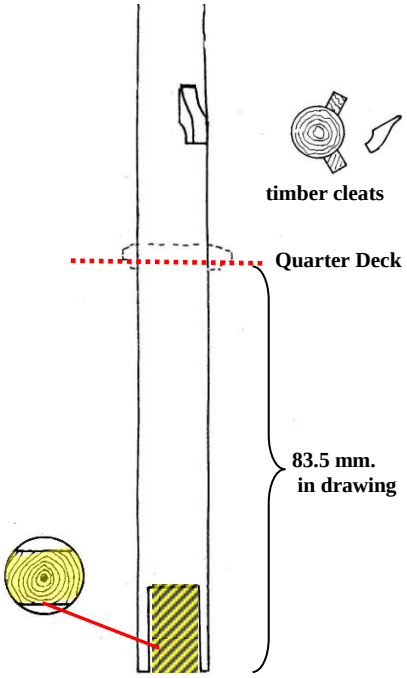


Figure 53: Main Mast Drawing

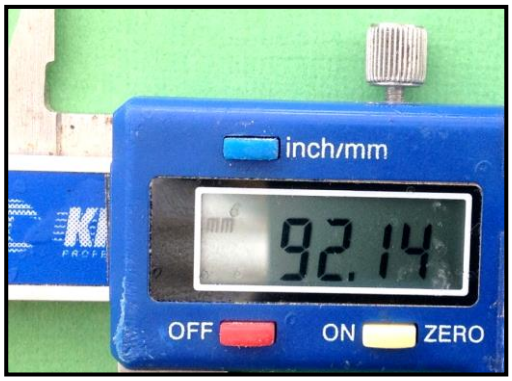


Figure 54: Actual Height of Quarter Deck to Base of Mast Seat

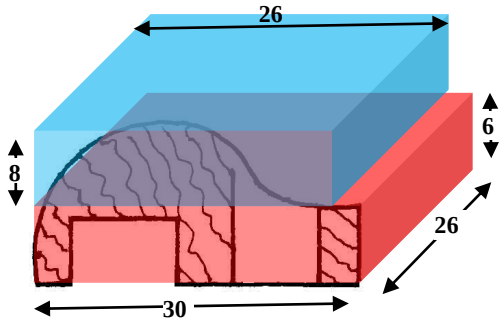


Figure 55: Producing a Cap for the Main Mast

Mast Cap

The mast cap supplied was too small with a base size of only ***24.5 x 16.5 mm***. when it should have been ***30.0 x 26.0 mm.***

A cap was produced from ***two pieces of scrap*** timber, one ***6 mm.*** thick and the other ***8 mm***. thick (refer to Fig. 55). This had the advantage of being able to create a square mortise (hole) right through the pale red block and then covering it with the shaped blue block piece. Euromodel are making the necessary changes to this piece. **N.B. The holes for the two eye pins were drilled underneath the cap before assembly**.

Figure 56: Main Mast Head, Crosstree & Cap

Crosstree Support

Mast top supporting framework consisted of four timbers:

trestletrees
- two pieces ***6 x 7 x 64 mm***., and

crosstrees
- two pieces ***2 x 5 x 56 mm***.

The mast head is yet to be pinned to the rounded mast below it. After fitting the circular top, this section will all be painted black.

Top

This top is constructed in the same manner as for the bowsprit top.

The deck, though, shows the lubber's hole as in the foremast top.

- ***twelve*** ribs were distributed radially at even spacings around the top to support the upper ring (one rib is not shown in the drawings). The ribs were made from ***2.5 x 6.0 x 13.0 mm.*** The ribs were also longitudinally tapered as shown in the drawings.

- 'Very flexible beech' was used and soaked in water for the upper ring.

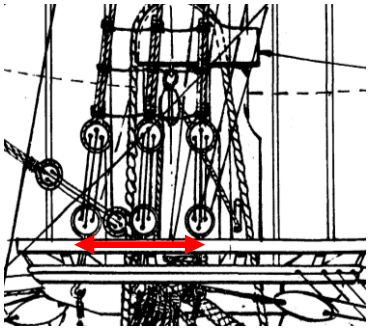


Figure 57: Deadeye Hole Positioning

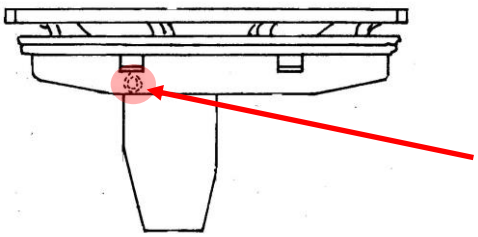


Figure 58: Main Top Eye Pin Installation

- Positioning of the holes needed for the deadeye straps (Fig. 58) are off-centre of the mast line.

- An eye pin needs to be installed underneath one of the cross tree members midway between the two trestletrees – refer to Fig. 58. Also refer to Plan Sheet 8, 'Dettaglio C'

Bolsters

The bolsters were constructed in a similar manner to that of the foremast. They were created from ***4 x 6 mm***. scrap timber. Since the fid was being included, the length of the bolster had to be shortened.

Cheeks

The kit supplies ***4 x 17 x 150 mm.*** and the basic approach is to use that for all cheeks. Perhaps not necessary, these two cheeks were formed from scrap so that the taper downwards from ***5 to 3 mm.*** could be made as per the drawings.

Main Topmast

The major concern was the interpretation of the head with logic leaning towards the head being square in cross-section but most builds seem to avoid this ? Whilst the fore topmast drawing clearly shows the mast head being square, the main topmast gives no such indication. The approach was to carry that square cross-section through to this mast.

