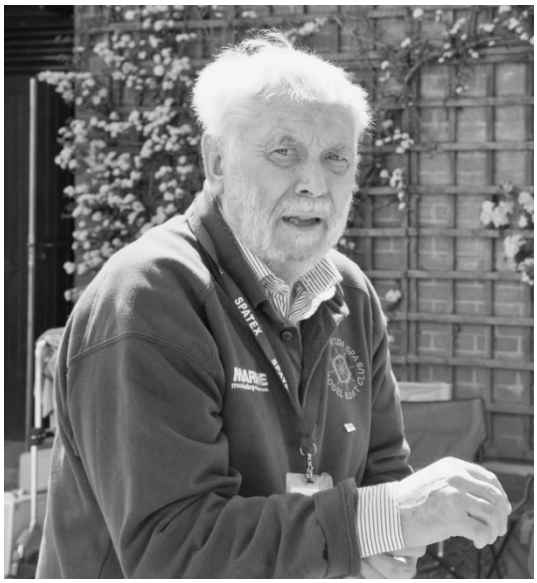
THE PLYMOUTH.

Originally built by Grayham Shaw.
Rebuilt, due to necessity.
By Nige Dale.

INTRODUCTION.

The Plymouth was originally built by Grayham Shaw, who, amongst his other interests, was an active member of the Droitwich Spa Model Boat Club. I had the privilege to have met the man, and enjoyed his company at sailing venues attended by the club. He built an array of boats, motor and sail, of which the Plymouth was one. Unfortunately Grayham is no longer with us. I was offered, and subsequently purchased the Plymouth from his estate, and added the vessel to my collection.



Grayham Shaw.

The Plymouth.

When I acquired the Plymouth she was described to me as a Plymouth Hooker, which I accepted as Grayham was a man who knew his boats, and amongst his social contacts were some of the most authoritative people within the field of coastal sailing vessels of the British Isles. Hooker is a term I know and is associated with the commercial fishing industry, as are Drifting, and Trawling. Hooking is a term associated with long lining or line fishing and these terms have been used for this style of fishing for centuries. The Vikings used this method, and one can only presume that a lot of other cultures earlier to the Viking would have used this

style of fishing as well, although not commercially viable today, it was a mainstay of our fishing industry until about 1770 when beam trawling became more extensively recorded as being used.

When I took over the ownership of the model it was in a dismantled condition for transport and storage, and the bow sprit was missing. As a prelude to re-assembly I did some research of the Plymouth Hooker as a vessel, and as with a lot of things we took for granted and assumed would be here for ever, the Hooker has faded from use, memory and record, leaving tantalizing hints or references but not many items of documentation containing real substance, or perhaps I was not looking in the right place. There are still a couple of Plymouth Hookers in use, but these are mostly converted to racing and leisure use, opposed to fishing. But they gave me some ideas.

The vessel was put together for sailing as well as my knowledge would allow. She also came with no stand, so a stand was made, upon which she could show off, and once completed was sailed on many pleasurable occasions.

In parenthesis, it has to be said, that a lot of us modellers are good at building our models, and designing in, a strip down format, to accommodate our storage capabilities. But are pretty useless in documenting how the boat goes together should the occasion arise where someone else takes ownership of that model. It is not too bad with motored models, but with sailing vessels it can be a mine field when considering the sail plan, the rigging (standing and running) etc, so this is something I am going to attend to in the near future, and write an assembly guide for each of my own boats; a project in itself.

It was on one of these pleasurable occasions that she came to grief, it all happened on a fateful day in the August of 2018, whilst sailing in the Fishguard Harbour, of Pembrokeshire.

A SUNDAY IN AUGUST 2018.

The sun was shining accompanied by a warm breeze; it was a beautiful morning indeed. Checking the tide tables over a mug of the morning brew, indicated that high tide was at 0903, Milford Haven with a height of 6.45 meters. This meant that Fishguard was about one hour later, and within reach of a place to sail on this fine morning.

Loading the car with the most accessible boat to hand, I was off for a mornings' relaxation at Fishguard Harbour, half an hour away, with free parking, toilets nearby, and an Ice Cream van that serves tea and coffee, what more could you want.

Parking the car in the most convenient place, which was at the top of a slope, (today more often referred to as a slipway) that was built for horse drawn vehicles to launch boats, and to go to ships at low tide to load and unload, I set up the Plymouth for a mornings' sailing.

A shallow angle of a slip way would indicate its original use of an access for horse drawn vehicles, where the steeper angle would indicate a more recent construction for motored vehicles. Quite often there is an example of each within a historic harbour. Usually the slip for horse drawn vehicles is most probably towards the inner most reaches of the harbour, where the more recent, steeper slips are constructed within the mole or quay.

The tide was still coming in, and was not going to be a very high one but more than adequate for my needs of the day. But, unbeknown to me, the shore on the opposite side of the river was going to be more than useful later.

The day was near perfect the wind and sun mixed with cloud, would offer the most irritable of persons, no complaint.

The Plymouth as always looks good in the harbour, and a lady who has lived on the quay all her life, said that it reminded her of when she was younger, the harbour had a lot like the Plymouth working from here, and were owned and operated by the local fishermen. Today the sails have gone, but some local fishermen are still here, landing predominantly crabs, lobsters, and other crustaceans.

Getting lost in yourself, (as you sometimes do, when sailing) removes you from the reality of your surroundings, and wraps up in your own world. This world, which in essence, is where you came to when you launched your boat, is apart from, although still apart of, of the greater reality. The reality in my morning of sailing was the sun was having an

increasing difficulty of peering through the clouds, which were getting more voluminous without my noticing, as my preoccupation was for sailing.

A sudden gust woke me from my little world, and the fight for the survival of the Plymouth began.

The squall wind came from nowhere, and could be described as a katabatic type of wind, that came straight down. The Plymouth was driven flat on the water, righted its self immediately, shook its sails, and ran before a very strong gust with the prow well down in the water, showing all the signs of a boat being driven under by the strength of the wind. The squall stopped, for a brief moment then hit again, driving the Plymouth forward toward the opposite bank of the river course within the harbour. This was not just a couple of yards away, but the width of the harbour itself.

The wind was too strong to sail before the wind as it drove the prow under, so I had to sail off the wind. This caused the boat to drive along at a precarious angle with the sail arm fully out. Luckily the Plymouth drove up the shore line, and wallowed in the little water that was left under the keel. Now at least, I didn't have to wait for the tide to go out to get her back, but walk round to the other side of the harbour, and remove her to somewhere safer.

I have had the privilege of being around boats all my life, first paddling or rowing them since about the age of seven, and in all that time I have never encountered a wind that was as fierce

as that one. It seemed to come from nowhere, the wonders and terrors of nature will always be a source of amazement to me.

THE AFTERMATH

The model is heavy due to its internal ballast, but holding a fair bit of water of the Cardigan Bay as a result of a weather phenomenon made it very heavy indeed. It required removing some of the water while the boat was beached to lighten the load, then moving it to a more appropriate place nearer the car, and tools for further work, prior to taking the boat home. The salt water did a bit of damage but I thought it not too bad at the time, however, when the boat dried out things started to move, with the deck planking starting to separate from the

frameworks as the first sign that all was not well.

A decision had to be made on what to do, as leaving the Plymouth as it was, was not an option, and scrapping is not even to be considered, so that leaves only a rebuild, so that's where we are. The rebuilding of, The Plymouth.

THE RESEARCH PRIOR TO THE REBUILD.

Towards the end of the nineteenth century, sailing fishing vessels with a single mast, a covered deck, a straight bow and a comparable rig were often referred to as a Smack, but silhouette illustrations also describe the model as a Sound Trawler. The reference of a Smack is difficult to confirm by clearly identifiable features, as it could be argued the rig makes her a Hoy, Sloop or Gaff Cutter, but vessels deemed as Smack are noticeably less sharp in the bow than the Hoy, Gaff Cutter, or Sloop. The Hoy is an older style of vessel with a larger tonnage for the carrying of cargo, where the Smack is smaller in tonnage and arguably used more for fishing. As the bow of the Plymouth is straight, and modelled on a Hooker, will remain a Hooker, but it didn't stop me looking for more information.

In researching the rig of the Plymouth, I went down several avenues to try and get a better understanding of the subject of this boat, and similar boats to add to my limited knowledge of boats which has been a lifelong passion which only gets worse as time goes by. One of these avenues finally brought me to an article of an Essex Oyster Smack, The Betty CK145. This article was very informative and had significant information of the history of The Betty, and also some guidance towards identifying a Smack. I include here some notes that I made from reading the article that "may be" of help in the identification of a boat as a Smack, but be warned, I did indicate "may be".

A Smack.

