

Galleon San Salvador v1.0

Card Model Assembly Instructions

*Graphic design and description
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The model of the galleon San Salvador was designed in scale 1:100 (1:96) and represents the ship as it is being re-constructed by the Maritime Museum of San Diego. *The complexity of this model is approximately 8 on a scale of 10.*

I. General rules and guidelines:

1. Printing the sheets with model parts.

- a) The sheets of model parts are designed to be printed on standard “letter size” paper in “landscape” configuration. Printing on metric A4 size paper is also possible as the actual size of the image border is 26x20 cm and will fit an A4 size page. Printing should be performed in the HIGH resolution mode of the printer – the higher the resolution the better. We recommend printing on ink jet printers although printing on laser printers is also possible.

- b) There are 12 sheets to be printed for this model: #1,2,3,4,5,6,7,8,9,10,10R,11.
- c) At least two different types of paper should be used – high quality photo matte paper (50-65 lb) for majority of the parts and thin, presentation type paper (24-27 lb) for printing sheets 9 and 10. Staples Photo Supreme Matte and Epson Heavyweight Presentation Paper are examples of the former and Epson Presentation Paper Matte is an example of the later.
- d) Even the Heavyweight Paper described above is too thin to construct the frame of the ship directly and has to be laminated on thick cardboard. Used often in card modeling, the word “laminating” can be a bit misleading – it has nothing to do with thermal laminating in plastic sheets. All it means in this case is gluing the sheet with printed parts onto cardboard of such a thickness that both sheet with parts and cardboard together have the thickness called for in the instructions.

2. Tools and Materials (All can be obtained from the average hobby or crafts shop)



Photo No.1 shows all the basic tools needed to build the model. Those are:

1. A cutting board is very important and will keep your knife sharp longer and will protect your work bench.
2. Hobby knife is the most important tool in this set. It is indispensable to cut straight lines and small details.
3. Small, sharp scissors are helpful in cutting curved shapes.
4. Tweezers – small tweezers are necessary to handle small parts.
5. Metal straight edge.
6. Compass
7. No. 11 replacements blades (for hobby knife)
8. Set of small bits used as patterns to roll thin cylinders.

9. Brush

10. Sanding stick.

11. Watercolor paint for edge touchups.

12, 13 and 14 – Glues. See description below.

15. Wood toothpicks to dispense glue.

16. Bamboo skewer used as template to form masts.

CAUTION: Please observe appropriate safety practices while using sharp edged tools as well as glues. If children are involved in the use of these tools, adults should carefully supervise them. Read all safety precautions included with glues, paints or sprays to avoid the gluing medium from sticking to skin; do not touch eyes when using glues or paints.

3. Glue types.

Every modeler has his own preferred glue and the following are only our recommendations:

- a) white glue (No.13 in photo above - Elmer’s Glue-All) – this type of adhesive is perfect for gluing small parts as it is non-toxic and dries clear. However, this is a water based adhesive and will “wet” the paper. Be careful with gluing large areas. Use only limited amounts of glue to ensure that paper does not curl and deform as the water from the glue is absorbed.

- b) toluene based “rubber glues” (No.12 in photo above - Weldwood Contact Cement for example) – we recommend this type of glue to glue large areas of paper – for example when laminating the parts. This type of glue is non-water based and will not wet the paper. It creates a strong but flexible bond and thus is particularly useful when gluing hull skin to the frames. It will allow certain adjustments in placement of the parts after they are initially connected; something that may be difficult or impossible when using other types of glue. However, it is mildly toxic and will stain the paper if used carelessly.
- c) cyanoacrylate or “Super glue” (No.14 in photo above) – this type of glue creates a strong, rigid joint but is unforgivable in placement of the parts and the mistakes are impossible to correct. We recommend this glue to assemble the frame of the ship where we can position the parts first and then apply the glue – see photo No. 3. Do not get this glue on your fingers! Read cautions on glue!