Figure 59: Main Mast Top, Cheeks, Cap & Head ; Topmast Heel

Scrap timber (by combining thinner pieces together) was used to create the heel of the mast as one 'curved' piece. In making the topmast, the drawings were followed exactly and finished up with the ***10 x 10 mm***. heel sitting loosely in the ***12 mm.*** wide separation of the trestletrees.

This should have been anticipated before starting. It was a disappointing error in the drawings but in the end it was decided to leave things as they were – not changing the drawings - and carry out a careful bit of packing when assembling.

Both masts have two important features :

- **fid** (common term but source of word seems to be unknown) to support their weight, and
- **sheave** – in the heel of the topmast. As in other parts of this ship, the 'sheave' is a simulation based on two holes joined by a narrow channel.

DRAWING INTERPRETATION OF C4

The stated dimension for tapering shows the maximum ***10 mm.*** at the bottom tapering upwards to a minimum of ***7 mm.*** The measurement from the drawing determined a tapering from ***9.5 mm***. upwards to ***7.4 mm.*** (these drawings were created before the digital age and CAD…. so your call).

Main Topmast (continued)

Figure 60: Topmast Cheek

Cheek *rear surface*: raised central area denoted by black circle represents sheave. A channel has been cut around the sheave to allow for the rope.

Cheeks

The cheeks are cut from the supplied ***4 mm.*** thickness (***4 x 17 x 150 mm.***) and for a basic approach that is what I suggest is done. However, the drawing shows a ***3 mm.*** thickness and that is what was used. The rope channels passing through the cheeks could have been made as two straight grooves.

Figure 61: Main Topmast Crosstree (without any curvature)

Crosstree [C5]

trestletrees - two pieces ***3.5 x 4 x 32 mm***., and
crosstrees - two pieces ***2 x 3 x 35 mm.***

The crosstree posed a dilemma – the drawing shows a distinct curvature in the crosstree members and historically that is correct. With the aim of simplifying things, the majority of builds that I have seen ignore this curved timber and opt for two straight pieces (Fig. 61). From a total perspective, that approach could be acceptable.

These curves are difficult to achieve and so I opted out of 'good practice' and decided to follow the usual trend of straight pieces [Alternatives: very flexible beech timber is an easy approach but expensive or soaking in ammonia + water mixture and then bending using heat]. I also felt compelled to accept that this was not strictly a scratch build !

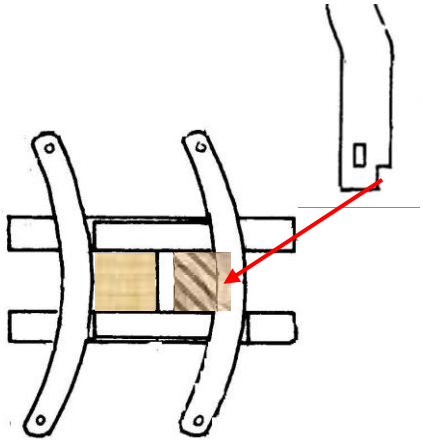


Figure 62: Main Topmast Crosstree Drawing – from Plan Sheet 6 - (showing curvature)

Measurements from C5 in Plan Sheet 6 indicate that the topmast head/topgallant heel combination will not fit in the space between the two crosstree members. However, closer examination shows the cut out in the base of the topmast heel alleviates this apparent problem – refer to Fig. 62.

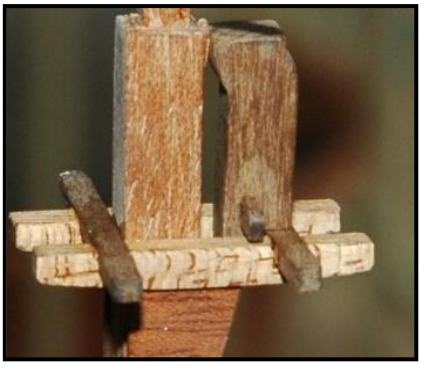


Figure 63: Topgallant Heel Seated in the Topmast Crosstree

HINT: It was far safer to do this cut-out after producing the fid opening. Working from the drawings, it was found that some small adjustments to both the size of the cut-out and the fid hole position were necessary – refer to Fig. 62.

Mast Cap [C6]
Supplied piece slightly different (***21 x 13 mm***.) than drawing size (***18 x 15 mm***.) but not a problem.

Main Topgallant Mast
This mast could be made simply by tapering the supplied rod from ***7 mm.*** up to ***5 mm.***

As for the foremast topgallant mast, having made the small off-set mast heel, it was decided not to produce the mast head as a separate piece due to the following reasons …

- the diameter of the mast is much smaller compared to the other mast sections making pinning difficult, and
- there is a sheave to simulate thus leaving little room for the pin in the mast head.

The mast above the heel was produced as one piece from some ***8 mm.*** rod and reduced it down to the required taper of ***6 mm.*** up to ***5 mm.*** There was ample material above this to form the squared mast head (***5 x 5 mm***.).

Figure 64:Top Gallant Crosstree

Crosstree [C8]
Making up the crosstree framework are four timbers:

trestletrees
- two pieces ***3 x 3.5 x 21 mm***., and

crosstrees
- two pieces ***1.5 x 3 x 22.5 mm***.

There are two eye pins, one each side.

