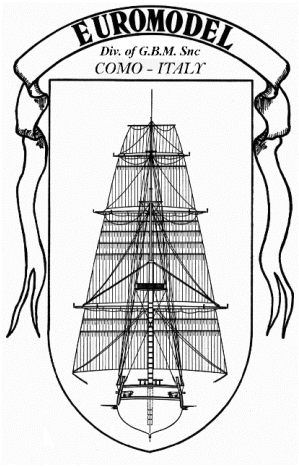
TRANSLATION LINKS

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 ?

12.YARD 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).

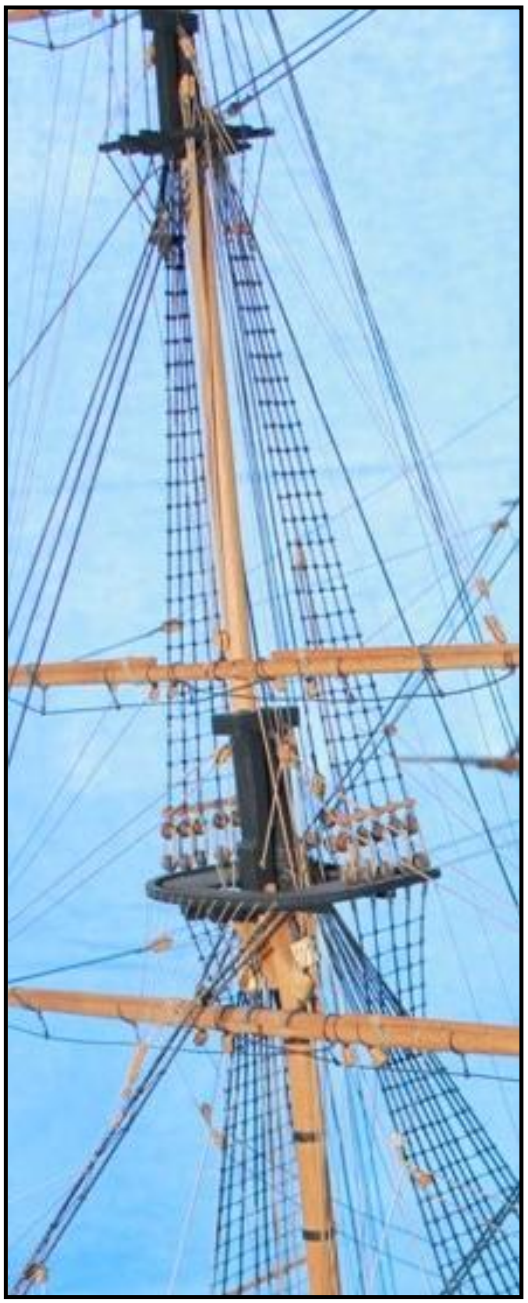
For the purposes of discussion, this ship is considered as an 18 C build.

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

Contents

Illustrations

[The figures below are not hyperlinked]



Colour Dilemma

Colour is very much up to the modeler to choose. Whilst the use of colour – particularly ochre – was common in many British naval ships around this time, many builders choose to leave all timber unpainted with a minimal use of black as depicted on this page.

For ***the more historically inclined***, the following comment should be useful ...

> " ... yellow lower masts, black from the bibbs to the lower mast cap including the tops; natural varnish finish for the topmasts above the mast cap with again black for the hounds, crosstrees, and topmast cap; varnished top gallant masts with black up to the topmast cap and again for the hounds; **yards were usually all black, the studding booms most probably varnished or natural... "**

This raised a dilemma ... natural wood or painted black for the yards and studding sail booms ? If I went for the painted appearance, it would be more historically correct but would also tend to mask some of the intricate detail of the studding sail boom irons.

Nevertheless, I opted for the black painting. If you follow suit, then some of the detail that follows you might consider unnecessary ?

Chapter 1: DIMENSIONS & TRANSLATIONS

Spar Nomenclature

This list also includes masts ...12 x 445mm. (1), 10 x 700 mm. (1) ; 10 x 450 mm. (1) ; 8 x 650 mm. (1); 8 x 675 mm. (1); 6 x 550 mm. (1); 6 x 550 mm. (1); 6 x 420 mm. (1); 5 x 700 mm. (1); 5 x 650 mm. (1); 5 x 200 mm. (1); 4 x 350 mm. (1); 3 x 200 mm. (1); 3 x 660 mm. (1);1 x 580mm. (1)

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

36: Spritsail Yard – Pennone di civada (5 mm.)
37: Upper Spritsail Yard – Pennone di controcivada (3 mm.)

B: Foremast

38: Fore Yard – Pennone di trinchetto (7 – i.e. 8 mm.)
Studding Sail (stuns'l) Booms (4 mm.)

39: Topsail Yard – Pennone di parrocchetto (5 mm.)
Studding Sail (stuns'l) Booms (2 mm.)

40: Topgallant Yard – Pennone di velaccio (3.5 – i.e. 4 mm.)

C: Main Mast

41: Main Yard – Pennone di maestra (9 – i.e. 10 mm.)
Studding Sail (stuns'l) Booms (3 mm.)

42: Topsail Yard – Pennone di gabbia (5.5 – i.e. 6 mm.)
Studding Sail (stuns'l) Booms (2 mm.)
(according to a table found in Lees, the main stuns'l boom had a maximum diameter of 10.5 inches = 3.7 mm. at this scale tapering to a lesser thickness)
43: Topgallant Yard – Pennone di velaccio (4.5 – i.e. 5 mm.)

D: Mizzen Mast

44: Mizzen Yard – Pennone di mezzana (6 mm.)

45: Topsail Yard– Pennone di belvedere (4.5 – i.e. 5 mm.)

46: Lateen – Antenna di mezzana (5.5 – i.e. 6 mm.)

Spar Dimensions

- Individual yard section lengths will need to be cut from the longer lengths supplied in the kit.

- These final 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 yard + studding sail boom combinations are indicated by ***broken lines***.