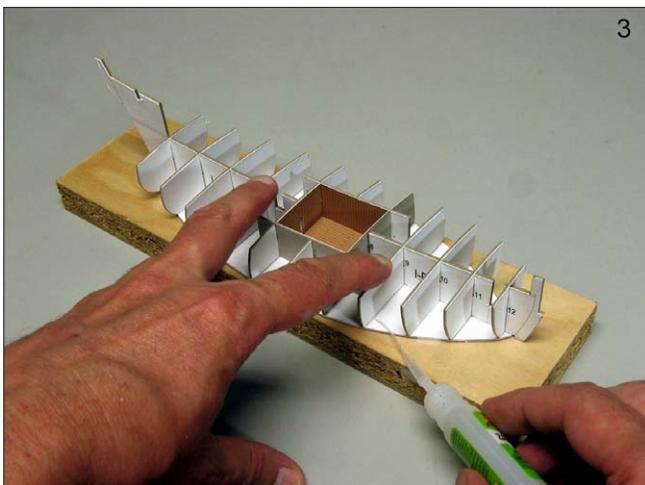
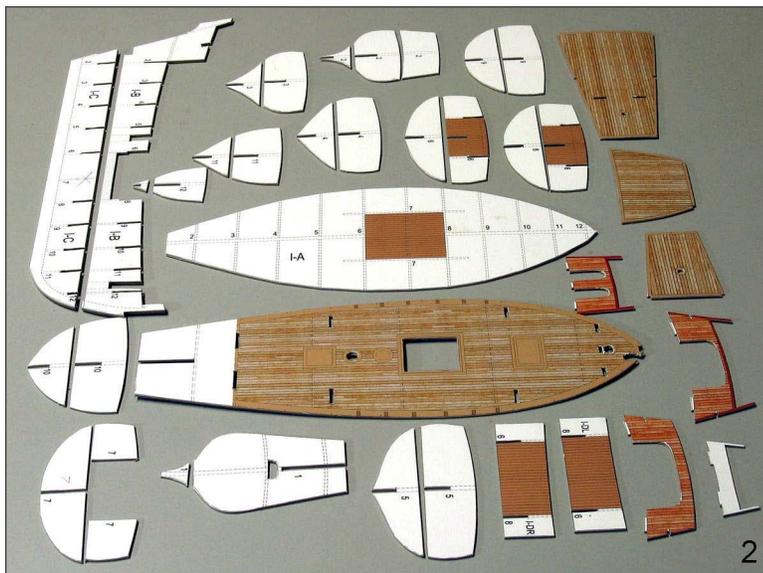
4. Edge painting

The beauty and main advantage of card models over other types of modeling is that the parts are “pre-painted” – they are printed with ready textures and colors. With modern printing technology, even home prints can be of high quality and having colors and textures already applied can greatly simplify model construction. However, cutting paper or cardboard leaves a white, unpainted edge that may look unsightly. Thus, it is recommended (but not required) that the paper or cardboard edges of paper be painted -- just to mask the bright white of the paper; precise color matching is not necessary. Watercolor paints are best for edge painting for texture and they will not affect the glue.

II. Model construction

1. The hull

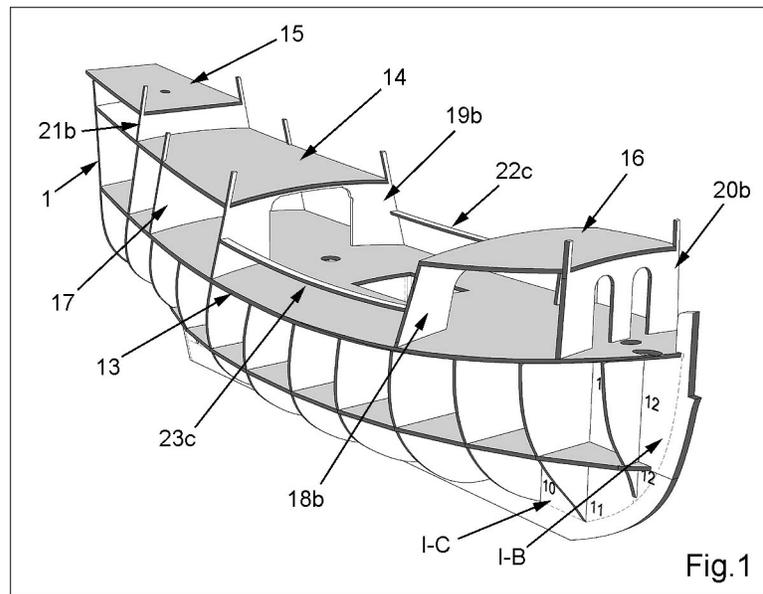
(Note: “Cardboard” and “posterboard” are used interchangeably here. It is not required to be exact with thicknesses but a lighter and heavier grade of posterboard is recommended with the heavier cardboard about double the thickness of the lighter. These qualities of cardboard are available from an arts supply or hobby store) Construction of the hull begins with laminating hull bulkheads and decks on cardboard with approximate thickness 0.8mm and 1.8mm (0.8mm = 0.03in; 1.8mm = 0.07in thick) to give the hull of the model strength.



The only parts to be laminated on 1.8mm cardboard are longitudinal bulkheads I-B and I-C. All other parts of the hull frame and all decks should be laminated on 0.8mm cardboard. By laminating on 0.8mm and 1.8mm cardboard the total thickness of the pieces should be about 1mm and 2mm accordingly. Photo 2 shows all parts of the ship hull laminated on cardboard and cut out ready for assembly. **Note:** for bulkheads 18, 19, 20 and 21 only “b” elements are laminated on cardboard. To assure correct alignment of the hull frame it is recommended to attach part I-A to a flat and sturdy surface (i.e., a piece of wood board) and proceed with the construction of the top part of the frame.