Figure 55 (not this build) differs:

- ***no eye pins***
- ***all four crosstree pieces same size***

Mast Cap
Supplied piece slightly different in length (***16 mm***.) to the drawing size (***14 mm***.) but not a problem. There are two eye pins, one each side – not evident in Fig. 63

Flagstaff
Starting with ***3 mm***. rod, this was tapered upwards to ***2 mm.***

Chapter 7: MIZZEN MAST

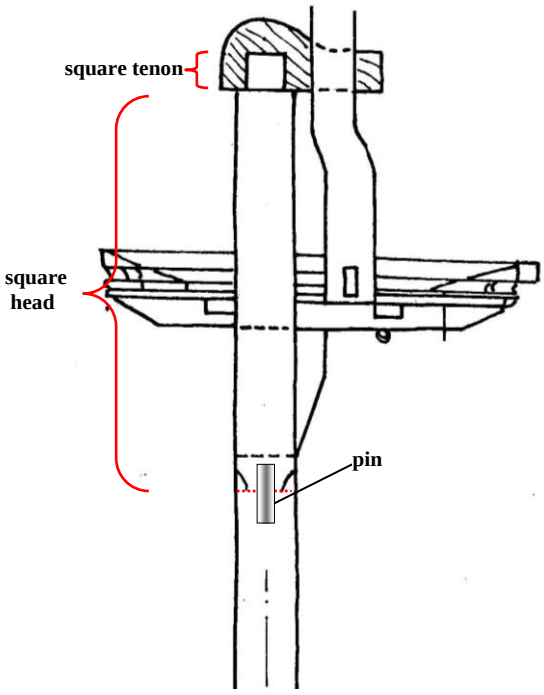


Figure 65: Main Mast Head

Mizzen Lower Mast

Composition and Length

As with the other masts, there were two ways to tackle this mast. It could have been entirely made from a tapered round rod ranging from ***8 – 7 mm.*** (very straightforward), in which case the space between the trestletrees beneath the top may need to be reduced slightly. Using only the rod, a ***7 x 7 mm***. square head cannot be produced – insufficient material!

More exactly, the mast can be made from a shorter slightly tapered rod as described ***and*** a ***7 mm.*** square section at the head (Fig. 65) which was the method intended to be used but it did prove difficult to align the head and the mast. Not sure why … finished up using some ***12 mm.*** rod and shaped that as one piece. The ***10 mm.*** could have been used but the corner edges of the mast head would have been rounded. Both approaches required a ***5 x 5 mm***. tenon on top.

In either case, the completed length of this mast section will be ***longer*** than in the drawing!!!

The length below the upper quarter deck in this build was ***111 mm.*** and confirmed by measuring from Plan Sheet 10. However, Plan Sheet 6 which contains all the detailed drawings for the masts clearly shows that this measurement should be ***104 mm***. There was no choice but to go with 111 mm. given the fixed dimensions of the hull and its frames.

This resulted in an overall length of approx. ***331 mm***. (below the square head, ***279 mm.*** of the rounded rod was used). If you are using only the 8 mm. rod, then a short section of ‘something’ will need to be added to the bottom to increase the length.

Mast Cap

Plan Sheet 6 only shows a side view of this cap and so it was assumed that the width of the supplied piece was suitable - the length was correct. Unlike the other two caps for the lower masts, this one does not have grooves cut in on the upper surface for the halliard rigging.

Mizzen Lower Mast (continued)

Crosstree

Making up the mast top supporting framework are four timbers:

trestletrees
- two pieces ***4 x 4 x 48 mm***., and

crosstrees
- two pieces ***2.5 x 3 x 45 mm***.

For the trestletrees, the ***4 mm***. thickness appears to be made from two strips. Was not sure about this but did settle on one strip made up as ***4 x 4 mm***. from some scrap material.

NOTE: *In the drawing for D2, the space between the two crosstrees is shown as **16 mm.** Measuring off the drawing of D3 (lower mast), the spacing is **17 mm.** - the latter measurement was used.*

Top

Deck Opening
This top is constructed in the same manner as for the foremast top.

Top Support
Making up the mast top supporting framework are four timbers:
trestletrees – two pieces ***4 x 4 x 48 mm***., and
crosstrees - two pieces ***3 x 2.5 x 45 mm***.

Bolsters
The bolsters that are glued onto the top of the trestletrees were created from ***3 x 4 mm***. timber and sanded to create a quadrant shape over which the shrouds will be ultimately pulled down. The drawing suggests a flat-topped/bevelled bolster but the traditional quadrant shape was chosen.

Installation of Crosstree/Top
Remember to allow for the inclination of the mast. [Unfortunately, this was not so in this build but hopefully it will go un-noticed!!!]

Topmast/ Topsail Mast

This mast could be made simply by tapering the supplied rod from ***5 mm.*** up to ***3.5 mm.***

Having made the small off-set mast heel, it was decided not to produce the mast head as a separate piece due to the following reasons …

- the diameter of the mast is much smaller compared to the other mast sections making pinning difficult, and
- there is a sheave to simulate thus leaving little room for the pin in the mast head.

The mast above the heel was produced as one piece from some ***5 mm***. rod and reduced it down to the required taper of ***3.5 mm***. There was ample material above this to form the squared mast head (***3.5 x 3.5 mm***.).

Crosstree

Making up the mast top supporting framework are four timbers:

trestletrees
- two pieces ***2 x 2.5 x 18 mm***., and

crosstrees
- two pieces ***1 x 3 x 22.5 mm.***

Mast Cap

Dimensions slightly smaller but acceptable. Two eye pins used, one either side of the mast cap.

Flagstaff

Starting with ***3 mm***. rod, this was tapered upwards to ***2 mm.***

Ensign Staff

The ensign staff is attached to the poop deck but the following figures show an obvious difference in that Fig. 66 has the staff seated on a flat deck but the drawing (Fig. 67) clearly indicates a curved deck. **Not this build** but just another illustration of 'your choice'.