I. A working boat in the style, or formally used in fishing.

II. A gaff rigged cutter or ketch (running main, sometimes mizzen, staysail, jib, without a stay and tops'l).

III. A long keeled heavy displacement craft, level bow sprit, no leeboards.

IV. Straight bow, deep forefoot, low raking keel, counter stern, rudder trunk.

V. A low freeboard and good bulwarks.

VI. Fully decked and obvious sheer.

VII. Tiller no wheel.

VIII. Blocks no winches, wooden spars.

This list of criteria is still a little generalized, but evolution rarely settles into areas of clear demarcation, so perhaps some observations from an evolutionary point view may be necessary. From the early to middle of the sixteenth century commercial sailing ship evolution took a leap forward in northern Europe. The divergence from square rigged vessels to a more serviceable sail plan was used on a wide variety of vessels to include small and large craft that could be used on estuary, the new inland waterways freshly

constructed in Holland, and on the home waters of the coastal regions of Northern Europe. These emerging styles of vessels in both draught and tonnage used a new (or now recorded) innovation of the sprit sail, which gave these vessels greater sailing capabilities than the more traditional vessels with yards and square sails. During this period of the mid sixteenth century these vessels proliferated, and in Holland the sprit sail became known as a "smak sail, schmack sail, or smakke sail".

Although these notes indicate the evolution of this sail plan via the introduction of the Sprit as a spar within a four sided sail, it is only a small step removed from a dipping or standing lug sail being rigged from the mast, rather than from around the mast. Also it is necessary not to forget that within the evolutionary process of any sailing vessel, there are also the individual requirements of the hull as a commercial platform designated by the owner or user for its ultimate commercial use. Once the operational design for the hull has been established, the basic sail plan can be considered, usually through historic knowledge and experience, but even this can change where a sailing master would alter the sail plan to suit the hull and manning capabilities when finally put into service.

The Dutch used the sprit sail sail plan on a smaller version of the Tjalk, and rigged the vessel as we recognise as a cutter rig, and called it a Smak. Variations of this evolved sail plan were used on different hull designs in Holland, and on vessels that needed a full deck opposed to open holds, and still utilised the use of the leeboard. These vessels were called, Bojer, Fleute, Kuff, Huker, Guliot, and lastly the Smak. During this time, and across the North Sea was a vessel that was coming into existence called a Hoy, which carried a similar sail plan but the hull was full keeled and required no leeboards. The main benefit of this fore and aft sail plan is that the vessel can be sailed closer to the wind than the historic square on yard sails, and I would suggest requiring less man power, a major business factor of any industry in any time frame. Towards the end of the nineteenth century, sailing fishing vessels with a single mast, a covered deck, a straight bow and a cutter style fore and aft rig were being referred to as a smack.

Grayham built the Plymouth with information and knowledge he had of these vessels, and with a consideration to what he wanted to achieve from its construction. From the research, Hooker prototypes were built with an open deck, but the model was fully decked complete with cargo hold, possibly for ease of build and to conceal the operational baggage of servos and batteries etc. The sail plan can be described as Gaff Cutter, Hoy, Sloop or Smack, but for ease of use no Gaff was fitted, so the model would be running on a main, jib and stay sail.

The sail plan, being so similar to West Country Coastal Sailing Vessels, had to be a point of research for the type of cargo hold which would complement the deck of the Plymouth model, as this is an item which needs considering within the

rebuild. Research found that a cargo hold with a curved top would suit the type of vessel that the Plymouth may have looked like, if having a cargo hold and fully decked. The curve tops of these holds were removable sections that ran the full width of the hold aperture, so the hold for the model will have this feature replicated in an attempt to add a little character. Although a curve top cargo hold on a prototype would have been sheeted over with canvas, the model will show the wood construction and will be varnished. The Plymouth model as a Hooker is a fishing vessel, and to try and replicate from research, a possible hold type or style which could be applied to the model fishing boat, very quickly became a subject that is as varied as the quarry the vessels went in pursuit of. So the curved top cargo hold installation of the rebuild remained unchallenged as a fitment.

During the investigation into cargo hold types and usage, came the ever present questions of what would be right, would look right, and would be right for the rebuild of the Plymouth. The applications of the deck layout with the chosen cargo hold type, (and in addition to the information gleaned from the research,) the original deck layout and its relevant fittings did not seem quite right for the boat. It was decided that the original companion way would be refitted in a slightly different place and the small access would be reviewed to see if it would fit. Although this will deviate from what Grayham built, the main purpose of the rebuild exercise is to salvage an unserviceable model into a serviceable unit.

The realisation stuck that in order to find; A, as much information about these types or any types of boats, and

B, determine what would be right for the model you are building, (particularly without a prototype reference,)

The propensity to deviate from the type of vessel the model was, to a model that could be construed as being totally different, is very easy to achieve. When in researching a rebuild of this nature, with limited information of its class or style, you have to remember that you are looking for information of these vessels, not another prototype to copy.

REBUILDING THE PLYMOUTH.

STAGE 1.

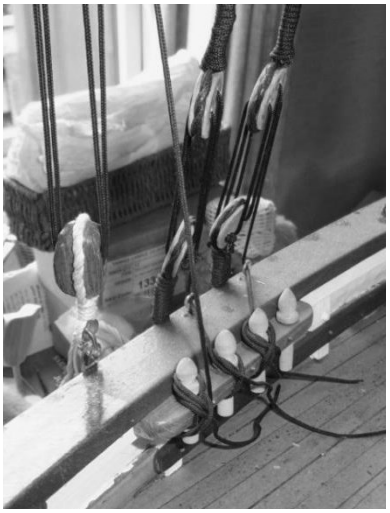
In deciding on what, and how, to rebuild this vessel, she was assembled as for sailing, and placed on a table. Once upon the table, time was taken in

considering and developing the plan of action for the rebuild.

As mentioned in the parenthesis within this documents introduction, some notation of the rigging was needed to help put her back together. First things first; take a lot of photographs of the running, and standing rigging. In taking some of the photos I realized the rigging in some areas could been done a little better, although functional, the rigging will be revised and tidied up, (put right depending upon your point of view) when re-rigged.

Fig 1

Fig 2



With the photographs taken, the next item was the sail plan, and did it need alteration? As I had no idea as to how Grayham intended the sail plan to look or function, the sails were put to the boat in the most practical way when she first came into my care, and was used accordingly. However, a slight alteration to the Bow Sprit, Jib, and Stay sail set; a lowering of the main peak, will help the handling of the boat when the renovation is completed. Identified from the research, the bow sprit in a sail plan like a smack should be more level, so the first decisions of the renovation were made; alter the bow sprit, jib and stay sail setting slightly, and lower the main peak. Lowering the peak of the main sail is a definitive alteration to the main sail, but the bow sprit and jib set may be me putting into place what Grayham had originally rigged.

Measuring the positions of the components that make up the deck clutter that is the Plymouth, (hatches, pin rails, companionway, and the Tabernacle/ Heel Bitts for the bowsprit) a layout drawing was made of these fixtures in the original positions, to be re-instated into or around those positions within the process of the rebuild. In measuring these fixtures, it was determined the scale of these to be roughly or probably, 1:12 scale, and then proceeded to measure the rest of the boat, deck planks and bulwarks as a comparison.

Fig 3

Fig 4

The deck planks measured about, 3/8”/ 10m and the top timbers under the gunwale (sometimes narrowed) for the boat frame/ ribs were 3/16”/ 5mm. These dimensions although not wrong, seemed to be a little out of synch’ with the rest of the boat, and probably more attuned to 1:16 scale rather than 1:12 scale. So an increase in timber size to reflect more of a 1:12 scale construction was considered appropriate. There could be an argument that a 4”/100mm deck plank on a 40’/12000mm boat was fine, but it was noticed that deck planks were the same as timbers in the companion way access, so another type of wood in the planking to offer a contrast to those timbers is preferable. The second decision for the rebuild was made; review a possible change in the timber of the deck planks, or introduce another feature as an offset.

The hull livery of black with a light blue stripe would remain, but, adding a white pin stripe above and below this blue line would help to emphasize its presence. The pin stripe will also add a little more colour to the hull, and will be in direct contrast with the more subdued colours of blue and black. Third decision of the rebuild is made; a little more paint in places.

A note book was pressed into action as a reference for the notes made, and drawings constructed. This note book will be the main reference point in the rebuild, accompanied by the photographs taken, to help put the Plymouth back together.

STAGE 2

Within the Stage 1, there are noted three areas where decisions of how the rebuild may differ from the original. There will be some variances from the original as there is someone else doing the rebuilding, and will have a different signature in the work done. But the object of this exercise will be to keep the rebuild as close to the original as possible, so she will always be the Plymouth, rather like a prototype going into a dry dock for maintenance.

In carefully removing the deck clutter, it became apparent that the deck was reasonably water tight (as it were) at deck level, which would allow a little water on the deck should the need arise in normal circumstances. Unfortunately, the front hatch for the net locker, cargo hold and companionway were all used as accesses to the hull void with no coaming or upstand to reduce the propensity of water ingress.

In fig 4, this omission is obvious in the cargo access void, a big square hole with no upstand. Likewise in Fig 5, the access for the rudder servo is just a hole. This meant, that any water that could potentially arrive on the deck could go straight into the hull and bilge, and not running off through the scuppers. Not necessarily a problem as such, nor a

criticism of the boat construction, as the Plymouth was not designed to sail on the sea itself, or get caught in a squall in Fishguard Harbour on a fine August morning.