Using Super Glue (as described in I.2.c) assemble the top hull frame (photo No.3). Most of the decks of the ship have “camber” – are curved in the direction perpendicular to the ship axis. Tip: Gently bending them before assembly will help in proper alignment of the decks and bulkheads. After the upper part of the hull frame is ready and the glue dry, it can be removed from the wood board and the bottom of the hull frame can be completed as depicted in Fig.1.

The ready hull frame should be left to dry; the next important step is to “phase” the edges of bulkheads and decks. When cut out from the sheet the edges are mostly “square” and the thickness of the cardboard will cause them to project over the proper lines of the hull. This has to be eliminated by gently sanding the edges with sandpaper. Yes, the parts of the hull frame, laminated on cardboard, can be sanded just like wood. All bulkheads and decks should “follow” the lines of the hull after sanding the edges (Fig. 1).



Assembly of the hull plating starts with gluing together hull sides (part 22a with part 22b and part 23a with part 23b). Note that parts “b” are larger than parts “a”. The top edges of the corresponding parts should be aligned and only the bottom of parts “b” should project below parts “a”. This will create a gluing surface for later installation of bottom plating. Be careful to correctly align hull sides with bulkheads and decks.

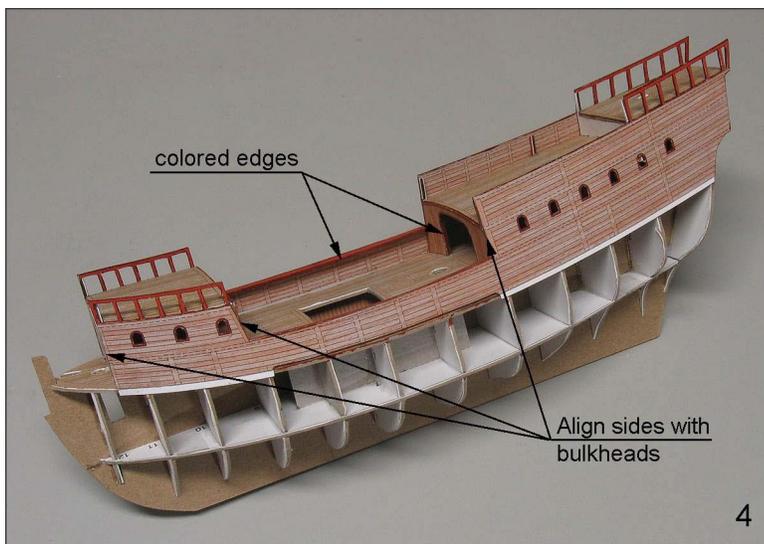
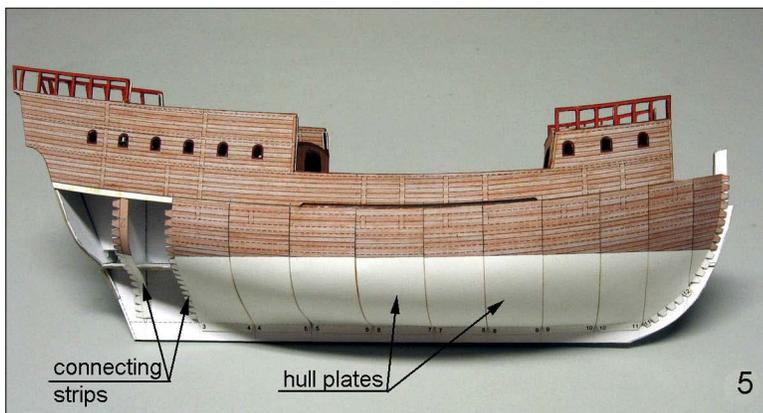


Photo No.4 shows assembled hull sides with edges of the parts colored to match the “wood” color of the parts. Note white edge of “b” parts of the hull side projecting below “a” parts. At this point, installation of hull plating can be started by gluing all the strips connecting hull plates to the corresponding bulkheads. White glue works best in this case. There are separate hull plates for port and starboard sides of the ship and the plates are identified by a pair of numbers corresponding to the same numbers for the bulkheads the plate connects. Tip: After cutting the plates out of their sheet, form