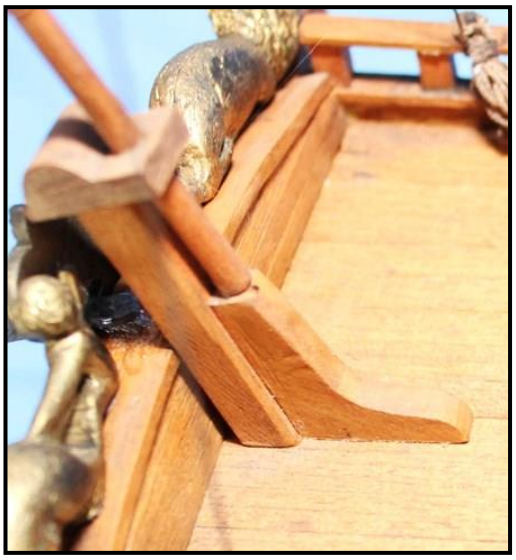


Figure 66: Ensign Staff on a *Flat* Poop Deck

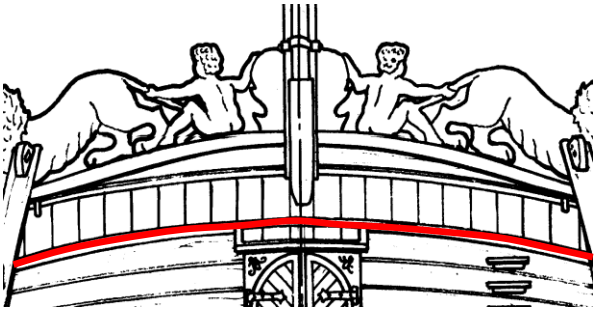


Figure 67: Curvature of Poop Deck

- There is no specific drawing for this component but Plan Sheet 1 does show most of the detail.
- The staff was set at **102º** to the Poop Deck but the final angle you achieve will depend on how you set the work up!
- The kit allows for a length of ***8 mm.*** rod to 'vertically' support the staff pole (E1).
- In this construction, some scrap timber was used to make the supporting column square in cross-section.
- Dimensions:

  Base supporting bracket (carved from scrap timber)
  - ***24 mm***. in length by approx. 18 mm. high.

  Staff pole
  - ***144 mm.*** in length, tapering upwards from 4 to 3 mm.

  Staff base
  - approx.. ***6 x 6 x 36 mm***.

  Distance between tenon and hole in mast cap
  - ***5.5 mm.***

Mast Cap [E2] has the same dimensions as that for Mast Cap [B6].

The supplied piece was very close to the drawing dimensions so no change but as always the finished diameter for the ensign staff to fit through must wait until later. For ease of construction, the square hole was made circular – far easier to drill than carve out !!!

Chapter 8:YARD CONSTRUCTION

Yards, Lateen and Flagpole Dimensions

A: Bowsprit

A9: Spritsail Yard – Pennone di civada **(6 mm.)**
A10: Upper Spritsail Yard – Pennone dell'albero di parrocchetto **(4 mm.)**

B: Foremast

B11: Fore Yard – Pennone di trinchetto **(9 – i.e. 10 mm.)**
Studding Sail (stuns'l) Booms – bastone di scopamare **(2.5 – i.e. 3 mm.)**

B12: Topsail Yard – Pennone di parrocchetto **(5 mm.)**

B13: Topgallant Yard – Pennone di velaccino **(3.5 - i.e. 4 mm.)**

C: Main Mast

C11: Main Yard – Pennone di maestra **(10 mm.)**
Studding Sail (stuns'l) Booms – bastone di scopamare **(3 mm.)**

C12: Topsail Yard – Pennone di gabbia volante **(6 mm.)**

C13: Topgallant Yard – Pennone do gran velaccio **(4 mm.)**

D: Mizzen Mast

D8: Mizzen Yard – Penna della vela latina **(6 mm.)**
D9: Topsail Yard– Pennone di contromezzana **(5 mm.)**
D10: Lateen – Pennone di mezzana volante **(4 mm.)**

E: Stern

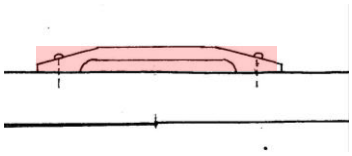
E:**Stern Flag Pole** - Asta bandiera di poppa (4 mm.)
E1:**Supporting Mast for Stern Flag Pole** - Maschio dell'a di bandiera (8 mm.)

Features or Not

The Euromodel drawings are for a ***scratch build*** and there are quite a few interesting and historically accurate features about these yards in the drawings which are worth considering (***but perhaps not including***). That is the builder's choice and many such models have been built without them.

a. Central sling cleat

The sling cleat is a characteristic feature which keeps all the rigging located in the center.



Since this is only a kit, there can be no expectation that all the detail will be supplied. Simplifications such as those in Fig. 68 may be made to avoid this level of detailing.

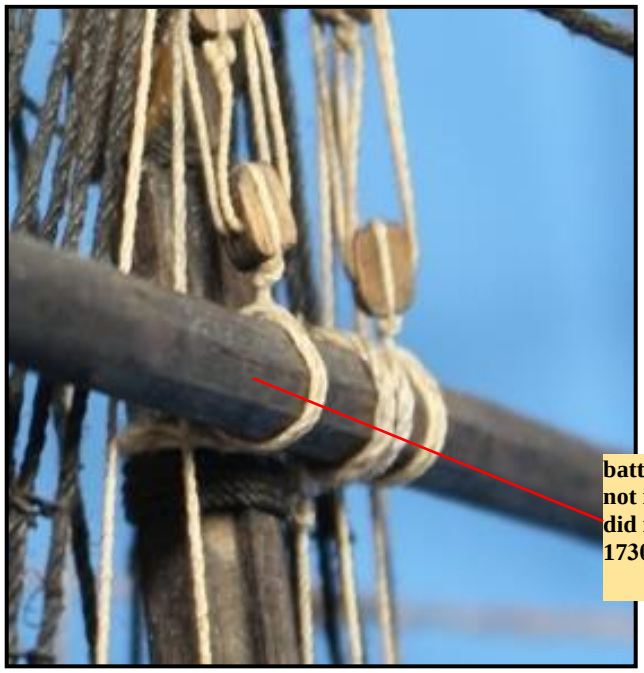


Figure 68: NO Sling Cleat

b. Yard Sheaves

Between 1640 – 1720, Continental ships had yard sheaves associated with the rigging of leech lines (which in this early example, shades of a martnet-style rigging might be interpreted) for the main and fore sails (Fig. 69 below). Examination of many models shows a total absence of this fundamental feature ?