In refitting the deck clutter it will either be fixed directly to the deck, or if access is required to the hull void, to introduce a coaming/ upstand to the items when re fitting, in an attempt to reduce any potential water ingress should the deck become awash in the future. Another decision made for the rebuild; an effort to limit water ingress into the hull from deck wash.

Fig 5.

A picture of a deck void.

After removing the deck clutter, quite a lot of the deck planking came away in large sections, which just made the boat look more distressed in its appearance. It became more apparent as the stripping process continued; that the boat was more in need of a rebuild than previously thought. It was necessary to remove the brass chain plates, and stem cowling as the effect of shade (shade is a posh term for non-ferric rust) also required attention. With the deck planking removed, the condition of the planking substrate or base support of plywood started to be a concern as some of the plywood used was showing delamination in places. It was considered prudent to remove that as well, and rebuild from the original frameworks that Grayham installed, but even these frameworks had submitted to the effects of salt water, leaving very little to rebuild from. However, the rebuild will be to the design intended by Grayham, after all, it is still The Plymouth.

Fig 6.

The boat frameworks, although in position, were loose, where the adhesives relinquished the propensity for the job of sticking parts together. These frameworks will have to be removed, for reuse or replacement where applicable.

You have to stop and ask yourself if, when even faced with very few sailing venues; is sailing model boats on salt water sensible? I will admit that when all goes well it is most satisfying, but when things go wrong, a lot of damage is done very quickly.

An area or feature to be considered is the margin to the deck, the planking trim between the hull and the deck which adds character to the deck. (A margin could be

described as being similar to a household skirting board, but in the horizontal plane) There will be some thought on that possibly looking at old working vessels to help in the decision. There are a few moored in Milford Haven at the moment, it is always good to look at the work of others, and consider their work against your ideas. As for the margin, it is still under consideration, but of a lower priority now the boat is completely stripped, and a margin is a job in the future.

STAGE 3.

With the frameworks removed, the renovation will be a longer process than originally perceived, (but whose fault is that? answers on a post card to…) So first things first, start as if it is a new fibre glass hull, wash with soapy water, then, make and install the frameworks of the boat.

The deck level is determined by the position of the scuppers that Grayham put into the hull. This will make life interesting, but hopefully the effort will be worthwhile. I intend to fit the shelves for the deck the full length of the boat either side, with the hope of enabling a smooth line for the deck. Whether the design intent for the shelves will ever work in practise, remains to be seen and only time will tell.

Fig 7.

Fig 7, illustrates the start of the process of installing the shelves for the deck. Where, the shelves are braced apart with timber so that the shelves will follow the lines of the hull. These braces will remain in place for a few days to allow the timber to gain moisture and also yield to the braces, hopefully forming a bend in the wood for the shelves. It is hoped that the timbers will set along the line of the hull to enable the final fitment of the shelves.

All hope denied. *The forming of the shelves to the shape of the boat using braces and wedges, did not work. So the introduction of kerfs to the shelves will be used to help bend the wood. A kerf is a slot cut into the wood to allow the wood to bend more easily. The type, depth and frequency of the kerfs can be determined by mathematical formula. There will be no formula used in the introduction of the kerfs into the shelves, and will be introduced as felt necessary to effect the bend.*

The line along the hull where the shelves sit, are the heads of small brass screws that hold the rubbing strakes (screwed and glued) onto the outside of the hull. For the shelves to fit flush to the inside of the hull, recesses in the shelves need to be made to accommodate the heads of these screws. These screws are inserted on a random distribution, so time will need to be taken to get those positions right.

Fig 8.

In Fig 8, the shelves are refitted as well as most of the deck beam forms. The beam forms are a mix of what was there before made by Grayham and some new fitments made for replacement. The curve of the deck or camber was determined from measuring the salvageable deck beams and estimating the curvature ratio. The curvature ratio was estimated as being ¼" per foot or approximately 1mm in 50mm, so the replacement beams for The Plymouth were fashioned using this ratio. As calculations were required to determine the deck camber for each beam, those figures were expanded and put into a chart for future reference. In addition to this chart a description of the origins of these figures was produced to make a complete article in itself, and is placed within the appendix of this narrative. Some of the timber frameworks within the hull void remained installed, these held servos, batteries, etc, as the adhesive still maintained its function.

The installation of all the deck beams and servo accesses continued, as well as the fitting of noggins to aid the installation of a deck substrate to support the deck planking. The frameworks that hold the deck also support all the deck clutter, of companion ways, hatches, fid rails, chimney's, etc. all of this clutter will require forethought as to how these fitments are fitted, whether screwed or glued, load bearing (Fid Rail) or not, as with deck hatch.

The sail control line which goes to the sail servo, requires a guide tube to be inserted from a point on the deck to the area of the servo within the hull void. For this guide a brass tube was glued into the frame works of the deck to act as a conduit

for that control. With all the foundation work completed for the deck it was onto the next stage.

Fig 9.

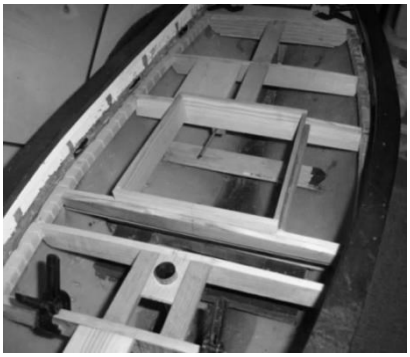
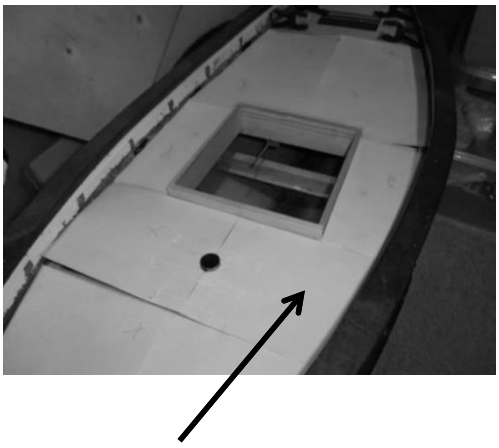


Fig 9. Shows the beams and void accesses fitted for the start of the installation of the deck substrate.

Stage 4.

The deck substrate on which the finished deck planks will be laid will be 1.5mm plywood. This will be laid in multiple sections as this is easier than trying to grapple with large sections of timber. To determine the shape of the sections that will make up the deck substrate, patterns of thin card were made, and marked for identification.

Fig 10.



Patterns of thin card

Fig 10, indicates the patterns of thin card in their positions upon the deck frame. Once these pattern positions and shapes have been confirmed, the deck parts can be cut from the 1.5mm plywood. To fit the plywood sections it is advisable to start at either end of the boat and work in towards the middle, this will give you a less restrictive place to work when finishing off the deck substrate.

Fig 11.

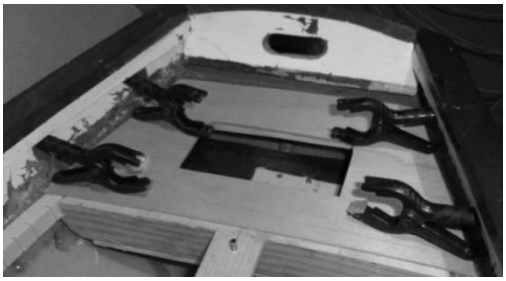


Fig 11, shows the start of the laying of the deck substrate. To help hold the plywood sections in position, spring loaded clamps were used, but contrary to their design. Instead of using the jaws as the intended compression clamp, the handles were used as an expansion clamp, holding the plywood down by using the gap under the gunwale to hold the clamps in place. Crude but effective.

Fig 12.

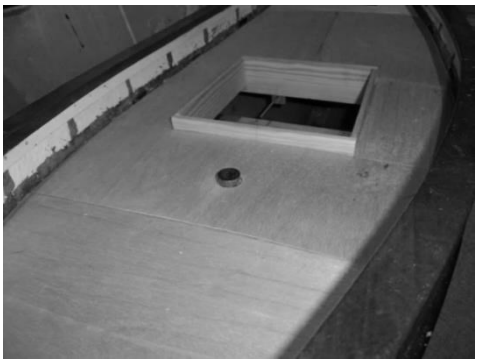


Fig 12, shows the deck substrate complete. The substrate was laid to ensure the hull/ deck seams were water resistant and also to offer a uniform foundation onto which could be laid the deck planking. The areas between the underside of the gunwale and the deck substrate are to be cladded with timber to cover the fibreglass fabric of the hull, and to replicate the hull planking as seen from inside the boat. On the completion of the cladding of the hull interior, the margins were made, and the timbers were inserted to replicate the ribs of the vessel. A bit of a convoluted process but it works for me.

1. After cladding the hull interior, mark the inside of the hull to identify the positions of the rib dummies... make a short dummy rib…then make the margin blanks.