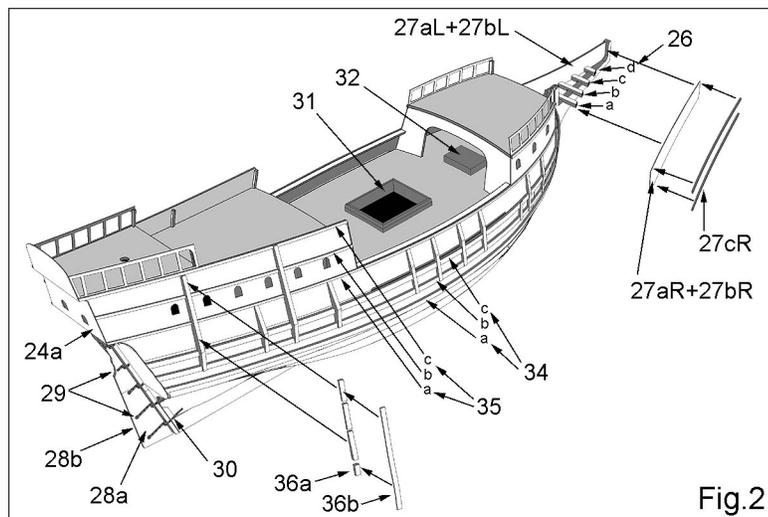
them carefully to follow the shape of the hull so they don't have to be "forced" to wrap around the bulkheads as this causes them to spring back and makes installation more difficult. We recommend using rubber glue to attach hull plates as this type of glue will allow small adjustments in the position of the plates. Tip: start assembly of the hull from plate 5-4 and proceed towards the bow and the stern of the ship simultaneously. When attaching hull plates to the bulkheads it is particularly important to keep the waterline (the line dividing the cream colored underwater hull from "wooden" upper hull) straight. See Photo No.5 for properly aligned hull plates. Coloring of the plate's edges will enhance the look of the hull when completed.

After completion of the hull plating the next step is to install the keel – part 25a, 25b, 25d and 25c. Both parts 25a and 25b have to be folded to create a "U" shaped overlapping bottom of longitudinal bulkhead I-C. Part 25d, after shaping, must be attached to the curved part of the keel at the bow. Tip: It is best to glue in part 25c (after laminating on 1.8mm cardboard) after installation of part 25a to the hull as this will give it the proper angle to match the angle of the curved bow of part 25a.



Installing "wales" (parts 34) is the next step in the construction. The wales and the vertical beams (parts 36) should be laminated on the same cardstock on which they are printed to thicken them to double thickness. Coloring the edges of the wales and vertical beams is a must as they are a very prominent feature of the ship. Dashed lines mark the location of the wales and beams on the ship hull and it is important to follow those lines precisely.

Fig.2 illustrates installation of wales and reinforcing beams as well as assembly of the ship rudder and bow structures. Installation of the small parts 29 and 30 are optional. At this point of the construction it is advisable to assemble the stand of the model. Keeping the model on the stand during installation of the remaining parts will keep it clean and will help avoid accidental damage.



Remaining parts of the hull and deck equipment like hatch covers 31, 32 and 33 as well as Ladders leading from main deck to the ship hold (part 43), forecastle (part 43) and stern decks (part 41 and 44) should be assembled and installed as illustrated in Fig.2. Note that due to curvature of the deck there are left and right ladders and the parts are accordingly labeled L and R.

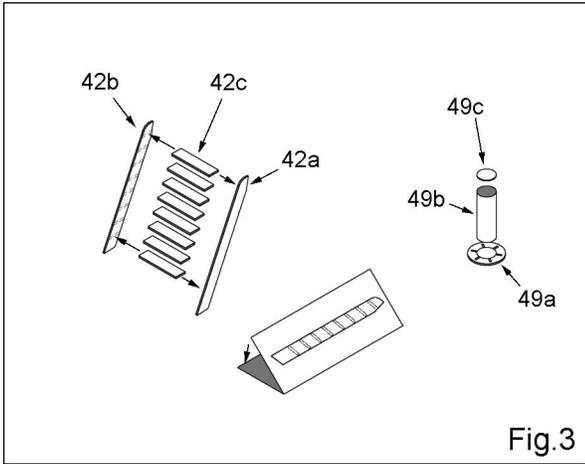
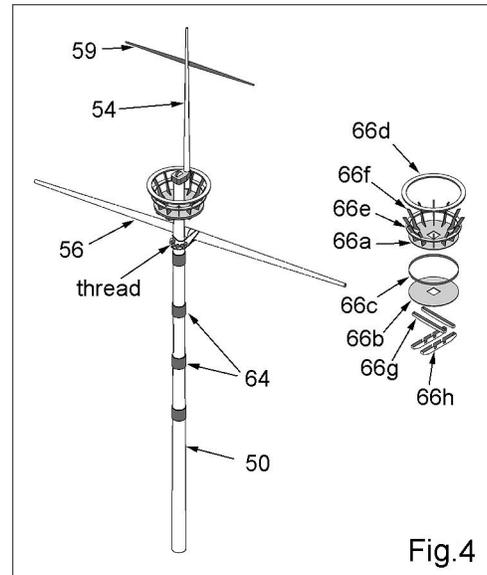


Fig.3 illustrates assembly of the windlass – part 49. Remaining parts of the hull and deck equipment like hatch covers 31, 32 and 33 should be assembled and installed as illustrated in Fig.5.



