INTRODUCTION:

The design goal of this series is to create models for the wargame table that are aesthetically pleasing, historically convincing (if not perfectly accurate - some compromises have been made to keep the construction simple), easy and satisfying to build using common or readily available tools and materials, sturdy enough to withstand the handling and transportation that wargaming requires, and inexpensive.

If you are a wargamer or model builder, you probably have all or most of the tools and materials that will be needed already.

These models combine the methods of scratchbuilding and paper modeling. Each one uses its own set of tools and techniques, which will be described in the specific steps of the instructions, but first, some general information that will apply to any of the models in this series:

TOOLS YOU WILL NEED:

1. A sharp hobby knife. The kind with breakaway blades is very good for this purpose, since you can snap off the old blade and begin each model with a fresh point.
2. A small sharp scissors. A seam ripper is good for this.
3. A metal ruler or straight edge. To guide knife cuts and scores, and aid in folding long, narrow parts. A 6" ruler will be good enough for most purposes, but a 12" one is nice.
4. Tweezers. Indispensable for handling small parts and pieces of rigging. The kind with an angled tip are especially useful.
5. Toothpicks. For applying glue to otherwise inaccessible spots.
6. Felt-tip markers. A black Sharpie will work if that's what you have handy, but the chisel-tipped calligraphy markers are easiest to use and give the best results. Long-tipped "brush" markers are almost as good. Ideally, you should have a black one, and a brown one. A dark red (not "fire engine" red) marker is useful for doing the gunwales, but brown will do if you don't have a red one.
7. Drill bits. For stepping the masts. The bit should be as close to the size of the mast as possible. Since the hulls are just paper, a power drill is not necessary. A pin vise is useful for the smaller sizes, and the larger ones (1/8"+) can be twisted by hand to create the hole where the mast will be mounted.
8. Wire cutters. Smaller is better; a rail cutter is perfect, but any small, sharp wire cutter will do.

MATERIALS YOU WILL NEED:

1. Cardstock. 60 to 90 pound (160 to 250 gsm) works fine.
2. Ordinary copier paper.
3. Heavy tagboard, about .5 to .75 mm thickness. 4-ply Bristol board is perfect, but any easily cut material (like balsa, for example) of the right thickness will do.
4. Wire. Florists wire works well, being soft enough to cut easily, but still stiff enough to hold its shape in short lengths. Most craft stores will have a variety of sizes. 16 gauge is best for the fore and mainmasts, and 18 gauge for the mizzen. The yards should be 22 gauge.
5. Glue. Any PVA based household white glue will work fine. Some of the parts will work better with cyanoacrylate, especially the "gel" type, but it's not strictly necessary.
6. Black cotton thread. For the rigging.
7. Paint. Hobby or craft paint, for coloring the wire parts. Tan and black are really all that's needed.

SOME GENERAL PAPER MODELLING TIPS:

1. Read over all the instruction before beginning, to get an overview of how the model goes together.
2. After printing out the parts sheets, spray them with a clear, matte sealant or fixative. This will prevent the printed images from being damaged by moisture or oil from your fingers, or by glue that gets where it doesn't belong.
3. Only cut out as many parts as you need at one time. It is easy to lose or damage small parts once they are separated from the sheet.
4. Rough-cut each part from the sheet first, and score any lines which are to be folded before trimming it carefully to its finished shape. The written instructions will describe where to score the part, and the accompanying photo will give further guidance by showing how the part is to be scored and folded.
5. Scoring is easiest with an old, dull knife blade, to avoid cutting into the cardstock. I frequently use the *back* of an old Xacto knife for this purpose. The purpose is to just make enough of an indentation, without actually cutting the cardstock, that it will fold crisply. Light pressure is sufficient, in order to avoid scratching the printed surface any more than is necessary to get a sharp fold.
6. Tint the edges of the finished part that will be exposed after it is in place on the model, by running a marker lightly along the edge. Don't linger in one spot with the point of the marker, as the cardstock will absorb ink quickly, and the printed surface will discolor. After folding, a crease will sometime show exposed white fibers; these can also be tinted with a marker to improve the look of the finished model.
7. Dry fit every part, holding it in its intended destination without using any glue, to make sure of the fit. Any parts that do not fit neatly into place can be refolded or trimmed before any glue is applied. If a part simply will not fit, or gets lost or mangled, don't panic; just print out a new one.
8. Use a sharp knife. Starting each model with a fresh blade is a good practice.
9. Use as little glue as possible, consistent with getting a good bond. Excess glue squeezes out of seams, creating ugly beads on the finished model, and warps the materials.
10. Be patient! Allow parts to dry completely before further trimming, or moving on to the next step. Move on to preparing the parts for the next step while waiting for the glue from the current step to dry. Or, pour yourself a (modest) drink, and sit back and admire your craftsmanship.