2. Position the margin blanks in their relevant places, and position the rib dummy onto a mark on the inside of the hull and draw round the rib dummy at the point it meets the margin blank.

3. Repeat this exercise for every position of the ribs on the margin blanks. The subsequent markings on the margin blanks are the areas to be removed to

form a template to accommodate the ribs when the margins are refitted.

4. Remove the areas to form notches on the margin blanks as indicated for the rib positions.

5. Using the notched margins as a template, fix the dummy ribs to the inside of the hull.

6. Remove the margins to allow the glue to set, leaving the ribs fixed in place.

Doing this this way, enables the modeller to finish and paint the inside of the hull without worrying about contamination to the margins if they are to be a different finish to the hull, as the intension here is to have the margins varnished, and the ribs painted.

Fig 12A.

Fig 14.

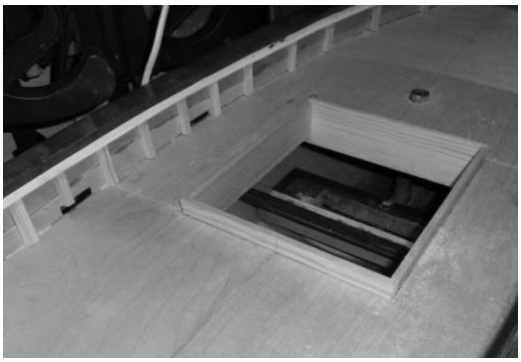
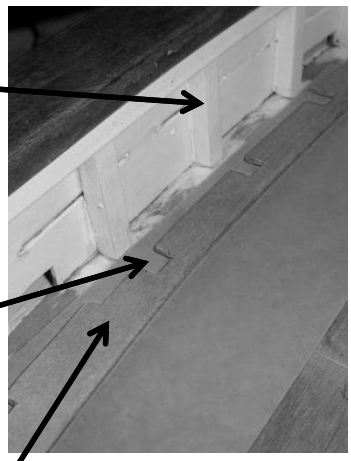


Fig 12A, indicates the installation of the rib parts, and Fig 14 shows the fitted timbers to replicate the hull ribs. The rib timbers were cut from a piece of 6mm thick strip wood beading. Although the timber was marked of at 7.5mm widths for cutting, the final result was a very slight variation in the widths of the timbers due to cutting and finishing by hand. These variances, although slight, will add a little character to the boat without being obvious that they are different.

Fig 15 shows the ribs fitted and painted with a section of margin in its state prior to varnishing and fixing in place. Fig 15 also shows up the quality of the finishing exaggerated by the macro photograph.

Fig 15.



Stage 5.

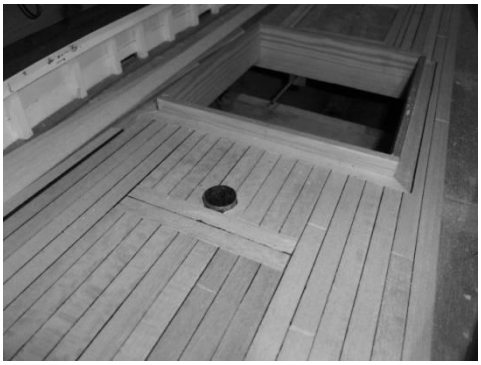
Once the ribs have been installed and the paint applied to finish them off, the margins can be fitted. One coat of varnish was applied to the margins prior to fitting as this makes life a little easier when it comes to finishing. Fitting the margins is a simple exercise as the shaping has already

been done and the positioning and holding in place is done by using clamps contrary to their design, see Fig 16.

Fig 16.

Planking the deck is a straight forward process as there will be no joggling of the king plank or the margins, a style which a lot of working vessels adopt as it reduces the work involved in creating the joggling, making the planking easier to fit. Drawing a centre line from stem to stern will be the centre line of the king plank, the plank that runs down the middle of the deck. But prior to laying that plank, the margins of the voids and fittings will be laid using the same planking as what will be used to plank the main deck. Fig 17, shows the deck partly planked, with a black edge to some planks to emulate caulking.

Fig 17.



The black edge of the plank to emulate the caulking was created by using a permanent marker pen and allowed to dry for a short time prior to fitting. The king plank was laid first along the centre line but without any black edging. The rest of the decking was aligned to the king plank with the abutment edge of the next plank (s) having a black edge. The black edge offers an orientation for each plank, as that edge is always fitted towards the centre of the boat or king plank, and helps you get each one the right way round. The marking of one side of the plank reduces the propensity to overdo the black line that emulates the caulking, and helps to keep each line uniform in size. Masking tape was used to cover the upper part of the plank to help protect the wood against any glue that may inadvertently get on the plank upper face; then the underside was applied with PVA and fitted to the deck substrate. Where reasonably practicable, the planks were laid in a complete run with the plank joints notched into the complete run in the positions where they would most probably reside.

Fig 18.

Fig 18, shows the planking processes completed requiring only sanding and varnishing to finish the re-decking, and enable the installation of the deck clutter.

Fig 19.

Fig 19, shows the bow section with the clutter installed, also a horse for the stay sail is also fitted, and is seen as a brass rod that transverses the boat just before the mast foot fid rail.

The deck clutter to be installed was mostly of a new build, but some was original and the positions of which were to be slightly different. The original parts of the Tabernacle/ Sampson post or heel bits for the bow sprit was turned 180° and a cleat was added to allow the heel rope to be laid off to finish the reeving of the heel sheaves of the sprit. The companion way was moved to mid ships on the stern section, and the anchor was fitted in the bow. The new builds of the cargo hold, rudder servo access cover, and mast foot fid rail were also fitted.

Fig 20.

Fig 20, shows the stern section of the Plymouth, with all the clutter installed into the final positions. This completes the rebuilding of the margins, deck planks and clutter, leaving the installation of the mast, sprit and all that is attached.

STAGE 6.

As indicated within the notes prior to the rebuild, some items or areas were deemed to require some attension. As the rebuild progressed, the reshaping of the main sail was done, where the peak of the main was lowered, and new stays for the stay sail and the jib sail were attached. The bow sprit was set more level to the waterline, and the top mast was lowered slightly. The results of the modifications to the sails and the bow sprit was, I was not fully convinced that the initial decisions in needing these modifications, was right.

After some thought and sitting looking at the rigged model for a while, it was desided to make a new Main Sail and reinstate the peak height of the original made by Grayham Shaw. Also the possibilty that the Jib sail was of a size and shape more conducive of a Stay sail/ Jib Top sail was being considered. So in making some paper patterns and chosing the best look, a new Jib Sail was made. The re rigging of the model with these new sails was done and another review was undertaken, the result of which was the feeling that the bow sprit was too flat and a rake should be re introduced to the line of the sprit, and the top mast should be returned to its original height. In the end the model retained its original main

sail shape, the rake of the bow sprit, and top mast height as indicated by the set up used upon taking custody of the model.

With the last belaying pin laid off, and nothing more to do than put the model away for a time when you and the model can go sailing, it allows the reflection that if adherance to advise noted within the research section of this narrative was done, a lot of work could have been avoided. Research note below.

The realisation stuck that in order to find;

A, as much information about these types or any types of boats, and

B, determine what would be right for the model you are building, (particularly without a prototype reference,)

The propensity to deviate from the type of vessel the model was, to a model that could be construed as being totally different, is very easy to achieve. When in researching a rebuild of this nature, with limited information of its class or style, you have to remember that you are looking for information of these vessels, not another prototype to copy.

I will take this into consideration when I do my next project…… probably.