YARDS, etc		**Diameters**							
		12	**10**	**8**	**6**	**5**	**4**	**3**	**2**
BOWSPRIT	**No.**	**Lengths**							
	21		295						
	22					291			
	23					102			
	24								60
	36					**267**			
	37							**133**	
FOREMAST	25		385						
	26			259					
	27						150		
	28							35	
	38			**373**			**416**		
	39					**235**			**244**
	40						**156**		
MAIN	29	445							
	30			289					
	31					173			
	32							85	
	41		**426**					**464**	
	42				**290**				**298**
	43					**189**			
MIZZEN	33			353					
	34				213				
	35							85	
	44				**516**				
	45					**188**			
	46				**400**				

Spar and Yard Translations

Fore	Main	Mizzen
velaccino (topgallant)	**velaccio (topgallant)**	**belvadere (topgallant)**
- decontrovelaccino	- decontrovelaccio	- controbelvadere
- controvelaccino	- controvelaccio	- volantebelvadere
- velaccino	- velaccio	- fissobelvadere
parrochetto (topmast)	**gabbia (topmast)**	**contromezzana (topmast)**
- parrochetto volante	- gabbia volante	- contromezzana volante
- parrochetto fisso	- gabbia	- contromezzana fissa
trinchetto (fore mast)	**maestro (main mast)**	**mezzana (mizzen mast)**

Plan Sheet Translations (12 – 15)

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 perla 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 Focs'le 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**

Chapter 2: YARDS

Yard Construction

The yards containing studding sail booms are : fore yard [38], main yard [40] and their respective topsail yards [39 & 41].

At the outer ends, these yards have a small extension termed the 'yard arms' and a small hole (red arrow) needs to be made in their ends to accommodate the outer studding sail boom iron rod. It is ***far better to drill this hole before shaping the yard while the timber is much thicker*** and therefore stronger. A ***0.5 mm.*** hole was produced.

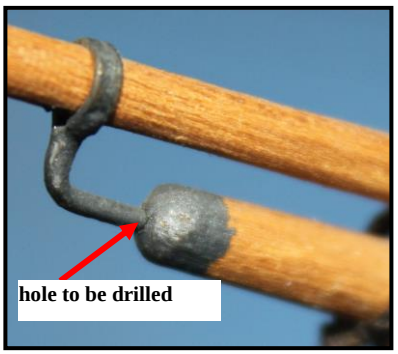


Figure 1: Hole for Outer Iron

- At the outset, it was decided to follow the historical style of painting the actual yard black, so what the yard is made from is immaterial. Photographs included in this file tend to be mainly unpainted.

- How the shape is achieved is up to builder – and there are some excellent methods of creating these yards by hand - but I utilized a small lathe.

- Due to the repetitious work, the four yards with the studding sail booms were constructed first. The stuns'l booms were left unpainted.

Figure 2: 'Battens' on the Spritsail Yard from the Bowsprit

Forming Battens from the Supplied Timber Rods

From measurements of Plan Sheet 3, the battens that form an octagonal arrangement in the middle of the yard appear to be an integral part of the original yard material. There is no distinction between the height of the battens and the surface of the yard itself. Euromodel has supplied rods that are larger than required (e.g. ***8 mm.*** vs. ***7 mm.*** for the foreyard) – but no batten material. With some careful marking out and filing, this effect can be created from the original rod. In Fig. 2, the spritsail yard on the bowsprit of one model shows the presence of battens *which appear to be part of the original rod used to make the yard* rather than showing battens added. A similar pattern can be found on all other yards of this model.

As a trial, a main yard was produced from some scrap material (Fig. 3) and whilst following the suggested cross-section widths at various points along the yard, some manipulation allowed for the central 'battens' that were slightly raised above the rest of the yard.

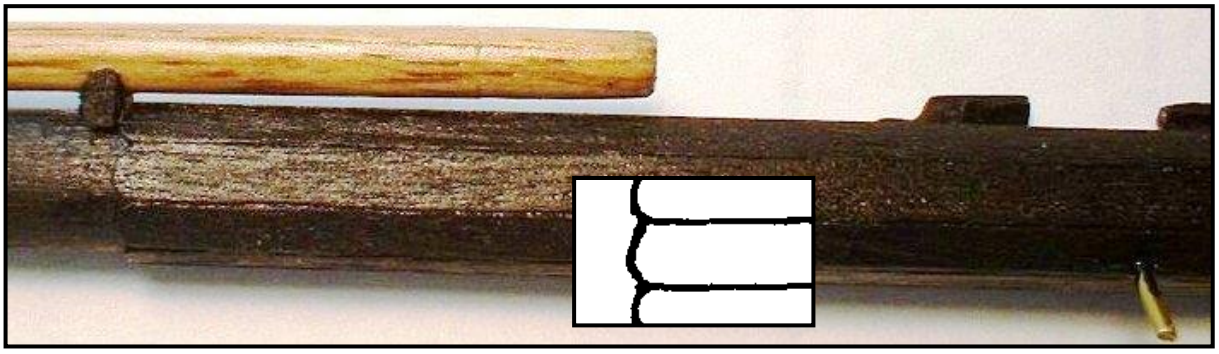
Figure 3: Forming Yard Battens from Yard Rod Supplied

Creating Battens using Extra Material

Figure 4: Battens

An *alternative approach* to the above comment is to add the battens in the middle to produce an octagonal effect. Since the kit did not contain any batten material, Improvisation with some ***0.5 mm***. thick strips was carried out. The ideal construction would see the determination of the correct width for each batten by reference to the outside circumference (diameter x 22/7 x 1/8). Each batten should be slightly larger to allow the edges to be beveled enabling a tighter fit between the battens. As shown in the drawing opposite, the ends of each batten are rounded.

In the basic construction, reference was made to simulating the battens using the supplied rod itself. Whilst this can produce the batten effect, it must be remembered that the battens were nailed onto the yard surface and so were *slightly raised above the yard surface*. Once the battens were in position, some careful sanding was required to produce a uniform surface.