If you are an experienced paper modeler, you probably have your own tricks and techniques that have proven successful; by all means, use them! There is no one "right" way to build these models. And if you are not very experienced, feel free to try anything that you think might work better for you (and let me know about it if it does!). You stand to lose nothing but the time it takes to print out a new set of parts and try again.

Additional hints and techniques are available at Steve Brown's excellent Card Modeling FAQ:

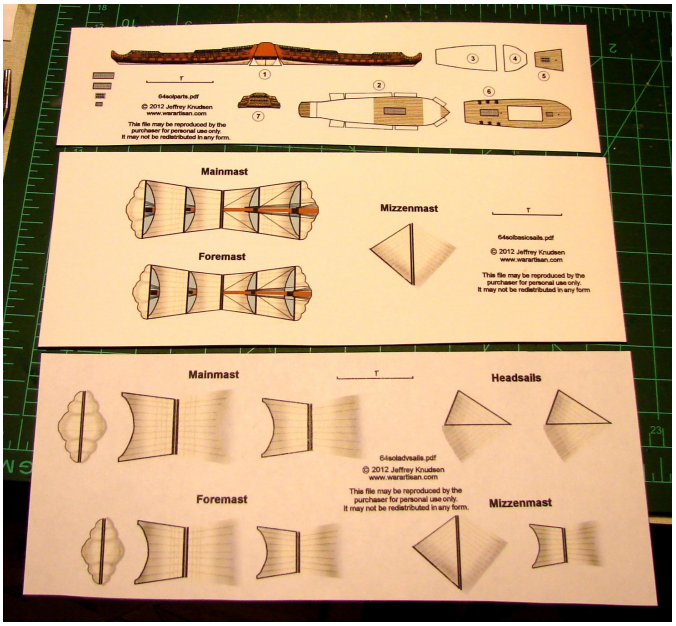
http://www.cardfaq.org/faq/

1:900 SCALE
64-GUN SHIP OF THE LINE

The steps shown in the following instructions will guide you through the construction of a 1:900 scale model of a 64-gun ship of the line.

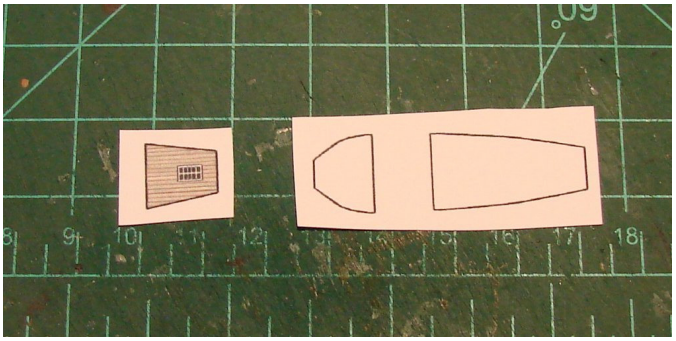
BUILDING THE HULL

First you will need to print out the hull parts (64solparts.pdf) on cardstock (60-90# works best).

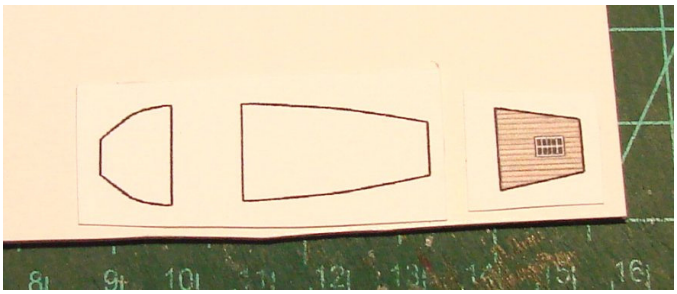


You will also need to print out your choice of either the Basic Sail sheet (64solbasicsails.pdf, shown in the middle, printed on cardstock), or the Advanced Sail sheet (64soladvsails.pdf, at the bottom of the photo, printed on plain paper). Be sure to check the "Fit" box on the printer dialog, or the parts may overlap the edge of the paper, and will be the wrong size.