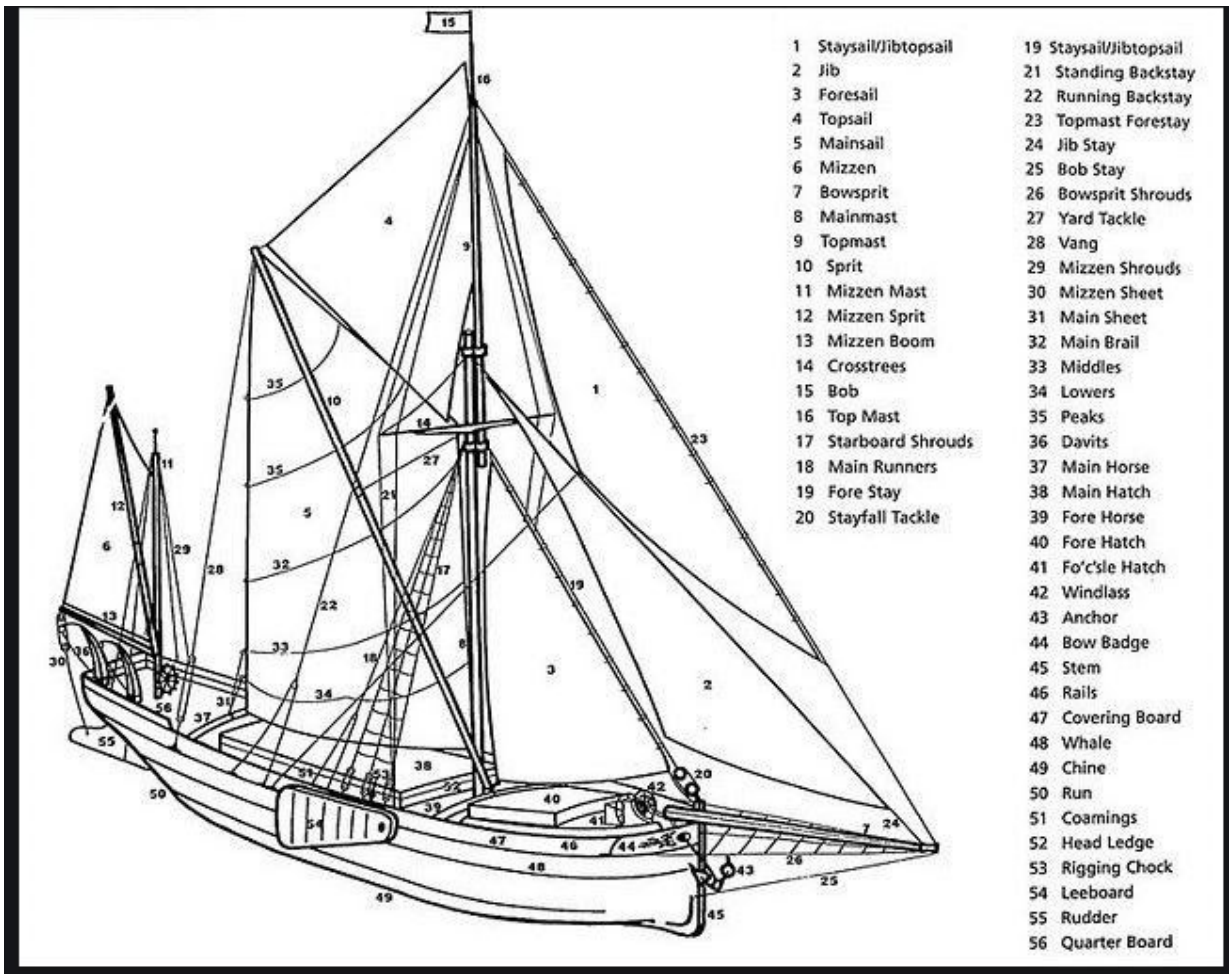
The rigging of the Plymouth followed normal practise where the standing rigging was install first, followed by the running rigging, then the sail control. Once the model was rigged, a limited amount of strip down can be undertaken to make storage and transport a little easier. This is done by 1) releasing the sprit heel ropes and withdrawing the bowsprit into the hull of the model, leaving all the lines of the rigging still attached to the sprit. 2) removing a location pin that holds the top mast in place which is located in the cross trees. (the bottom of the two holes in a framework through which the top mast passes and is held in place. 3) releasing the Peak Halyard and lower the top yard of the main sail.

Fig 21.

APPENDICES TO THIS ARTICLE.

Rigging from scratch, from transport or storage.

For this section I am going to assume that the Plymouth was derigged, but also that this section, where used in reverse, could be a guide to strip the model for transport and storage. In a strip down form the main mast and bow sprit are removed. The heel rope for the bow sprit plus the lanyards for the shroud dead eyes are left in place, and the chain for the bob stay was unclipped and left on the model. Also I am going to assume that the sail and rigging will stay with the main mast as it is easier to do so where stripping off these items is a task in itself, and the bow sprit will have some rigging and the stay sail included as well, but the clew sail control will remain with the model. The fore sail may or may not be attached to the model, and will be treated here as if was not attached.



Foremost, for the initial descriptions of a line, sheet halyard shroud etc the term "rope" will be used, then an appropriate term often used for those ropes (and other parts) will be displayed in italics, and it is hoped the illustration above will also help.

The main mast has some parts that with a bit of a description will make this section a little easier to understand, and these parts are the cross trees. The cross trees are at the top of each mast section for a support for another mast section that is to go above it and continue the mast length to the height that is deemed necessary to sail the vessel. This model has one mast section (top mast) above the main mast section (lower mast) so there is one cross tree to deal with. To hold the top mast in place there are two holes in a pair of frames at the top of the lower mast, through which this top mast is passed and is held into position. These two frames with holes are sometimes referred to as the "*Doublings*" where the top frame and hole is the "*Cap*" and the bottom frame is or are the "*Cross Trees*" themselves. The upper section of a mast section is generally squared off to facilitate the fitting of a cross tree (*doubling*). This squaring off prevents the cross tree from rotating around the mast and also helps with the *Cross Tree* installation.

Cross Trees and their uses is a field in itself, so only the requirements of the model will be dealt with here, and some descriptions may not be entirely correct but are there to help the re-rigging process. The sides of the *Cross Tree* are called a *Trestle Tree* and these timbers run forward and aft. The back and front timbers of the *Cross Trees* are the *Cross Trees*, the front *Cross Tree* on the model is elongated into a yard which is positioned in the front of the mast when installed into the model.

Also, the assumption that the reader understands some terms and names of parts of a boat are made, eg, Bow (sharp end) stern (blunt end).

The Standing Rigging.

1. Insert the *Main Mast* with the elongated *Cross Tree* towards the bow.

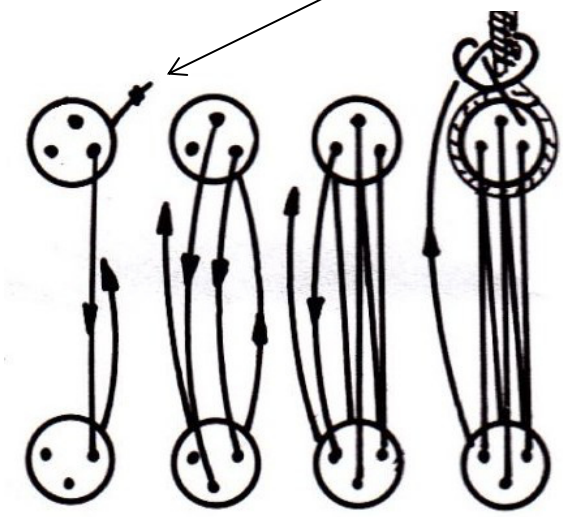
2. Raise the *Top Mast* and insert the pin that holds it up and in position. At the bottom (*foot*) of the *Top Mast* is a hole, which aligns with a hole that goes through the *Trestle Trees* through which the pin is inserted. The pin is attached to a white piece of cotton string for ease of identification.

3. Untangle the rigging ignoring the ropes that hold the sail and booms/ yards. Either side of the boat there are three strips of brass, two are fitted with round bits of wood with three hole in each, these round bits of wood are *Dead Eyes*. The strips of brass are referred to as *Chain Plates*, the two *Chain Plates* with *Dead Eyes* are for the *Shrouds* which also have *Dead Eyes*, and the remaining *Chain Plate* without the *Dead Eye* is for the *Standing Backstay*.

4. Identify the *Shrouds*; these ropes have a *Dead Eye* at the end of each. There are two *Shrouds* either side of the boat which are joined by a type of Sheer pole, a pole to aid the spacing of the shrouds. The lower pole of the two on each pair of *Shrouds* has a navigation lamp affixed, the red one is the left and the green one is the right hand side of the vessel. The rope to join the two dead eyes together on each side of the mast is referred to as a *Lanyard*. The *lanyard* is attached at one end onto the gunwale at an eye bolt. Thread the loose end of the *Lanyard* through the dead eye holes, starting at the top then to the bottom *Dead Eye*, moving from the hole most forward in the *Dead Eye*, and threading (reeving) each hole until all holes are occupied then finishing off with a half hitch as in (Lacing a Dead Eye) Fig 4 below then terminating on a belaying pin below the *Dead Eye* position. Connect all *Shrouds* in this manner ensuring the mast is upright in the boat when finished.

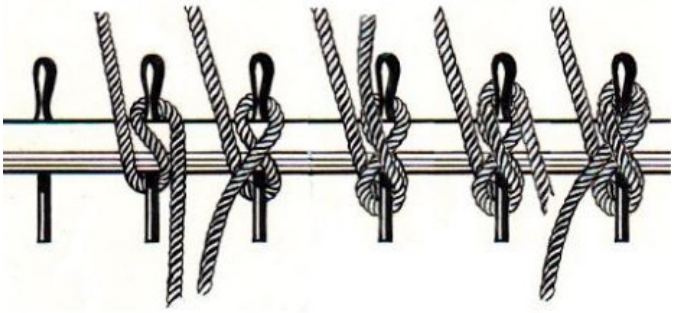
Note. There are different ways to lace a *Dead Eye* with the variations in how it is started and how it is finished off. Below is an example of starting and finishing the lacing on the *Dead Eyes*, but in a model this can be fiddly and on the prototypes with wet rope very difficult. English manuals of seamanship tend to favour the approach used here for the model, rather than the illustrated style below.

Lacing a Dead Eye. This end is attached to an eye bolt on the gunwale.