2. Masts

Fig.4 illustrates assembly of the mast, yards and mast platform. Sheet 9 that contains masts and yards should be printed on thin paper to allow tightly rolling the parts to form masts and yards. With some patience this can be achieved and the rolled parts can look surprisingly “wood like”. All masts are tapered and the yards consist of two parts to allow tapering from the middle of the yards toward both ends. Small pieces of toothpicks can be used as pins connecting two parts of the yards. Similarly, bamboo skewers can be used to reinforce the mast.

As an **optional approach**, all masts can be made out of wood if rolling each paper part turns out to be too difficult. In this case, paper parts show on the printed sheets should be used as templates to provide lengths and diameters for the cutting of wooden pieces.

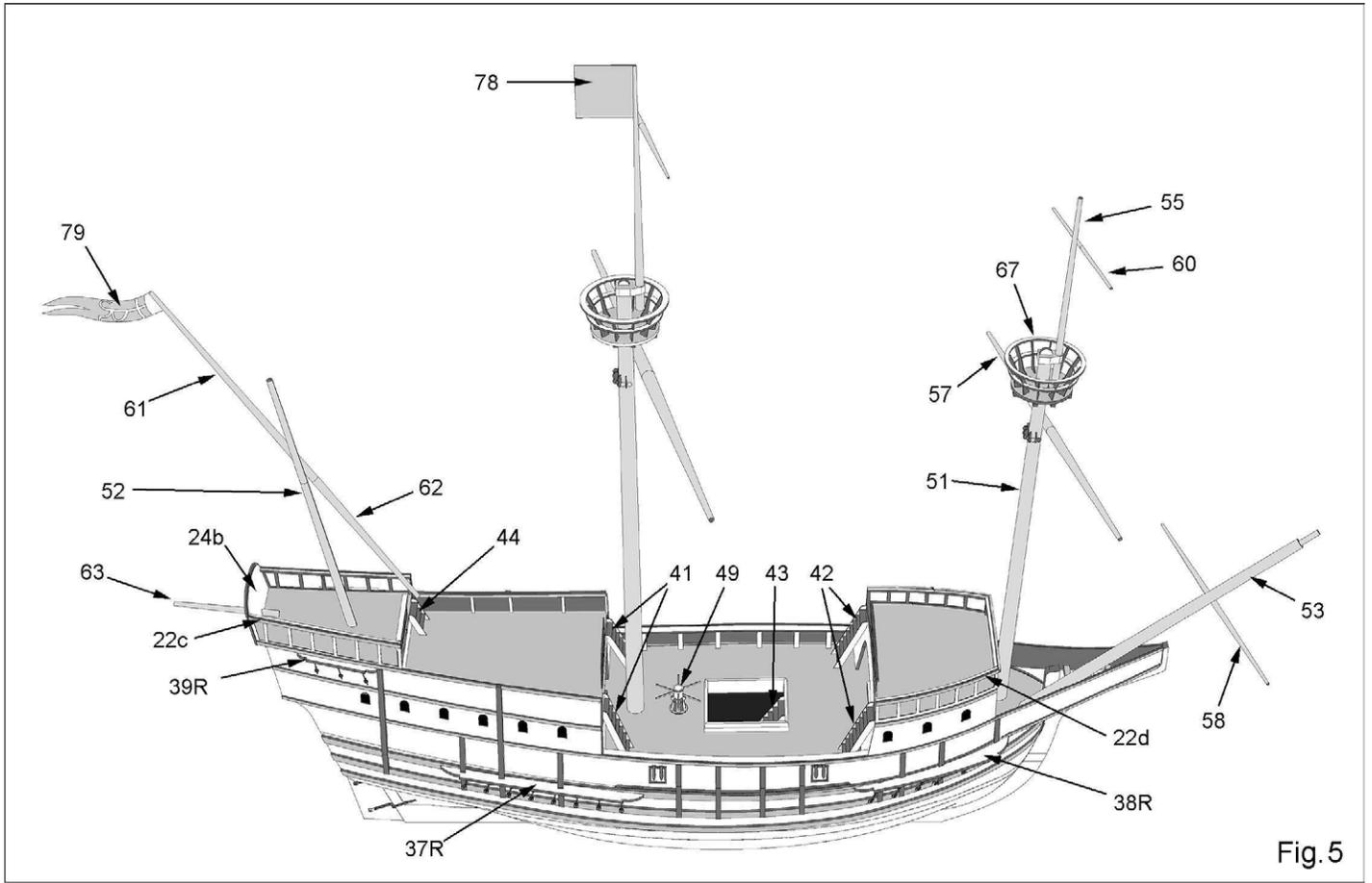


Fig. 5

3. Rigging

The most prominent elements of the ship rigging are shrouds and ratlines that help to stabilize masts.