Example of Shaping a Yard

Along the main yard, it was determined that a *mid-length section of* ***179.30 mm.*** *was untapered* and remained at the stated diameter width of ***9.0 mm.*** The remaining length each side of this was gradually tapered downwards to approx. ***2.5 mm.*** (although it was only worked down to ***3 mm***.). Be aware that the taper so produced has a *small degree of convexity outwards* (refer to Fig. 6).

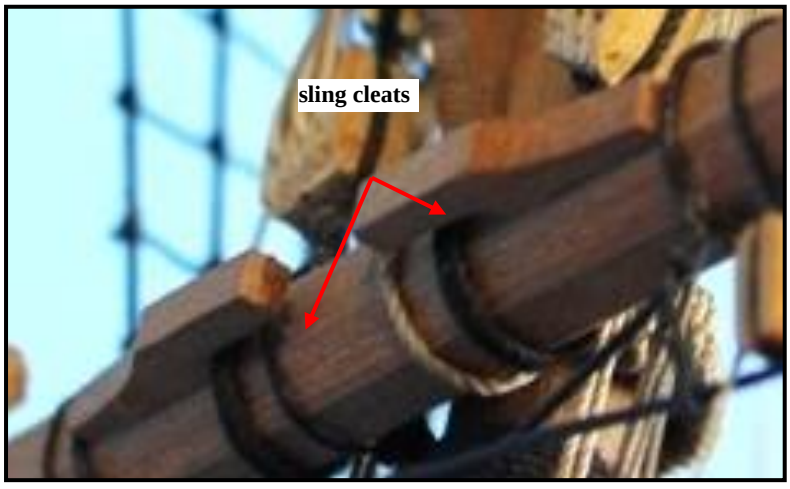


Figure 5: Sling Cleat Positioning

Cleats

- ***sling cleats*** keep all the rigging located in the centre of the yard
- ***yard arm cleats*** stop the braces, lifts and clew earings sliding inwards.

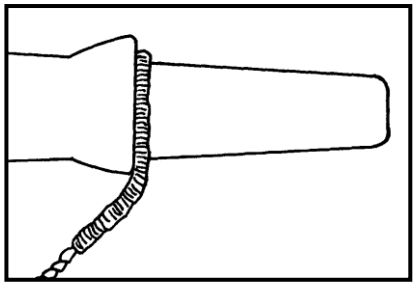


Figure 6: Simulation of 'Yard Arm Cleats'

In a basic construction, it is possible to avoid construction of the yard arm cleats by following the shape as indicated in Figure 6. However, if yard arm cleats are to be used, they are illustrated in Fig. 15.

Both cleats should be thin but in many models this is often not the case. Sling cleat width should be approx. ***1 mm.*** (and if using them, the yard arm cleats approx. ***1.8 mm***.). The easiest way of constructing these very small sizes is to glue the correct length on the yard and then trim down to the correct dimensions. The close proximity of each group of cleats also allows them to be trimmed to the same shape.

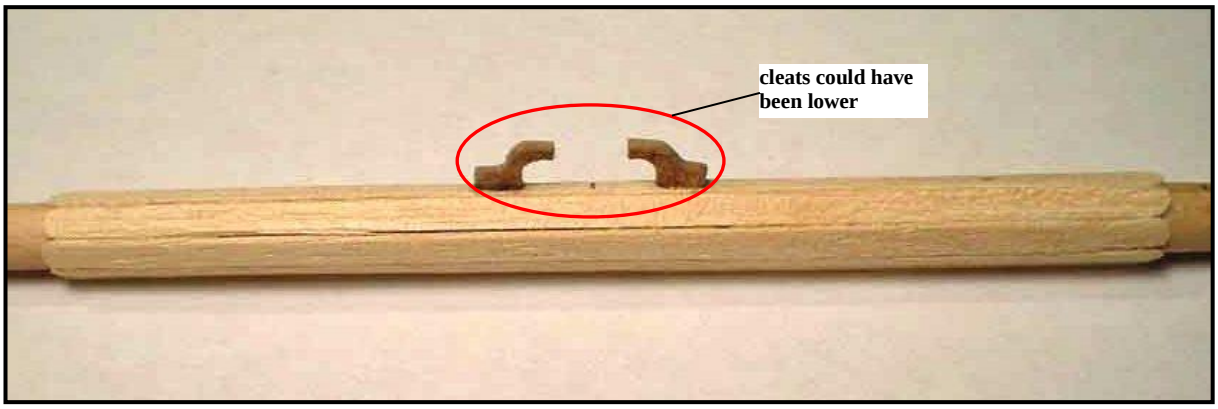


Figure 7: Sling Cleat Example 1

Stuns'l Booms & Irons

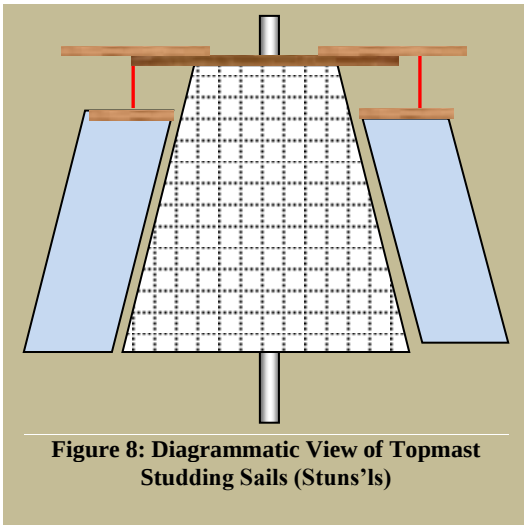


Figure 8: Diagrammatic View of Topmast Studding Sails (Stuns'ls)

Figure 9: Outer Iron 'A'

Figure 10: Outer Iron 'B'

Discussion

'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. 8 as an example, the topmast stuns'ls (and the lower stuns'ls) were set (red lines) from the ***stuns'l booms***. However, the topgallant stuns'l was set from the topgallant yard.