1 2 3 4

Belaying a rope on a pin.



1 2 3 4 5 6

5. The next ropes are the *Standing Backstay*. This rope is one piece on the Plymouth, and has a loop sewn into its centre which goes over the top of the top mast and hangs on a bit of wood I call here, a *Hound*, (*Hound; a wooden mast fitting used to secure the shrouds, forestay and other fittings/ ropes to the mast*) on the model it is a block of wood near the top of the top mast, just below the button. The sewn loop is in the middle of the rope/ back stay, and ends of which go either side of the boat, passing through the end of the cross tree

finishing on a block and tackle. The *Standing Backstay* has a block and tackle attached to each side/ end and is fixed to the model with a shackle to the remaining chain plate in front of the *Shrouds*. Once the shackle has been attached to the *Chain Plate* then the slack can be taken up in the block and tackle and the lines made off on a belaying pin below the *Dead Eye* position.

6. The last rope of the standing rigging for the mast is the *Running Backstays*. These ropes are attached to the top mast on the hound as with the *Standing Backstay*. The *Running Backstay* passes through a running block which is attached to an eye on the gunwale by a hook, astern of the chain plates, through which the rope/ *Running Backstay* passes to be laid off on a belaying pin towards the stern.

7. Insert the *Bow Sprit* through a ring on the right hand side of the front of the boat. This ring is called a *Gammon*. The *bow sprit* end which is to be inside the boat is the one which has a flat end and two holes/ sheaves going through it, near the flat end. The flat end is called a *Heel* and the holes are called *Sheaves*.

8. Under the Bow Sprit there is a chain which runs from a point on the bow/ stem near the water line, this chain is the Bob Stay, and is attached to the Bow Sprit by a clip latching onto an eye on the underside of the Bow Sprit.

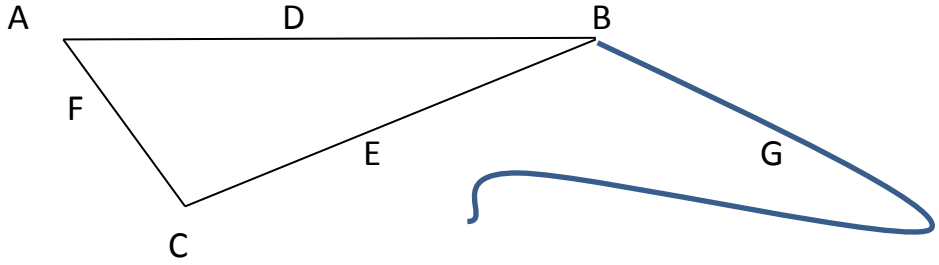
9. The *Bow Sprit* will align itself with a fixture as sometimes referred to as a *Tabernacle* or *Heel Bitts* into which it will be bound. This fixture will have a rope already fitted and this rope is referred to here as the *Heel Rope*. To tie the *Bow Sprit* into place, thread the free end of the *Heel Rope* though one of the *Sheaves* in the *Heel* of the *Bow Sprit*, then back through the ring from which this rope is attached, then back through the remaining *Sheave* in the heel of the bow sprit. To finish off this rope, thread the free end once more through the ring from which this rope is attached, and lay off (after tensioning) on the cleat on the side of the *Tabernacle* or *Heel Bitts* fixture (using the same method as belaying a rope on a pin) that houses the *Bow Sprit*.

10. The *Bow Sprit* as with most masts has *Shrouds*. On this model it is a single line which passes through eyes either side of the *Bow Sprit* near the outer most end, and the free ends are finished off on a belaying pin either side of the bow.

11. The *Top Mast Fore Stay* has a loop at one end with the other end free. The loop end fits over the *Top Mast* and onto the *Hound*, the free end then passes through a hole/ sheave at the end of the bow sprit to be finished off on a belaying pin at the bow section of the model.

The Running Rigging and the Sails.

There are three sails for the Plymouth. The *Main Sail* (four sided) should be still attached to the *Main Mast* by the yard and boom that support it. The other two are three sided sails, one of which should still be attached to the *Bow Sprit* whilst the other may or may not be loose. The sequence for rigging will be *Fore Sail, Jib Sail* and finally the *Main Sail*. The three cornered sails on this model are similar in design, rigging and in the naming of the parts.



A	Tack	E	Leech
B	Head	F	Foot
C	Clew	G	Halyard
D	Luff		

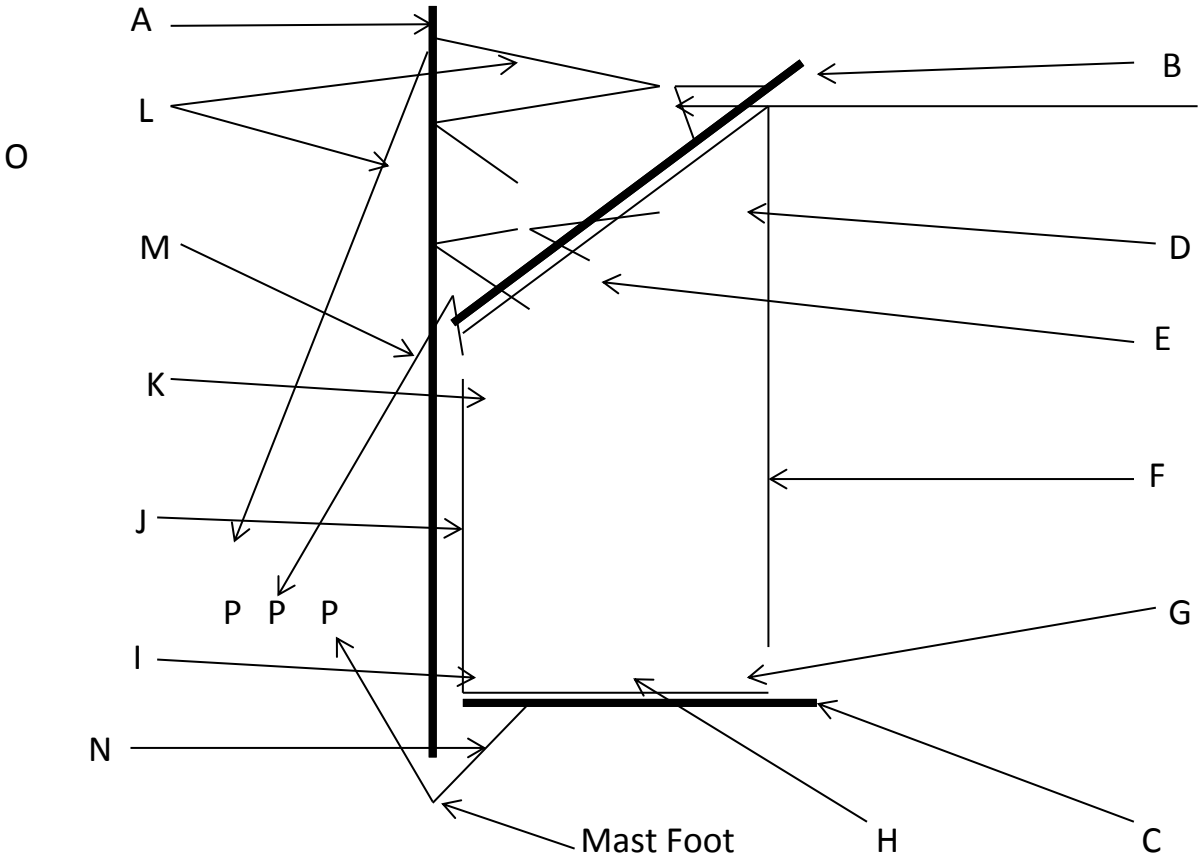
1. The *Fore Sail* is the smaller of the two three sided sails, where one corner (A) has a shackle attached to an eye, the second corner (B) has a rope/ *Fore Stay Halyard*, and the third corner (C) an eye, a rope/ *Sheet* and *Bowsie*. The first corner is called a *Tack*, the second corner the *Head*, and the third corner the *Clew.* To rig the *Fore Sail*, first attach the shackle at the *Tack* to an eye of the stem post of the model at the bow. Second, take the free end of the rope/ *Fore Sail Halyard* (G) and pass it through the block mounted on the front of the *Cross Trees*. Once the block has been threaded with the rope/ *Halyard*, the sail and halyard can be tensioned and tied off on a belaying pin in a pin rail at the base/ *Foot* of the *Main Mast*.

nb. The use of the eye in the *Clew* of these sails will be dealt with in the section sail control.

2. The *Jib Sail* is the larger of the two three cornered sails and may be still attached to the *Bow Sprit* by the eye at the *Tack* (A) and linked into an eye on the *Bow Sprit*. Take the free end of the rope/ *Jib Sail Halyard* (G) and pass it through the block mounted from the cap of the *Doubling* of the *Cross Trees*. Once the block has been threaded, the sail and halyard can be tensioned and tied off on a belaying pin on a pin rail at the *Foot* of the *Main Mast*.