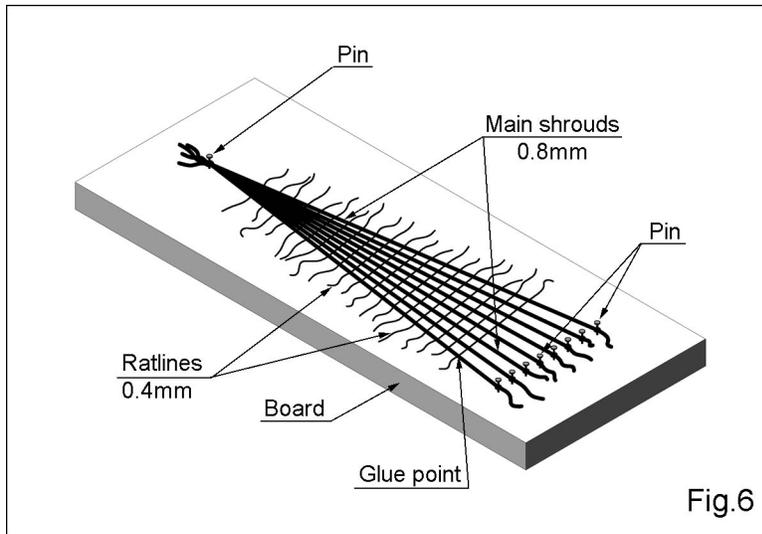
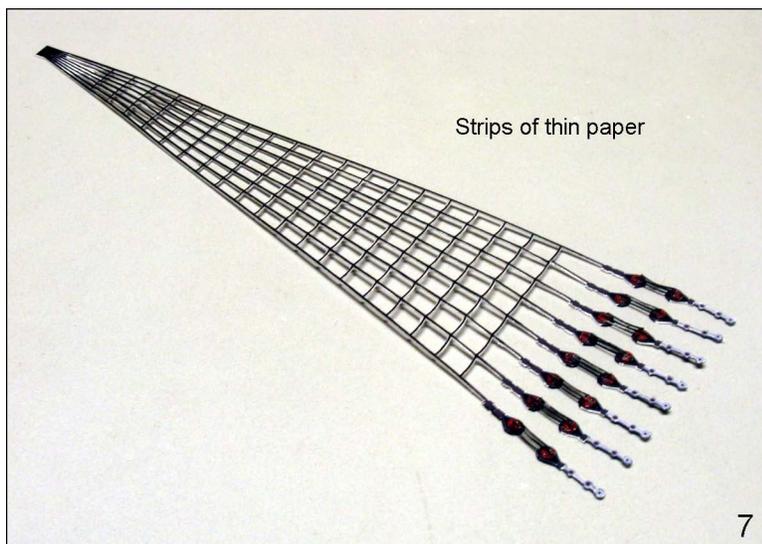
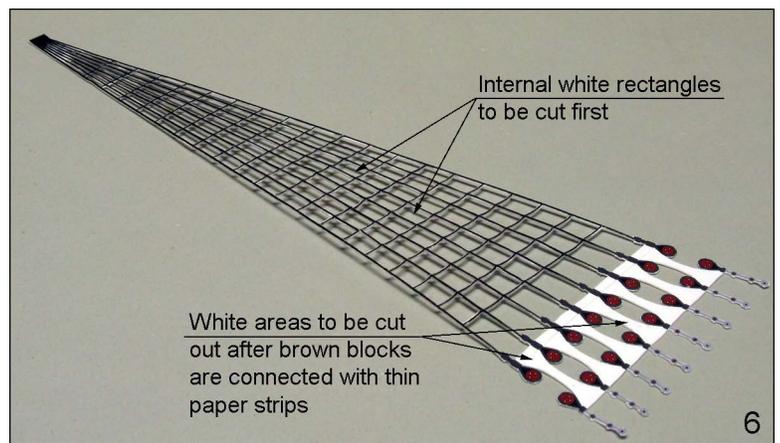


Fig.6

There are numerous methods to construct those parts and we will describe two of them here.

Method a) – the printed template for the shrouds on Sheet 11 is placed on a flat board (Fig. 6). Pieces of thread are used between top and bottom pins following the template. Small pieces of thread are then cut and placed on the template as ratlines and a drop of super glue is applied at each intersection point.. After all the ratlines are glued, the excess lengths of the shrouds and ratlines are trimmed and finished parts are ready to be installed on the model.

Method b) – Alternatively, the internal white rectangles on the templates of Sheet 11 should be carefully cut out (see figure), touched up with paint (to give it strength) and installed on the ship. No thread is used in this approach and everything is made out of paper. It may seem to be difficult to cut such thin strips of paper but it can be done if the proper sequence of cutting is followed. The first step is to cut out white rectangles between shrouds and ratlines leaving the first and last shroud still attached to the sheet of paper. Note that the entire assembly of the shrouds and ratlines consists of two parts – upper part ending with brown blocks and lower part with blocks and grey brackets that will be attached to the hull.