There are four stuns'l booms – two on each of the Foremast and the Main Mast.

English and most Continental ships positioned the booms in front of the yard at a 45° angle (Fig. 11) and were attached through inner lashings and two ***iron rings - 'irons'***. The outer ring was held by an iron rod bent at right angles and either inserted into the end of the yard arm (Fig. 10) or held by straps and bolts (Fig. 9) – or a combination of both.

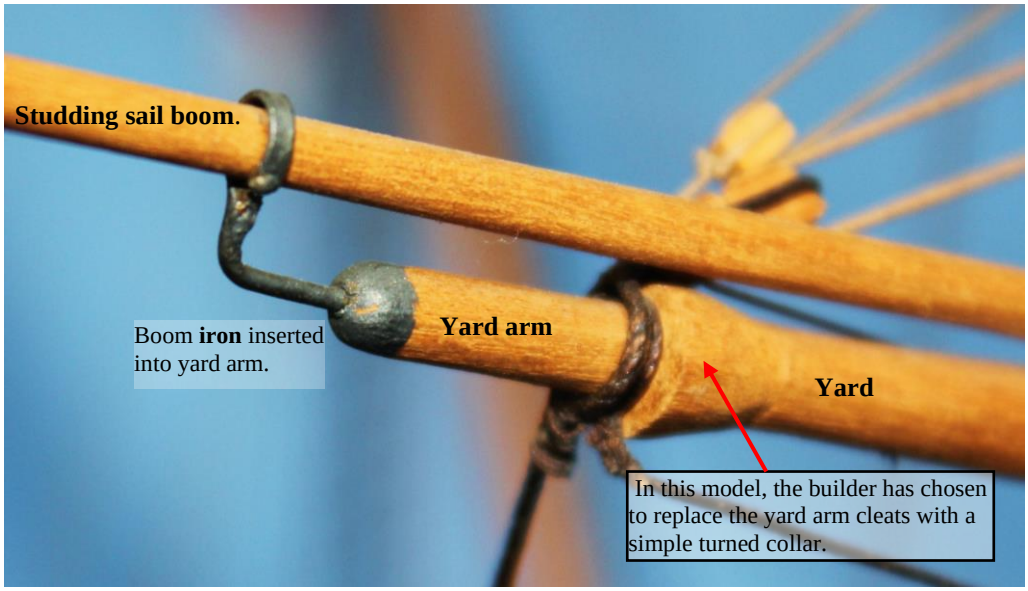


Figure 11: Boom, Yard and Yard Arm

Stuns'l Boom Positioning

The drawings in Plan Sheet 3 at first glance appear to portray this boom with rather an odd shape but all is explained when you realize that the drawing is a view from *behind* the yard with part of the boom obscured. The boom is actually a short distance outwards and upwards in relation to the yard (refer to Fig. 12 below).

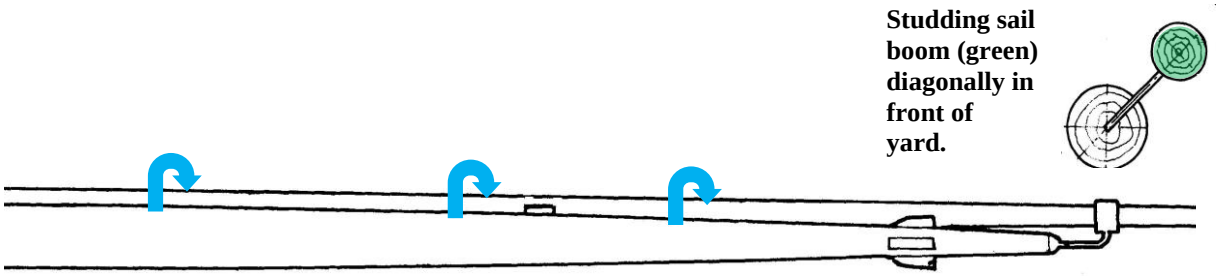


Figure 12: Stuns'l Boom Position (viewed from aft position)

Figure 13 (below) illustrates the diagram above but also shows the presence of an inner iron which is not evident in the main drawings – but is shown as 'typical' in a small drawing near the top right hand corner of Plan Sheet 3 (which was included in this build).

Figure 13: Stuns'l Boom Positioned Away From Yard

Outer & Inner Iron Construction

The easiest method here is for the simple 'iron' insertion into the yard arm as shown previously in Fig. 10. There would have been a metal cap or a pair of metal jaws over, and set into, the yard arm end and so in a basic build, painting the end black will closely produce the desired effect. A metal strip wrapped around the end and painted black would add a stronger sense of realism.

Brass & copper tubing or strips are commonly used to create the metal rings – both the inner and outer boom rings need to be loose to allow the boom itself to slide easily.

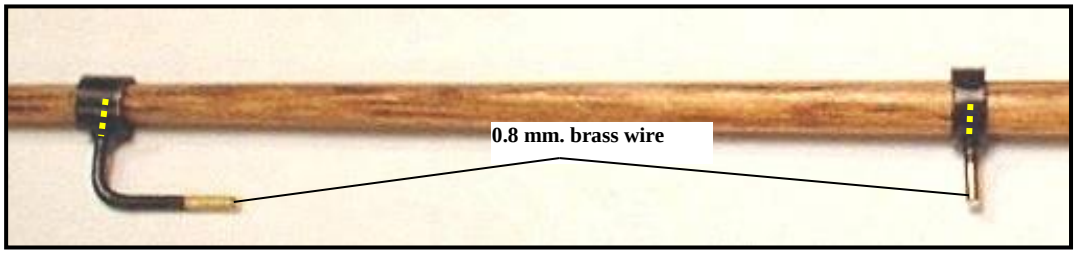


Figure 14: Iron Construction

In a model, the booms will be in a fixed position and no allowance is made for their movement. It is often suggested that the boom iron is soldered into the boom ring but as indicated in Fig. 14, the iron is simply inserted into the boom and fixed in position.