The fore and main yards had a sheave near each end and in this build brass sheaves were selected even though they were thicker than shown in the drawings. An alternative is to carefully thin a deadeye made from timber.

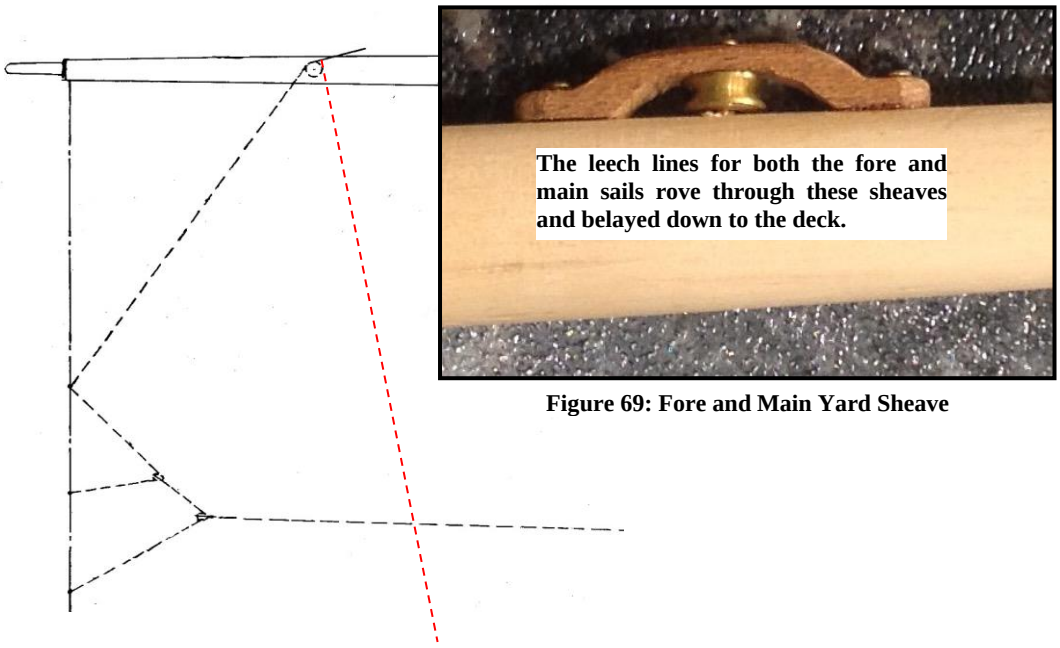


Figure 69: Fore and Main Yard Sheave

c. Stuns'l Booms & Irons

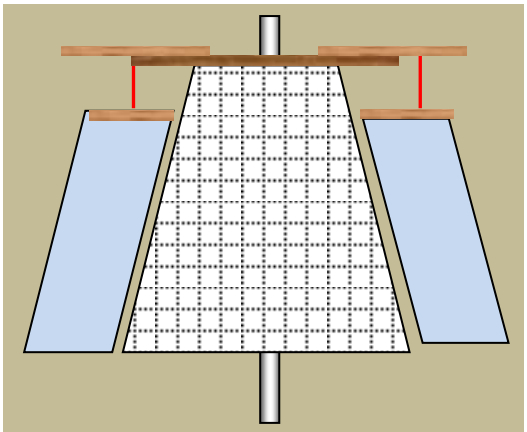


Figure 70: Diagrammatic View of Mast Studding Sails (Stuns'ls)

'Stunsail boom' or more frequently 'stuns'l'are naval contractions of the term 'studding sail boom'.

Stuns'ls (blue shading) were used to **increase the sail area when the wind was light and following**. They extended the sail cloth out further on either side of the sails normally in use. Using Fig. 70 as an example, the main and fore yard stuns'ls were set (red lines) from the ***stuns'l booms***.

The studding sail boom first appeared on Continental ships on the fore and main yards around **1650** and on the topsail yards around 1675. Given that **this ship construction began back in 1660**, it is not surprising that the *drawings only show these booms on the fore and main yards*. In this ship, booms were held in position directly behind the yards and could easily be slid outwards due to the presence of the supporting 'irons' (iron rings) – Fig. 71.

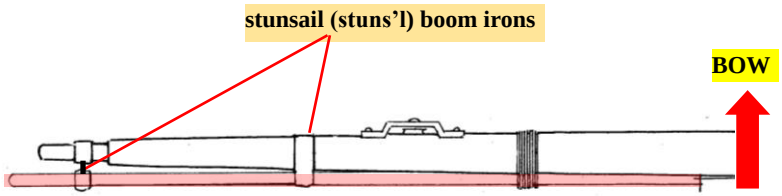


Figure 71: Stun'sl Boom on Main and Fore Yards

[Booms in this time period were often mounted diagonally forward of the yards].

Such is the individuality of the builder, the following photo shows the boom in a *different position*.