On the real ship the two parts are connected with thin ropes threaded through the blocks. On the model we can imitate this by gluing three short and thin paper strips between the blocks. This has to be done before the upper and lower part of the assembly is completely cut out of the sheet as shown in Photo No.6 and No.7. Tip: Such thin strips of paper are, of course, very fragile. The simple method of reinforcing them is to soak them with Thin Super glue. The glue will penetrate the fibers of

the paper and, when dry, will make the strips surprisingly strong. The entire assembly of the shrouds, ratlines and blocks should be treated this way. It has to be pointed out that, depending on the sequence of touch up painting and super glue application, different kinds of paint have to be used. If the parts are painted before super glue is applied, watercolor paint can be used. If parts are painted after the super glue application, some kind of solvent based paint has to be used as watercolor will not cover super glue.

- Sheet 11 also contains additional blocks – those can be attached over printed blocks to give the whole assembly a more 3-dimensional look. This step can be considered as optional. Photo No.8 shows ready shrouds attached to the hull.

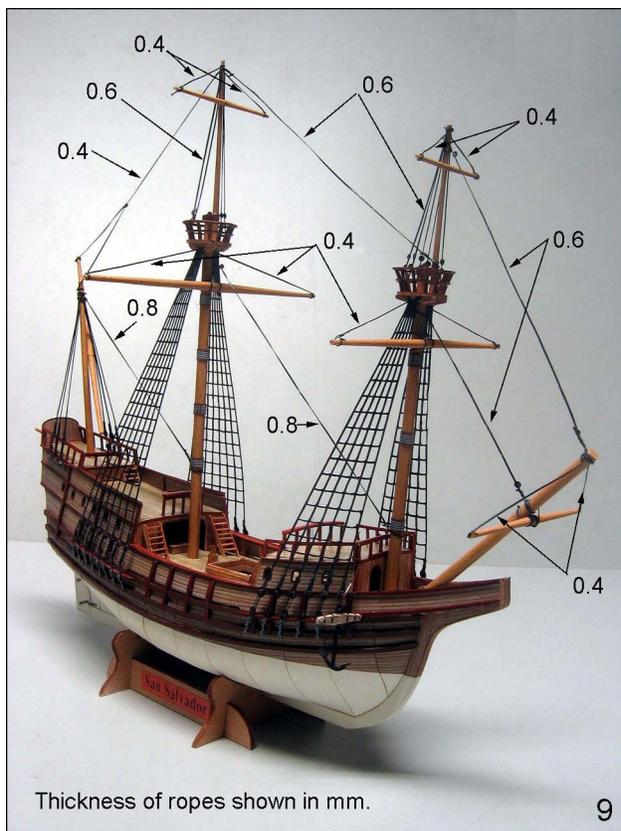
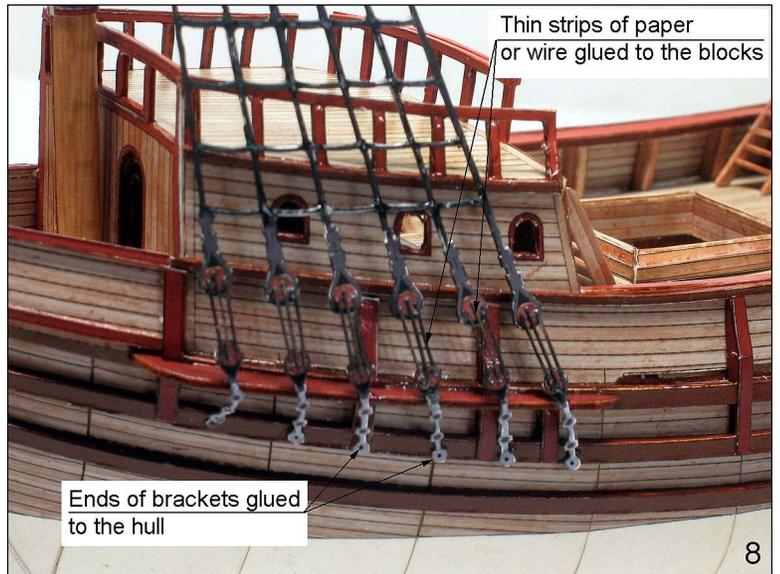