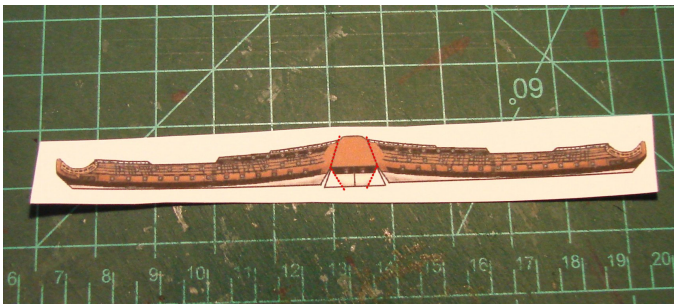
1. Begin by rough-cutting parts 3, 4 and 5.



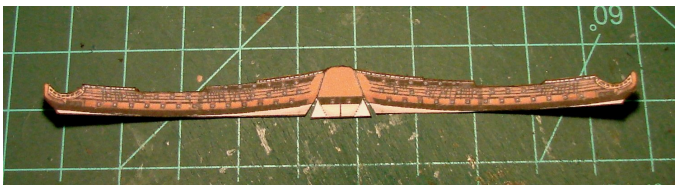
2. Make a piece of double thickness tagboard by gluing together two sheets. The finished sheet should be about 1.5 mm in thickness. Glue Parts 3-5 to this. Allow them to dry thoroughly.



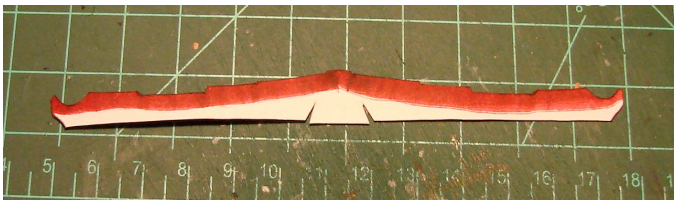
3. Rough cut Part 1, and score it along the lines marked in red on the photo.



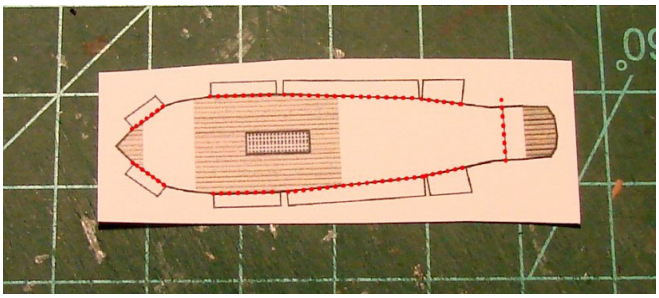
4. Trim Part 1 to its final shape, and tint all the edges except the waterline.



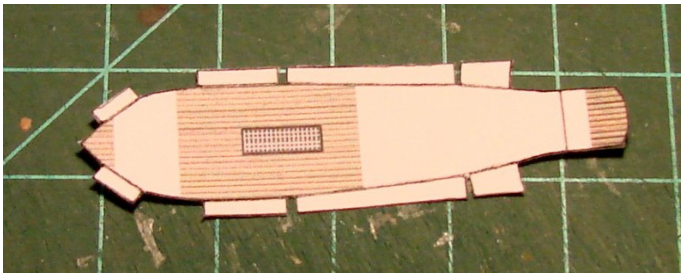
5. Turn the part over, and tint the top half of the back side dark red or brown.



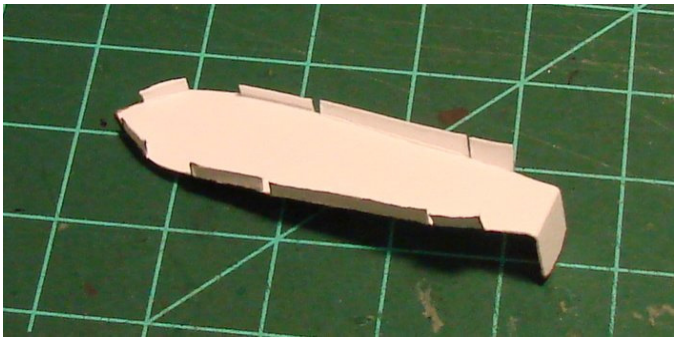
6. Rough cut Part 2, and score it along the lines marked in red.