Figure 72: Stunsail Boom Mounted ABOVE Yard

The construction of these irons may deter some and so it is not surprising that in a survey of *five* models of this ship, the studding sail boom had been omitted.

The construction of the irons is shown in Fig 73 but a simple alternative is to lash the booms to the yards !

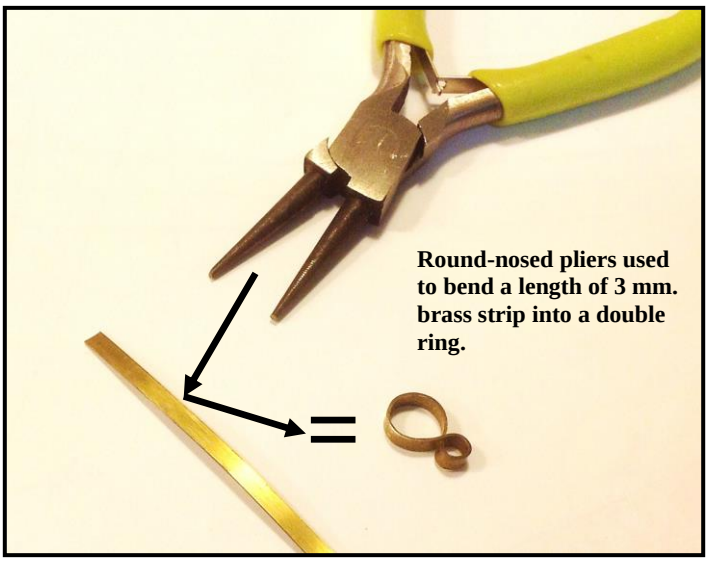


Figure 73:Construction of 'Iron' Rings

Constructing Stuns'l Boom Irons

Plan Sheet 6 shows the inner and outer irons but the detail is described in the following pages. Whilst Fig. 73 shows brass strip being used, other more simple alternatives are the use of black carboard or thick paper strips.

d. Footropes and Stirrups

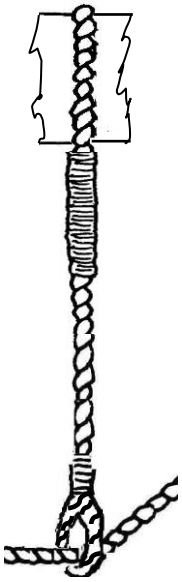


Figure 74: Basic Rigging for Footrope & Stirrup - Diagrammatic

Basic Construction

The following comments all rely on *simplifying the rigging* for the footropes & stirrups.

Figure 74 illustrates :

single lashing around the yard,
seizing under the yard,
simple eye around the footrope,
small seizing above the eye.

Rigging at a basic level then involves a manipulation of one or more of the above four points. The seizing of either the eye itself or that above the eye has not been considered.

Advanced Construction

The historical accuracy of the rigging for the footropes & stirrups is something that some builders may wish to pursue in more detail. Fig. 75 below (shaded areas) give further such details.

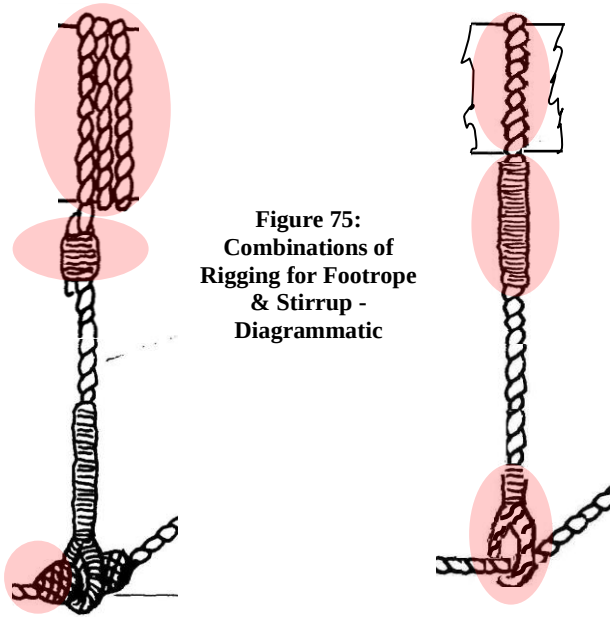


Figure 75: Combinations of Rigging for Footrope & Stirrup - Diagrammatic

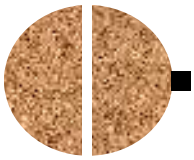
This drawing illustrates various combinations of rigging that *could* be used:

- multiple or single lashing around the yard,
- seizing under the yard,
- seizing around the eye itself,
- seizing above the eye.

Rigging at an advanced level involves a manipulation of one or more of the above points.

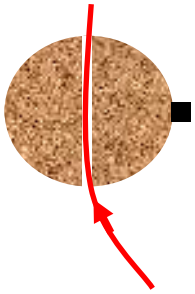
Method A (basic)

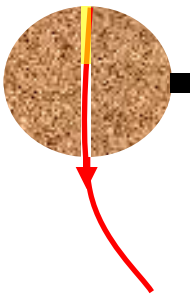
lashing to the yard	glued *through* yard and wrapped over once
seizing of lashing	non-existent
eye	stirrup placed over footrope
eye seizing	non-existent



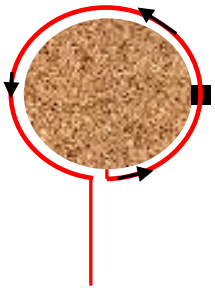
Step 1: At right angles to the sling cleats, ***0.70 mm***. holes are drilled through the yard as well as through each of the yard arms.

Step 2: Approx. ***60 mm.*** length of ***0.40 mm***. rope is threaded up through the hole with about ***10 mm***. protruding through the top.