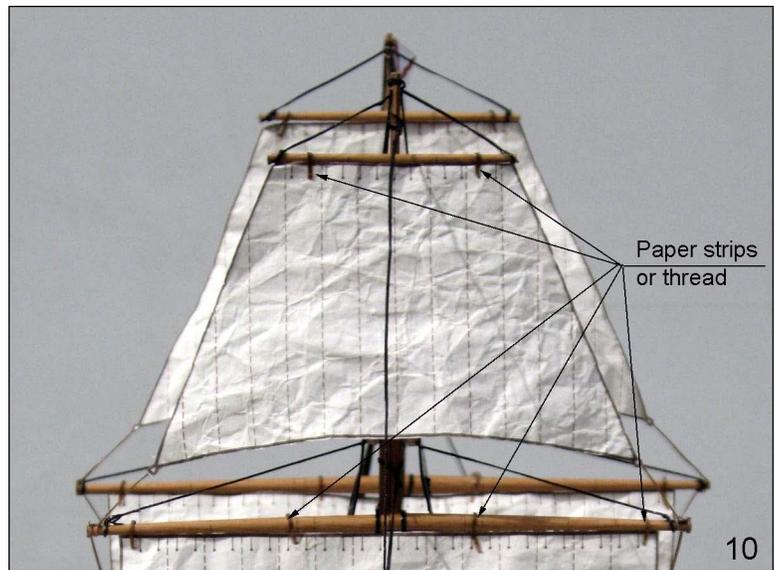
Photo No.9 illustrates standing rigging that can be installed on the model with recommended thicknesses of the thread used. This rigging plan is only the most basic rigging and the actual ship carried a much more elaborate system. Thread is recommended for rigging, but thin strips of strengthened paper could be prepared as a substitute.

5. Sails

Sheet 10 and 10R contain sails of the ship. The printing of this sheet should be done in two steps: in step one, Sheet 10 should be printed. Then, the paper should be removed from the printer and loaded into the printer so the reverse side will be printed. Sheet 10R should be printed on this reverse side. This way the sails will be printed on both sides.

Regular copy paper of 22lb or 24lb weight is the best to simulate sails. They can be made even more realistic by repeatedly folding and unfolding the paper to give it more of an old, worn look. **Optionally**, one can use lightweight tracing paper for printing the sails if your printer will support this kind of paper.

Glue the sails to the yards with small amounts of white glue. To reinforce the sail's attachment to the spars, small strengthened paper strips or thread should be attached as shown in Photo 10.



6. Base and final details

The stand for the model is made from Parts 76 and 77 and should be laminated to a total thickness of 2mm and assembled as shown in Fig.7. The model should be positioned so the more rounded support 76 corresponds to location of bulkhead 8.

Position flags 78 and 79 as shown in the pictures of the completed model.

Anchor – part 65 – should be assembled as illustrated in Fig.8 and positioned on the bow of the ship as shown on pictures of the finished model.

The finished model can be spray painted with clear varnish to protect it from dust and discoloration from UV rays.

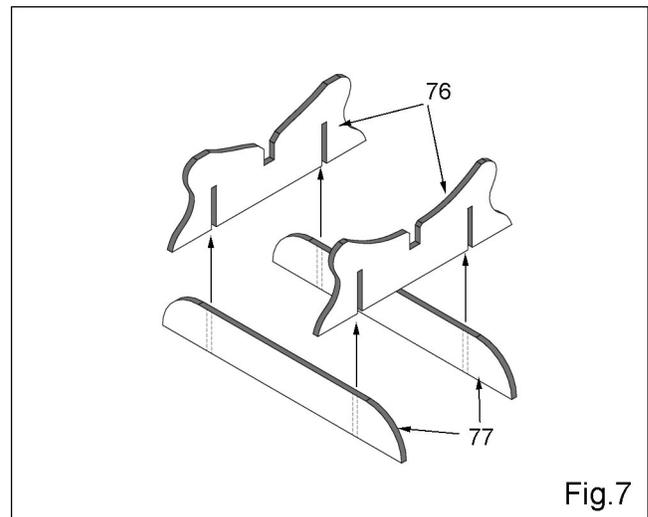


Fig.7

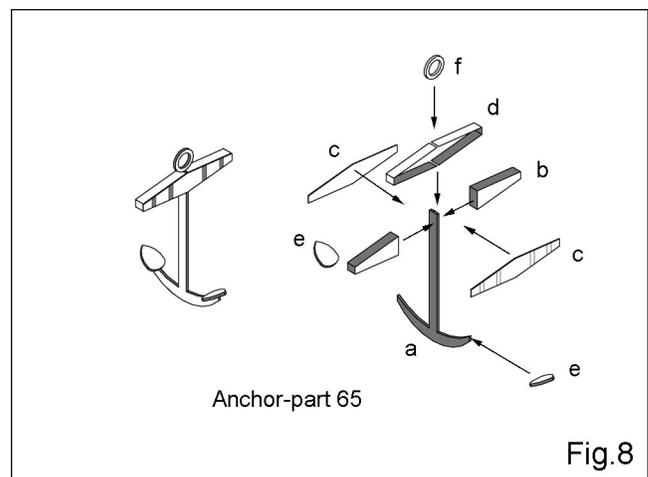


Fig.8



We hope that the modeler will enjoy our card model of the galleon San Salvador!