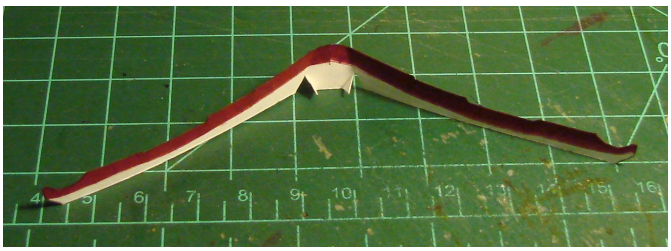
7. Carefully trim Part 2 and tint the edge of the stern rail (the curved edge on the right of the photo).



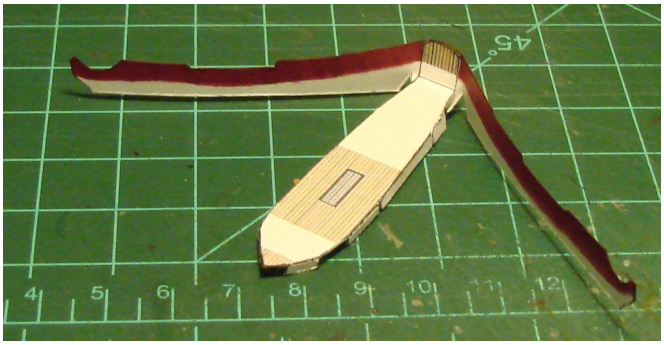
8. Fold Part 2 as shown, the stern up (towards the printed side) and the rectangular tabs down.



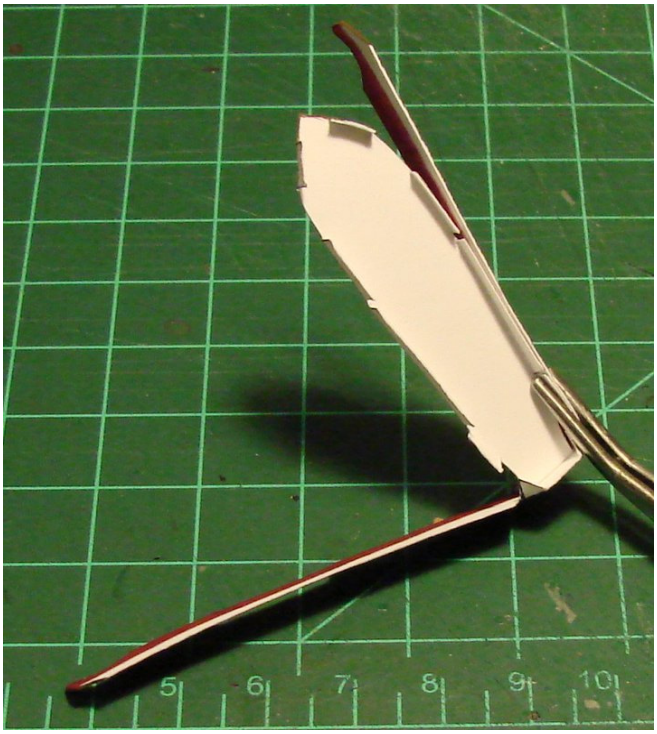
9. Fold Part 1 as shown.



10. Glue the stern tab of Part 2 to the center of Part 1 as shown. Line up the upper edges as closely as possible.



11. Beginning at the stern, glue the rectangular tabs of Part 2 to the inside of part one. Hold or clamp each one in place until the glue sets before moving on to the next. It is extremely important that the edges of the tabs line up with the waterline (the long, straight edge on Part 1).

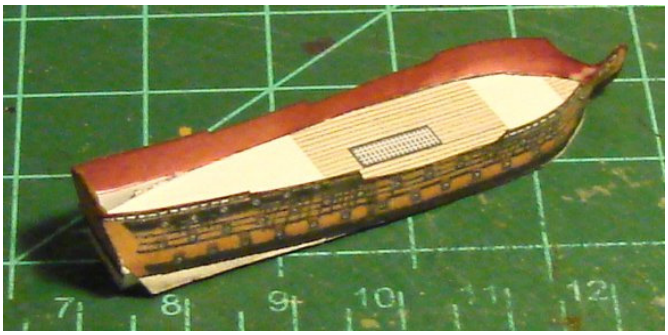


After gluing the sternmost tab on one side, do the one opposite to it. Work your way forward until all the tabs have been glued along the waterline edge of Part 1.