Outer Irons

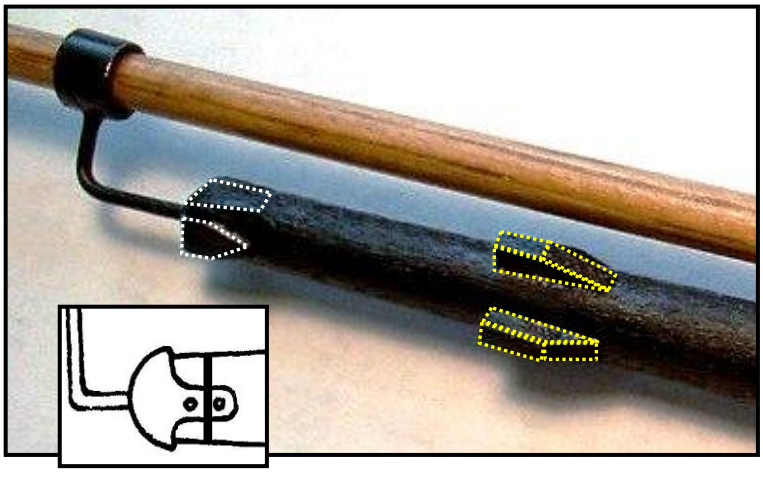


Figure 15: Outer Iron

The iron rod was inserted into the yard arm and the simulation of the metal jaws readily carried out by using black paint to outline the shape. Fig. 15 shows a further *possible step* by the addition of the jaws/ cap (white dotted lines) that both sealed the open end grain of the boom and ensured the iron would remain in position. The metal jaws were let into the yard arm surface producing a flushed surface. A 'metal' strap was then added to hold the jaws/ cap itself in position.

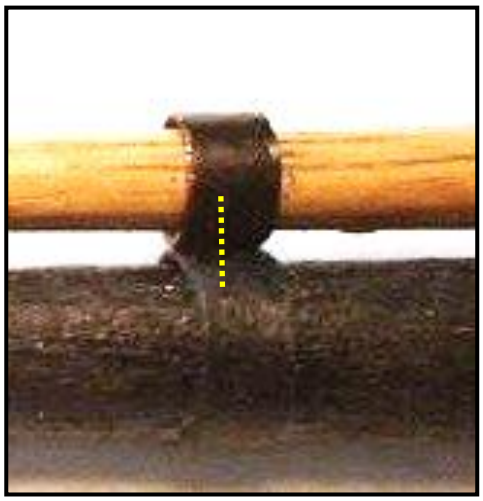


Figure 16: Inner Irons

Inner Irons

The inner boom iron was located about 1/3 distance from the end of the yard arm. This iron had one ring fitted around the yard with a second ring attached to it via a short rod. The upper, second ring was a loose fit to allow the stuns'l boom to slide through it. This ring also frequently had a hinge so that it could be opened.

The first band (around the yard) could be formed by using ***3.0 mm***. black automative pinstripe tape or black card. The outer band could be made from ***3.0 mm.*** brass strip or copper or brass tube.

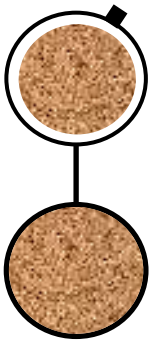


Figure 17: Inner Boom Iron

Figure 18: Battens and Mast Fixing Pin

Yard Rigging

A Commentary on Foot Ropes and Stirrups

Foot ropes extended aft along the yard and about 760 mm. below it – they provided a foothold for crew whilst reefing the sails. The rope of the lower yards was aproximately 24.2 mm. in diameter with the far end having a spliced eye fitted over the yard arm and the inner end made fast behind the sling cleat on the other side of the yard. The ropes were held by short vertical ropes known as *stirrups*.

At this scale of building, the rope diameter would be ***0.34 mm***. The drawings show 0.5 mm. but ***0.4 mm.*** was used as a compromise.

The following figures, taken from Plan Sheet 3, are only diagrammatic but illustrate the principles of foot rope rigging.

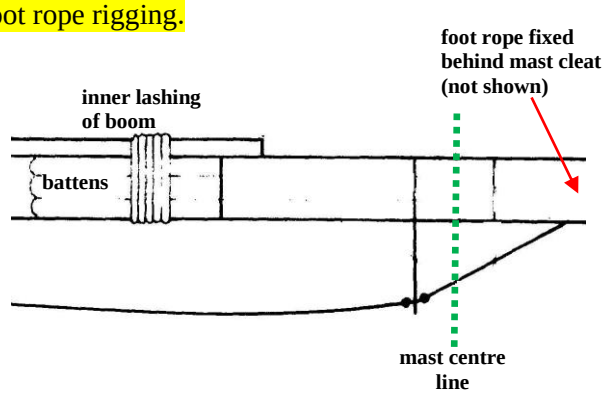


Figure 19: Inner Footrope (diagrammatic)

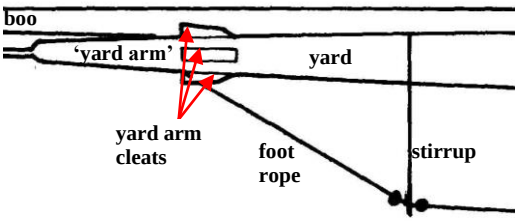


Figure 20: Outer Footrope (diagrammatic)

The drawings often attempt to show what ***could*** be utilized in the ship construction. Examination of Plan Sheet 3 (Fig. 20) shows the rigging in a complex format but in building a typical ship model, such arrangements are often simplified. What is done will be explained in the following pages.