The rigging of a main Sail of this type is not difficult but helps with some explanation. There are more corners, sides and names to the parts of this sail, than a three cornered sail,

and the description here refers to the model only, as what are termed as square sails have different names to some parts of that sail.



A	Main Mast	I	Tack
B	Yard	J	Luff
C	Boom	K	Throat
D	Peak	L	Peak Halyard
E	Head	M	Throat Halyard
F	Leech	N	Boom Vang
G	Clew	O	Bridle
H	Foot	P	Belaying Pin

3. Depending on the disarray of the sail and its control lines during transport and storage, some preparation may be required. Therefore checking and disentangling the various ropes may be required.

4. Check the setup of the *Throat Halyard* (M) and lay off on a belaying pin (P) at the *Foot* of the *Main Mast*, so the *Throat* (K) of the sail is about 100mm below the *Cross Trees*.

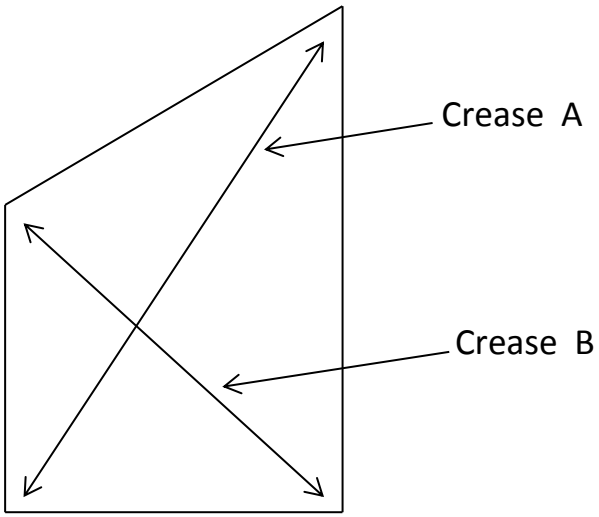
5. Check the setup of the *Peak Halyard* (L) and tension the rope so the *Peak (D)* of the sail is above the level of the *Throat* (K) of the sail, and lay off on a belaying pin (P) at the pin rail at the *Foot* of the mast.

6. The Boom needs to be set level or in a basic alignment with the deck of the model, and at a height that the swing of the Boom will pass easily over the companionway towards to the stern of the model. This can be done by holding the Boom by hand and taking up the slack in the rope/ *Boom Vang* (N) which laces between an eye at the *Foot* of the *Main Mast* and an eye on the underside of the *Boom*. Once satisfied the *Boom* will pass over the companionway easily, the free end of the *Boom Vang* (N) can be laid off on a belaying pin (P) upon the pin rail at the base of the *Main Mast*.

8. After setting the *Boom Vang* (N) attention can be returned to the top of the sail, and that of the *Throat Halyard* (M). Unlace the *Throat Halyard* (M) from the belaying pin and tighten or lift the sail by the *Throat* (K) using the *Throat Halyard* (M) until the *Luff* (J) of the sail is straight, without crease and not stretched. When the *Luff* (J) of the sail has straightened, lay off the *Throat Halyard* (M) upon a belaying pin at the Foot of the Mast.

9. To set the *Main Sail* correctly, unlace the *Peak Halyard* (L) from the belaying pin and tighten or lift the sail so the sail hangs without creases or any sags apparent. When satisfied the sail is without crease or sag, lay off the *Peak Halyard* (L) on a belaying pin on the pin rail at the *Foot* of the *Mast*.

There are a couple of circumstances where the *Main Sail* may exhibit a crease or a sag which may mar the look of the sail set, so included here are some simple answers to the crease or sag scenario.



Crease "A" is caused by the *Peak Halyard* being too tight, and undoing and easing the peak halyard and introducing a bit of slack will remove this crease.

Crease “B” rarely occurs as it is an over tension from the *Throat* of the Sail to the *Clew*. However, a sag in this direction will indicate that the *Peak Halyard* is too slack and some tension needs to be introduced.

Sail control.

The sail control will be by a servo for the *Main Sail*, a rope/ *Sheet* from the *Clew* onto a *Horse* is the control for the *Fore Sail*, and a running eye set into the *Clew*, through which a *Clew* control rope/ *Sheet* will pass, will be the control for the *Jib Sail*. The *Horse* on this model is a brass rod that runs across the boat just in front of the mast, upon which there is mounted a split ring.

1.

At the *Clew* of the *Fore Sail* is a rope referred to as a *Sheet*, and on this *Sheet* is a fitting that is called a *Bowsie*, a unit with three (sometimes two) holes in. At this stage of the re rigging one of the three holes of this *Bowsie* will be free, leaving the *Bowsie* part way along the *Sheet*, between the *Clew* and the free end of this *Sheet*. To connect the *Sheet* for the control of the *Fore Sail*, thread the free end of the *Sheet* through the split ring on the *Horse*, and then thread the free end through the vacant hole in the *Bowsie*. When this has been achieved lay in a figure of eight knot into the free end of the *Sheet* to prevent the sheet becoming free of the *Bowsie*.

This corner of the sail is now attached to the model and will move side to side subject to wind direction and navigational course. Any adjustment to the length of the *Clew Sheet* and subsequent sail setting can be done by moving the *Bowsie* to a different position on the *Sheet*.

2.

At the *Clew* of the *Jib Sail*, there is an eye laced into that corner. Inserted into the *Gunwale* either side of the model adjacent to the alignment of the *Fore Horse*, is an eye bolt. The eye bolt of the left hand side (Port Side) of the model has attached a rope with a three hole *Bowsie* fitted in place. The other end of this rope is a two holed *Bowsie*, tied off so it won’t part company with the rope. To set the sail up and to rig the rope which is the *Clew Control Sheet* for the Jib, to the sail and the remaining eye bolt the following is advised.

Remove the two holed *Bowsie* from the free end of the rope. Thread the free end of the rope through the eye laced into the *Clew* of the *Jib Sail*, from left hand side of boat through to the right hand side of the boat. Thread the free end of the rope through one of the two holes on the two holed *Bowsie* and then through the eye bolt on the *Gunwale*. To finish of this control rope, pass the free end of this rope through the second of the two holes and

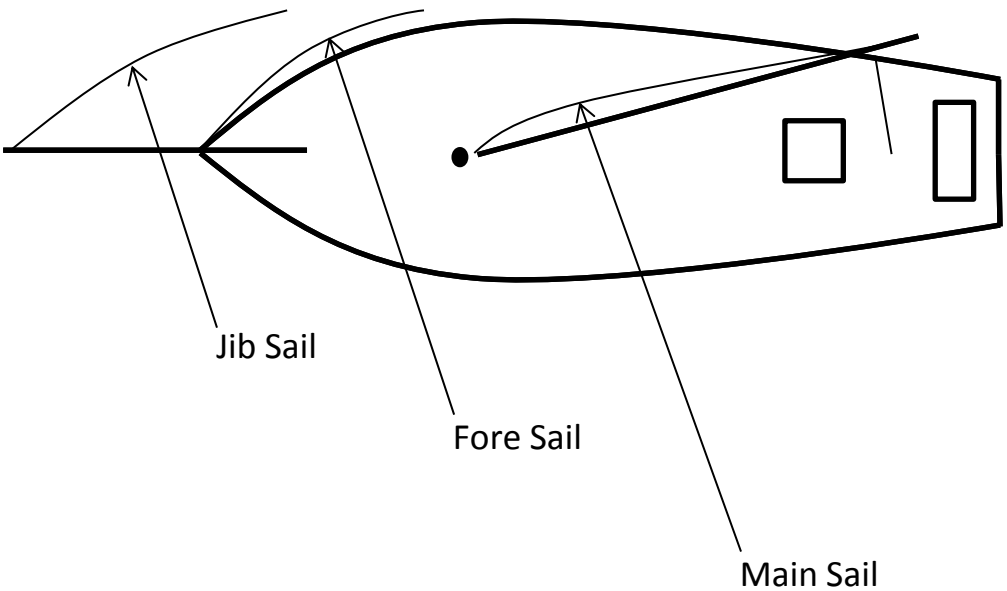
finish off with a figure of eight knot, and then remove the loop created by this attachment so the *Bowsie* sits tight onto the eye bolt.

This corner of the sail is now attached to the model and will move side to side subject to wind direction and navigational course. Any adjustment to the length of the *Clew Sheet* and subsequent sail setting can be done by moving the *Bowsie* to a different position on the *Sheet*.

3.

The control of the *Main Sail* is from a Sail arm servo mounted within the hull void, and is controlled by your actions via a radio control transmitter and receiver system.
On the underside of the *Main Sail Boom* there is a rope attached called a *Main Sheet*. On this model this *Main Sheet* is white, and slightly smaller in size to most of the black ropes for ease of use, and is attached towards the *Clew* of the Sail, long in length, and free of restrictions throughout its length. Located within the deck planking between the companion way and the access to the rudder servo is a brass tube that runs from this location in the deck to a point within the hull void that aids the actions of the sail arm servo, and thus the control of this rope.