When all the tabs have been glued in place, the hull should look like this:

12. Spread a little glue between the bow ends of Part 1, and hold or clamp them together until the glue sets. Be sure to line up the edges at the bow as closely as possible.

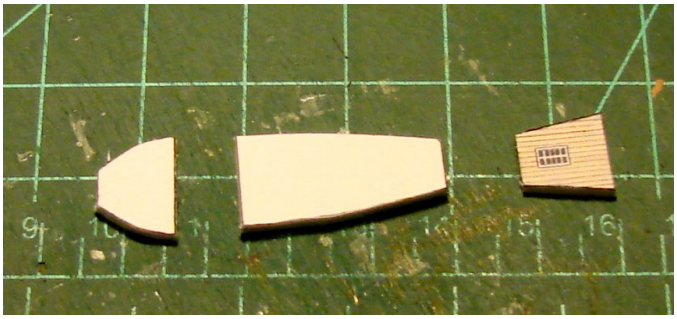
The hull should look like this so far:



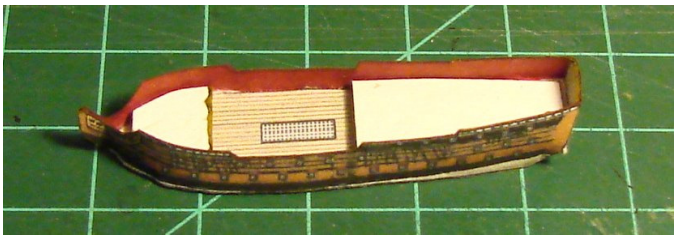
13. Next, bend the bottom of the stern in just slightly, so that the fold of the triangular tab lines up with the adjacent edge of the hull. Glue the tab to the inside of the hull in this position.

The stern should look like this, with both tabs glued:

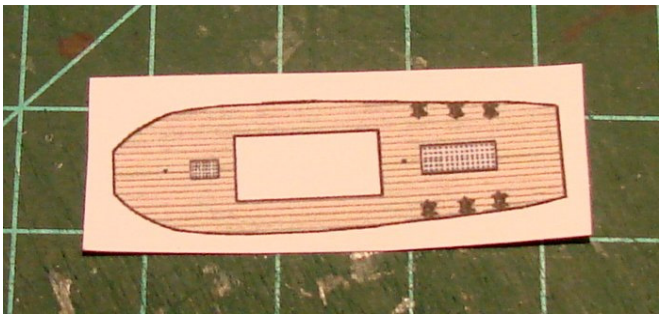
14. By now, the parts glued to the double tagboard should be dry. Cut them out, being careful to keep the knife as close to vertical as possible, so that the edges are nice and square, the exception being the short edge on Part 5 which should be cut with the knife angled away from the part so that the edge is undercut at about 60 degrees. Tint all the flat edges of these parts, black for the longer edges in the middle, brown for the others.



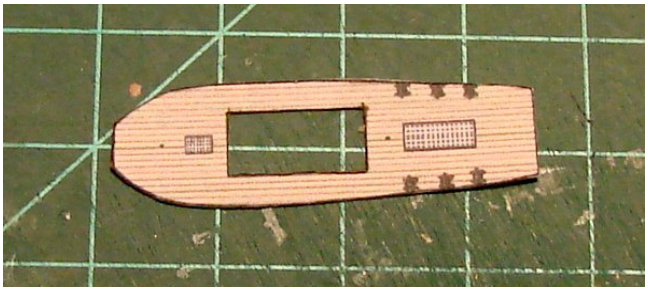
15. Spread a little glue on the white areas of Part 2, making sure it gets spread all the way to where the edges meet the inside of Part 1. Getting a little glue on the sides (where Part 1 was tinted), without going up so far that the glue will show, will help the hull hold its shape. Insert Parts 3 and 4 as shown, holding the sides of the hull in against them until the glue sets.