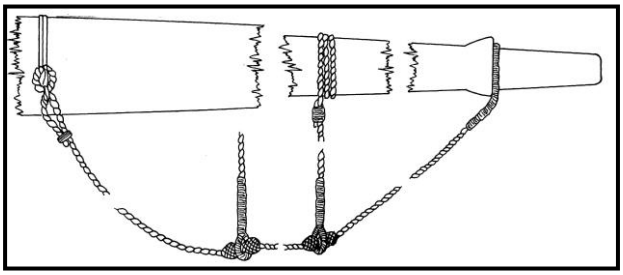


Figure 21: Yard Rigging

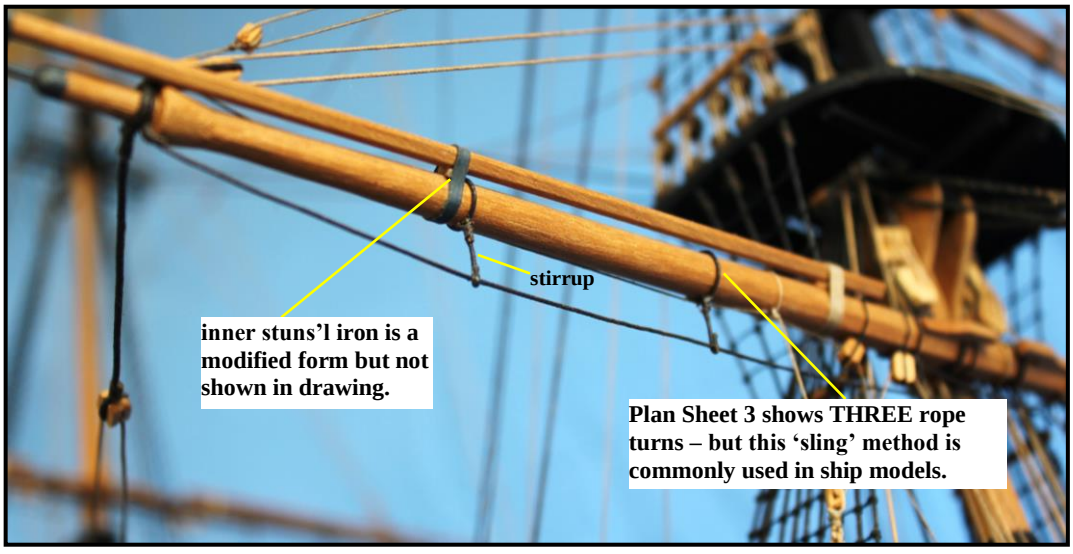


Figure 22: Stirrup Lashing to Yard

Accuracy in Rigging

Before getting too concerned about what is right or wrong with the method of rigging, it might be useful to show ***the stirrup lashed to a yard and the footrope underneath*** – both of which could have been readily improved. To the casual observer, it may well be that such exacting work (or lack of it) will probably go un-noticed.

Ignoring what is illustrated in Fig. 20, the simplest method is the single turn shown in Fig. 22 as well as the accompanying figures.

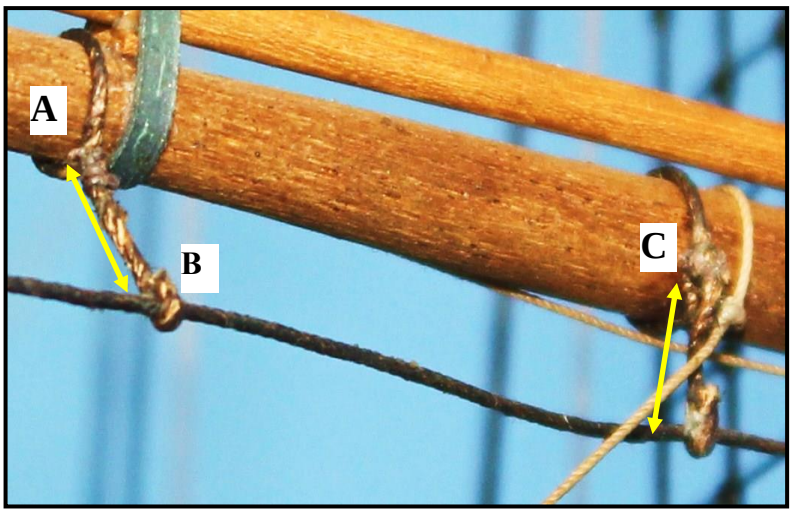


Figure 23: Stirrup Seizing, Example A

How this stirrup is seized together underneath the yard and above the footrope ***can be achieved by a number of different techniques***.

In Fig. 23 (from another model), the stirrup has been lashed once around the yard with the same rope serving around itself 3 – 4 times underneath the yard (‘A’) and glued in position.

The lower end (‘B’) has been bent around the footrope and glued in position. The second stirrup rope in Fig. 23 (‘C’) has somehow finished up with its ‘seizing’ on the side of the yard instead of underneath. The spacing between the yard and the footrope must be consistent but that is not the case (as shown by the yellow arrows).

In the following diagram, there is another example of rigging ‘error’. It is to do with the ***appearance of the stirrup and foot ropes***. The stirrup ropes (red lines) shown here are not all exactly vertical which actually adds some realism but the footropes (yellow lines) should have some small curves in them and even there, not all exactly the same. The overall impression just looks so much better !