Step 3: Apply a small amount of cyano to the top rope and then carefully pull back until the end is flush with the yard surface.



Step 4:
TRY THIS AS A DRY RUN WITHOUT THE CYANO GLUE ... carefully apply cyano to all but the last ***20 mm***. (so you have some rope to hold onto). Keeping the rope taut, pull it ***up the fore side*** and ***down the aft side***. Maintain the tension for a short time and the stiffened stirrup is now formed.

Step 5: Construction of FOOTROPE JIG (Fig. 76)

- The yard is put to one side while a jig is made for joining the footropes to the footrope.
- Two lines are marked on the board to represent the distance between the yard (and all the other yards) and the footrope.

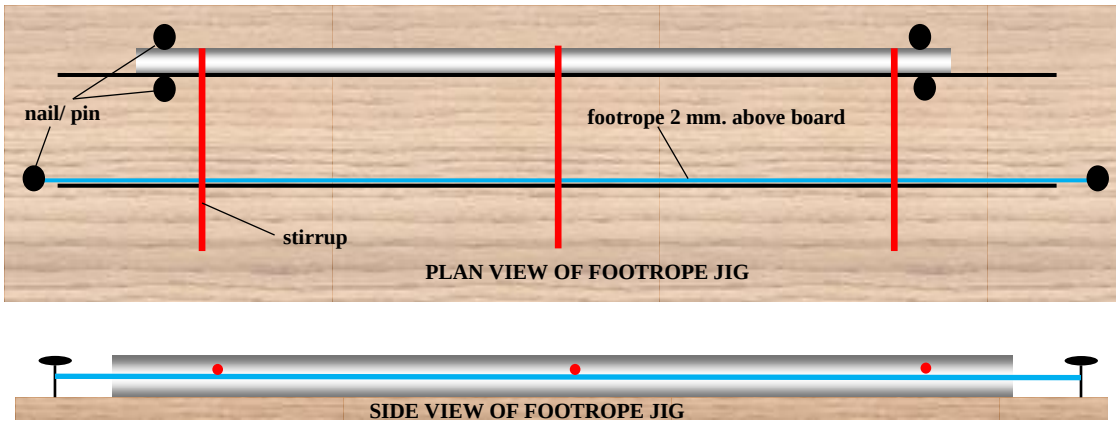


Figure 76: Footrope Jig

- A suitable length of ***0.4 mm***. rope (allowing for excess) is mounted over the lower line with two pins or nails and about ***2 mm.*** above the board. [a simple slip knot at one end and simple winding at the other end is sufficient.
- The yard is then put in place with four pins or nails with the stirrup ropes lying over the footrope.
- The stirrups are held in close contact with the footrope by placing something like a steel ruler (with some supplementary weight) flat on the board over the stirrup ends.
- Cyano glue is then carefully added at each stirrup/footrope junction.
- When set, the footrope ends are inserted into the holes made in the yard arms and glued in place.
- Excess ropes is removed from the yard arm upper surface. The lower ends of the stirrups are cut off flush with the bottom edge of the footropes.

This method does not directly allow for any footrope curvature between stirrups but this could be introduced.

Method B (basic)

lashing to the yard	wrapped ***over*** once
seizing of lashing	same rope for seizing (or thinner rope)
eye	stirrup wrapped ***around*** footrope
eye seizing	non-existent

Very similar to 'Basic Method A' but Steps 1 – 4 inc. are omitted with the ***0.5 mm***. stirrup rope wrapped around the yard and then fixed in position with the seizing under the yard being part of that rope or better still being a rope that is of a smaller diameter.

What could be seen as a small improvement is the placement of the stirrup rope under the footrope and being brought up and over and glued in position to form a rudimentary eye.

Method C (advanced)

lashing to the yard	wrapped *over* three times
seizing of lashing	thinner rope or false seizing
eye	stirrup wrapped around pin to form eye
eye seizing	thinner rope or false seizing

- ***0.4 mm***. stirrup ropes (with excess length) are attached to the yard by seizing using either a thinner rope or applying the 'false seizing' method.

- The yard with attached stirrups is put to one side while a jig is made for joining the footropes to the footrope.

- Two lines are marked on the board to represent the distance between the yard (and all the other yards) and the footrope.

- The yard is then put in place with four pins or nails with the stirrup ropes lying flat on the board and extending over the edge and downwards using 'alligator' clips as small weights. At this stage, ensure the stirrup ropes are perpendicular to the yard – you may wish to make some subtle changes before fixing to the footrope.

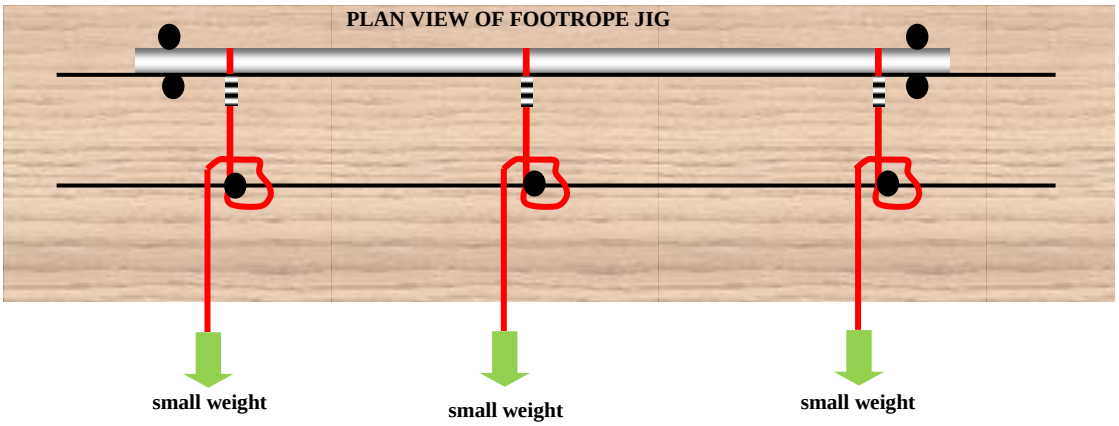


Figure 77: Footrope Jig (advanced)

- A nail /pin is then added where each stirrup rope passes over the marked lower footrope line.