Set the sail arm servo so the position of the sail arm linkage is in the position required for the function of the sail when close hauled or fully in (as it were). Thread the free end of the *Main Sheet* into and through the brass tube, and into the hull void. Retrieve the free end of the *Main Sheet* when it enters the void and thread the free end through an eye on the opposite side of the access to the end of the brass tube, this is to reverse the action of the main sheet to accommodate the action of the sail arm servo. Attach the *Main Sheet* to the sail arm linkage so the sail is in the close hauled position that is desired.



Looking down on the model from above, the angles of the *Foot* of each sail indicated here, is not a bad place to start as a sail set up. The final set up will be determined by use and understanding of what can be achieved and or, what would be acceptable as an all weather set up.

WORKING OUT THE CURVATURE OF A BOAT DECK.

For those who like a curved deck across the beam of their boats, often guess what they need, or do what looks right to them. For others who require a little bit more finesse, par se, or being pedantic, or just having too much time on their hands, and needed to do it the long way by calculation, which then allows the modeller the opportunity to state; I used this criterion to obtain the effect I wanted. Well, each to their own way of doing things.

For those who would like to know what the "proper" way is; this can be found with research, but, I have put a few notes together to offer some guidance, and also factored in some common sense. The common sense part is that I have rounded numbers up to make it easier to compile this data, as we are generally are cutting wood by hand, and not programming CNC machinery operations.

The general rule of thumb for the curve or the height of the apex/ crest of the deck camber at the centreline of the vessel seems to be; 1/4" per foot, (up to); 3/8" per foot of beam length. Simplifying this into a, 1:48 ratio for ¼" per ft, and 1:32 ratio for 3/8" per ft, then again to adjust the ratios to offer; 1:50, & 1:30; because it makes the numbers and life easier. But you can have any crest height you want, after all, it is your model, so here is how you could work out the camber of the deck.

1. Choose the height of the apex/ crest of the deck camber you want to use. It may be prudent to consider your deck height at the widest point (full beam) of your boat, then apply that criteria (relative to beam length) to all other deck beams.

2. Construct a 90° quadrant using the chosen apex/ crest height as the radius. Draw a vertical and horizontal radial line to complete the segment. See Fig 1.

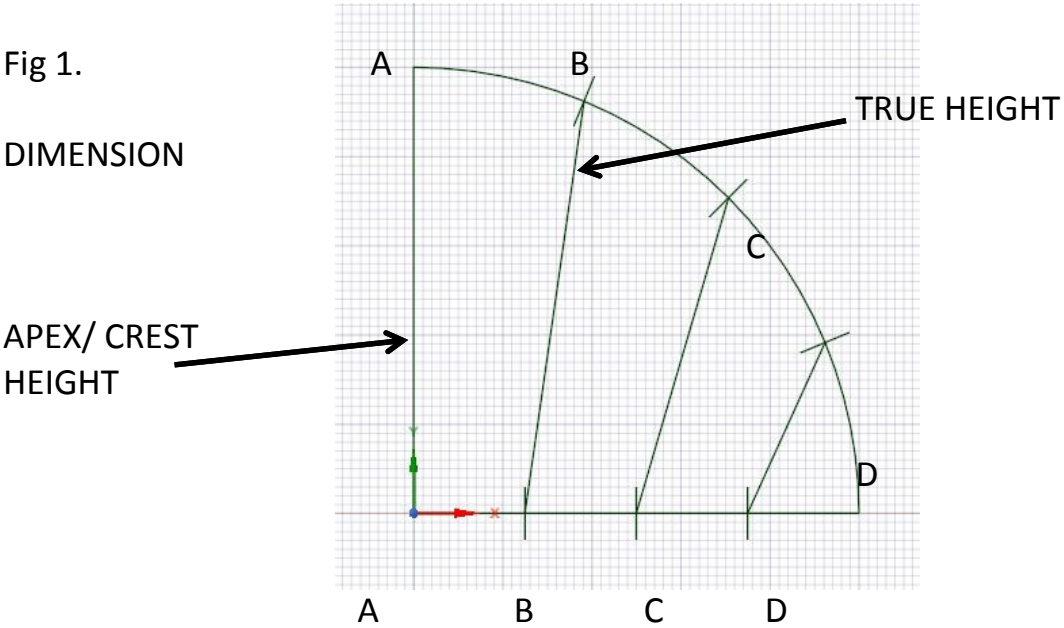
3. Divide the radial arch into four equal parts.

4. Divide the horizontal radius line into four equal parts.

5. Connect each of the intersecting points as indicated in Fig 1.

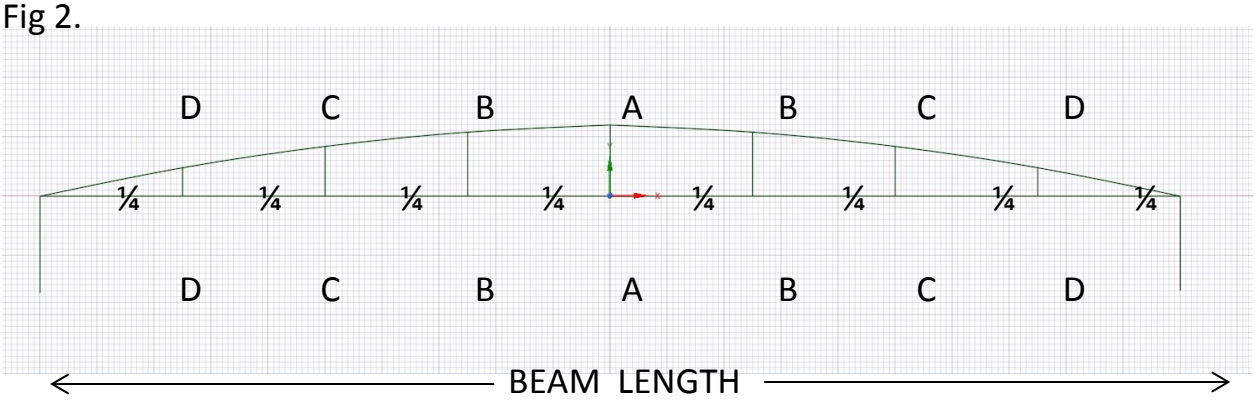
Each of these lines drawn to connect the intersecting points will become the true height of the deck curve at fixed points across the deck. Where A-A is the centreline, and the others are positioned equally either side of this centreline.

Fig 1.



The constructed quadrant and the developments within the quadrant, will give you the true dimensional lengths for the camber at four equally spaced points along the beam from the centreline of that beam section, where the A-A dimension changes due to the varying beam lengths needed to make the boat. For example, if you have a full beam dimension of 300mm, and a crest height of 9mm, then a beam length of 200mm in another part of the boat, will have a crest of 6mm. Using the criteria from Fig 1, the curve/ apex/ camber may be developed, and Fig 2, illustrates this development.

Fig 2.



All this takes time for each beam of the vessel you are building. A simplification is needed to make life a little easier. The first consideration was to find the factor for each beam position, against which the apex height of the beam length could be applied. These turned out to be about three decimal places each, and a little over the top for laying a deck

on a model boat. A rounding up of the factors for the calculations of the dimensions of the deck cambers was needed. For practicalities use the following.

Dimension B-B = Dimension A-A x 0.9

Dimension C-C = Dimension A-A x 0.7

Dimension D-D = Dimension A-A x 0.4

The table below, offers criteria for deck cambers for beam lengths against the 1:50, & 1:30, camber criteria. The beam length of the model is on the left hand side of the table, the apex height criteria for each of these beam lengths is indicated in the next column "A APEX", and rounded up dimensions for each subsequent positions of B-B, C-C, & D-D are noted to the right of that "A APEX" height and beam length dimension.

	01:50	≈1/4" PER FOOT DISPLAYED IN mm (2 sig fig)			01:30	≈3/8" PER FOOT DISPLAYED IN mm (2 sig fig)		
CAMBER→ BEAM↓	A APEX	B	C	D	A APEX	B	C	D
100	2	1·8	1·4	0·8	3	2·7	2·1	1·2
125	2.5	2·25	1·75	1	3.75	3·37	2·63	1·5
150	3	2·7	2·1	1·2	4.5	4·05	3·15	1·8
175	3.5	3·15	2·45	1·4	5.25	4·73	3·67	2·1
200	4	3·6	2·8	1·6	6	5·4	4·2	2·4
225	4.5	4·05	3·15	1·8	6.75	6·07	4·73	2·7
250	5	4·5	3·5	2	7.5	6·75	5·25	3
275	5.5	4·95	3·85	2·2	8.25	7·43	5·77	3·3
300	6	5·4	4·2	2·4	9	8·1	6·3	3·6
325	6.5	5·85	4·55	2·6	9.75	8·77	6·83	3·9
350	7	6·3	4·2	2·8	10.5	9·45	7·35	4·2

These notes only refer to the deck camber that could be introduced into a deck of a boat model. If these notes are useful then feel free to use them. The curvature of the deck throughout its length can be determined or indicated by the sheer and deck plans of that boat, but that's another subject entirely.