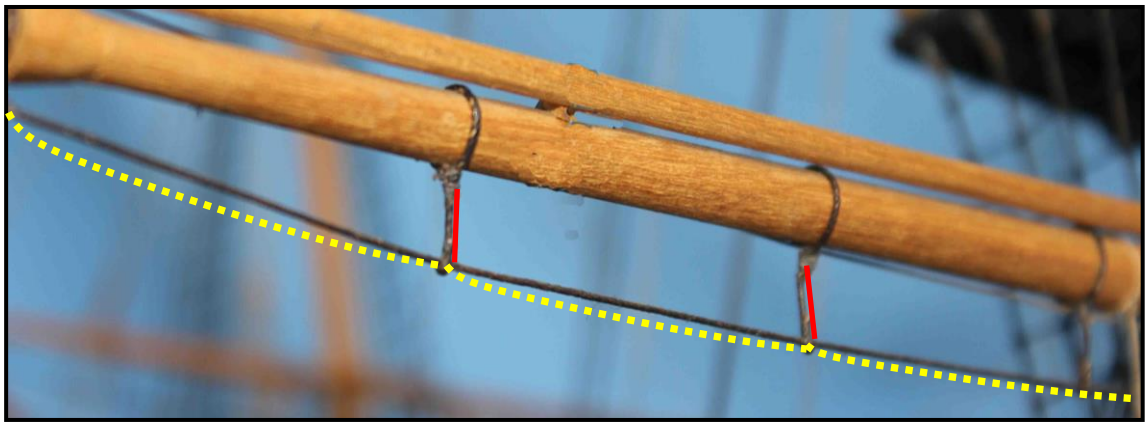


Figure 24: Making the Ropes More Realistic

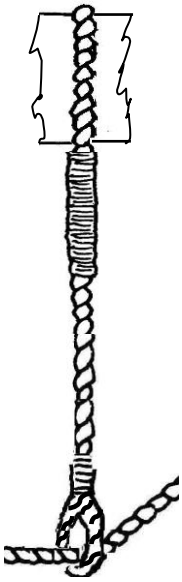


Figure 25: Basic Rigging for Footrope & Stirrup - Diagrammatic

Basic Construction

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

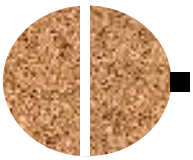
Figure 25 illustrates :
single lashing around the yard,
seizing under the yard,
simple eye around the footrope,
small seizing above the eye.

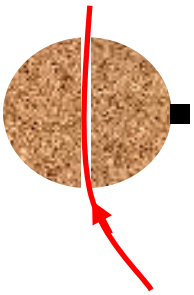
Rigging at a basic level then involves a manipulation of one or more of the above four points.

Basic Method A

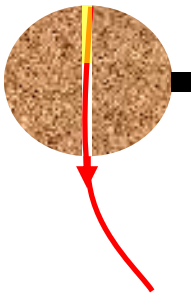
lashing to the yard	glued *through* yard and wrapped over once
seizing of lashing	non-existent
eye	stirrup placed over footrope
eye seizing	non-existent

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.

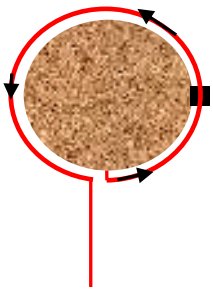




Step 2: Approx. ***60 mm.*** length of ***0.40 mm.*** rope is threaded up through the hole with about 10 mm. protruding through the top.



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. 26)

- 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.

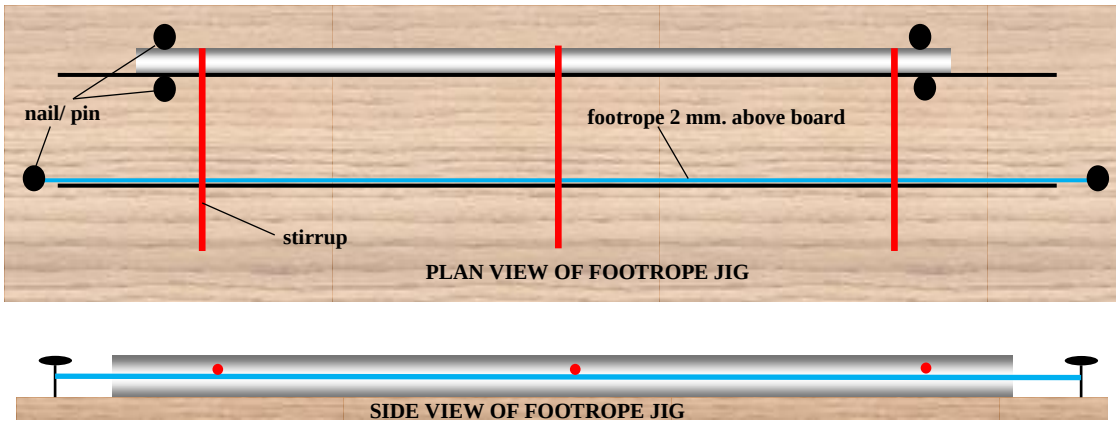


Figure 26: Footrope Jig

- 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**.**

Basic Method B

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.

Advanced Construction

The following comments all emphasise the historical accuracy of the rigging for the footropes & stirrups. There are more ideas here in this section – shaded in Fig. 27 below - that could be considered.

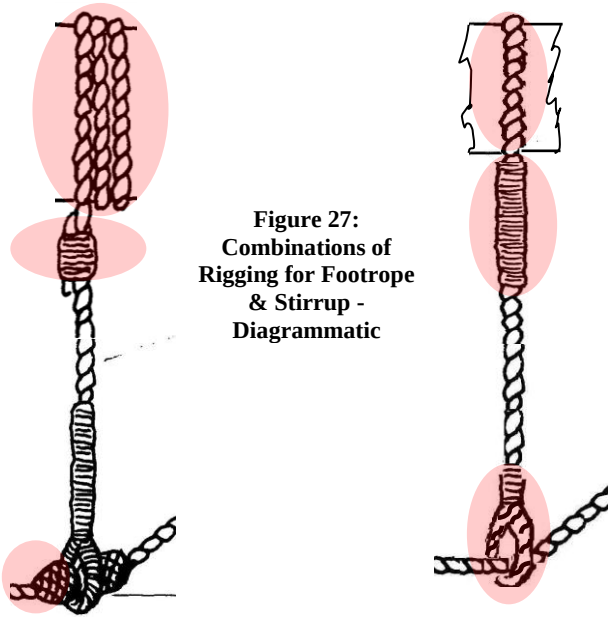


Figure 27: Combinations of Rigging for Footrope & Stirrup - Diagrammatic

Figure 27 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.