- Each stirrup rope is lightly glued with PVA at this point and wrapped around the nail/ pin … … ***keeping a few millimeters above the board***. The weight helps keep a small tension on the loop forming the eye.

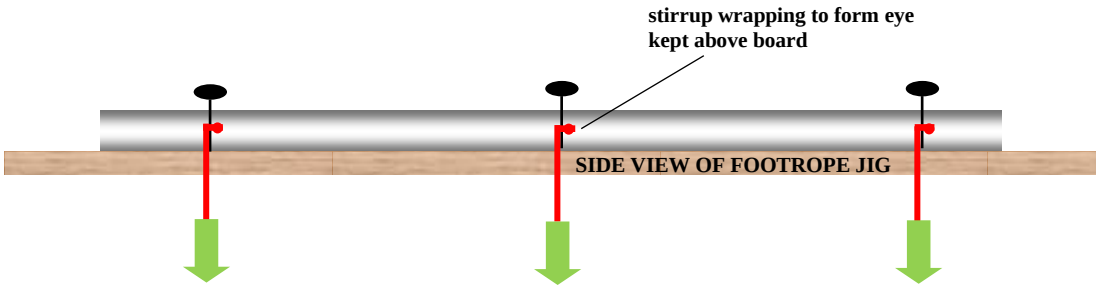


Figure 78: Forming the Stirrup Eye (advanced)

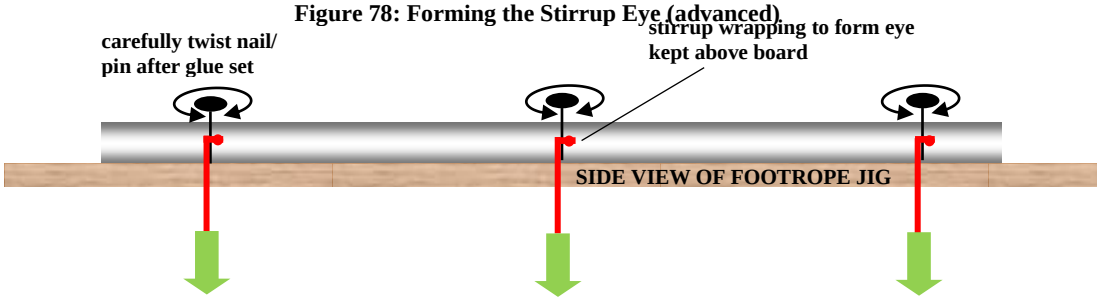


Figure 79: Removing Nail/ Pin from the Eye

- When the glue is fully set, the nail/ pin is carefully rotated backwards and forwards and then removed. The excess rope is not removed. The weights attached to these will still prove useful in the next step.

- The ***0.4 mm.*** footrope, fixed on one yard arm, is then passed through the stirrup eyes – a 'needle threader' was used to assist this operation. Again, small weights (in addition to those already attached to the stirrup ropes) are used this time to create a small degree of curvature as shown in Fig. 80 below. Glue is apsplied either side of the footrope.

- Any trimming is then carried out.

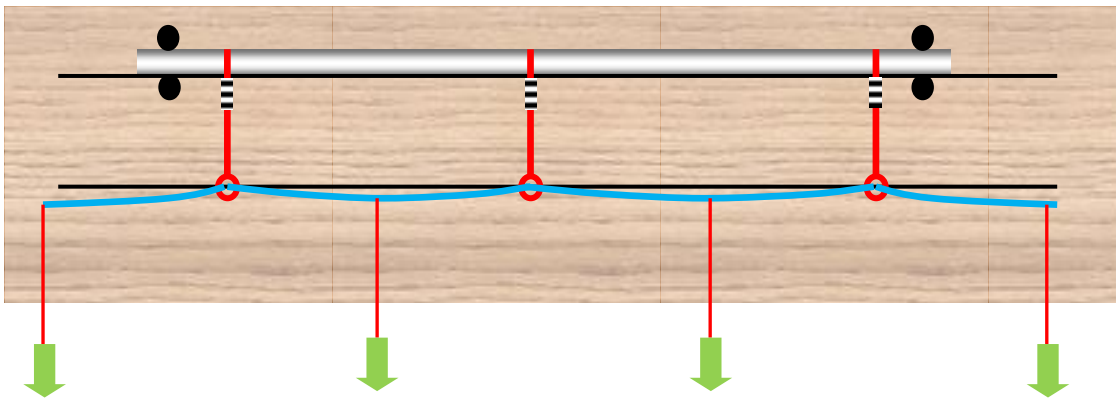


Figure 80: Creating Footrope Curvature

Pinning

Figure 81: Pin and Cleat

Technically, the rigging will hold the yard in place against the mast just like it would on a real ship and it allows the final adjustment of the yards - a pin arrangement would make this quite difficult. Having said that, *a large number of builders* do use the pinning method successfully with very few observers any the wiser.

Pinning requires direct contact between the yard and the mast, and when a yard is hung from jeers, it should probably not actually be physically in contact with the mast. If the yard is rigged using a parrel to a horse, then it's even more 'wrong' to have it in contact with the mast.