The following method of footrope & stirrup construction is not intended as a complete, watertight 'how-to-do-it' operation but an examplar that could be altered & improved. In particular, the seizing of either the eye itself or that above the eye has not been considered.

Advanced Method

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

Step 1: Construction of FOOTROPE JIG (Fig. 28)

- 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.

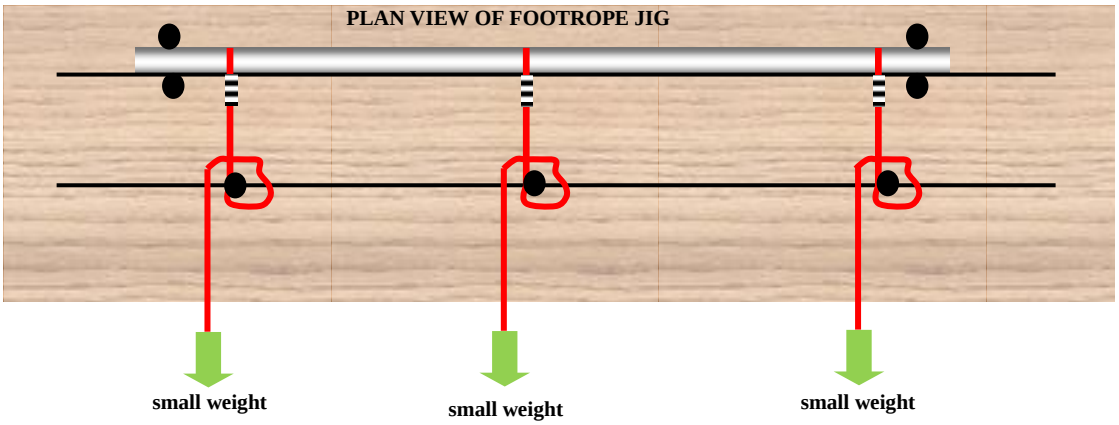


Figure 28: Footrope Jig (advanced)

- 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.

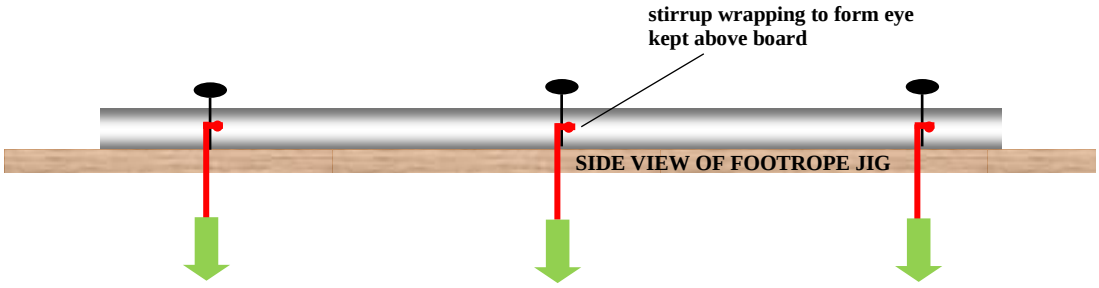


Figure 29: Forming the Stirrup Eye (advanced)

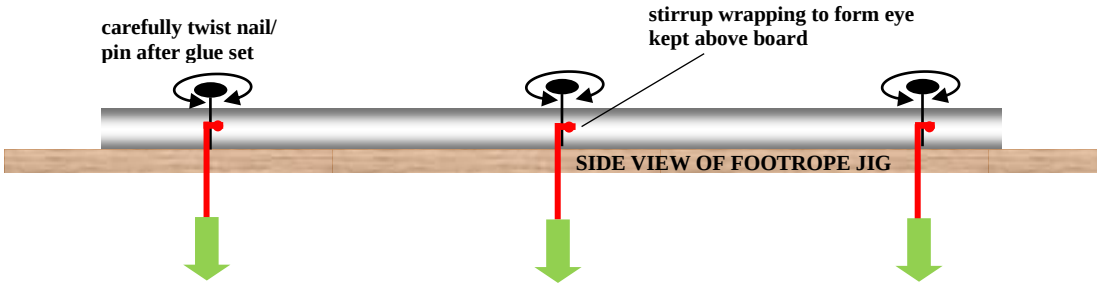


Figure 30: Removing Nail/ Pin from the Eye

- 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 – I used a 'needle threader' 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. 31 below. Glue is applied either side of the footrope.

- Any trimming is then carried out.

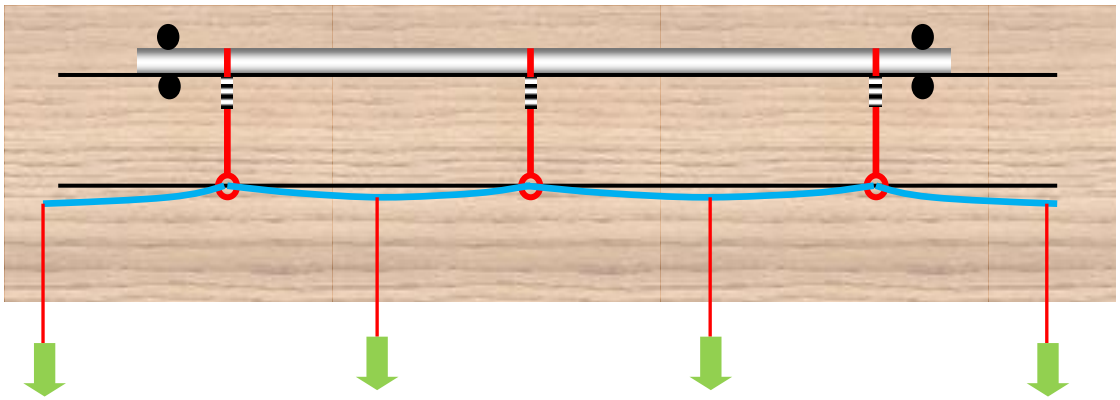


Figure 31: Creating Footrope Curvature