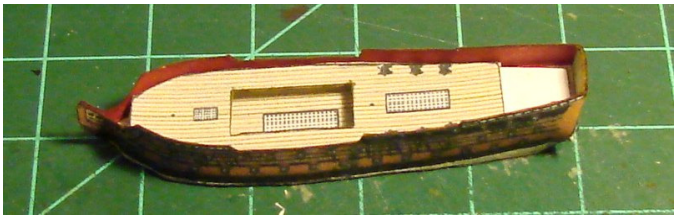
16. Rough cut Part 6.



17. Trim Part 6, and tint the edges of the rectangular cutout in the middle and the short, flat edge that goes at the bow..

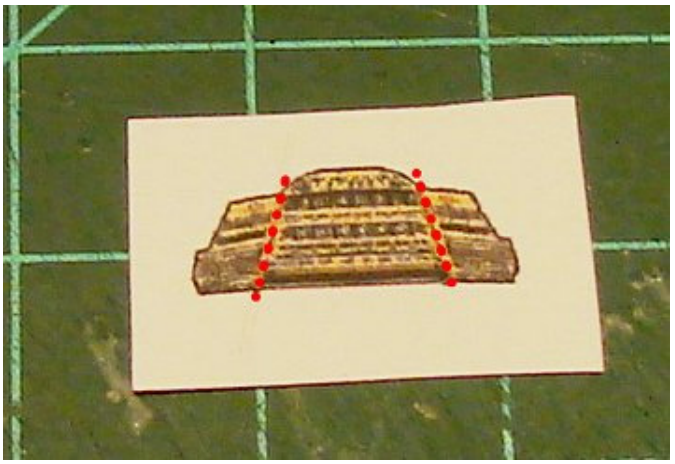


18. Spread glue on the top of Parts 3 and 4, and drop Part 6 into place on top of them, making sure to slide it as far forward as the sides of the hull will allow.



19. Glue Part 5 at the stern. Make sure a little glue gets spread onto the sides of Part 1 where it will meet Part 5, and hold the sides in place until the glue sets.

20. Rough cut Part 7, and score it at the places indicated by the red dotted lines.

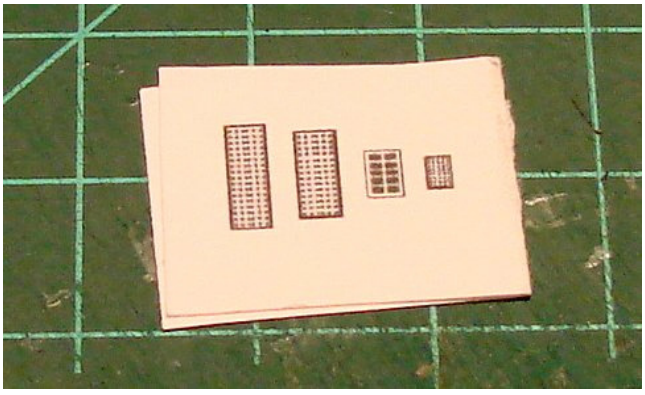


21. Tint the edges brown, and fold the part as shown.

22. Spread glue on the unprinted side of Part 7, and place it over the stern as shown in this photo, folding the side flaps onto the sides of Part 1. Make sure to align the top edge as closely as possible to the upper edge of Part 1 at the stern.

23. Last, drill holes the same size as the masts at the places indicated by black dots on the deck. Gently drill all the way through the layers of tagboard under the deck, since the masts will extend clear through to the ship's waterline when they are added.

Optionally, you may want to make the deck a little more three-dimensional by adding deck gratings and skylights. Cut out the extras provided on the parts sheet and glue them to a scrap of cardstock to give them a little thickness. Cut them out and glue them over the graphics printed on the ship's deck.



The hull is now complete, and is ready to have the masts stepped and the rigging, ensigns and pennants added.

The design for this model was taken from an actual builder's draught of a 64-gun ship of the line built in the mid-eighteenth century.

See more at www.warartisan.com
and on my Flickr page at
http://www.flickr.com/photos/war_artisan/collections/72157608049503046/

BUILDING THE SAILS AND MASTS

There are two sets of sails included with the kit; Basic Sails (64solbasicsails.pdf) and Advanced Sails (64soladvsails.pdf). Look at the pictures of both styles of sail and decide which of them you would prefer to do.

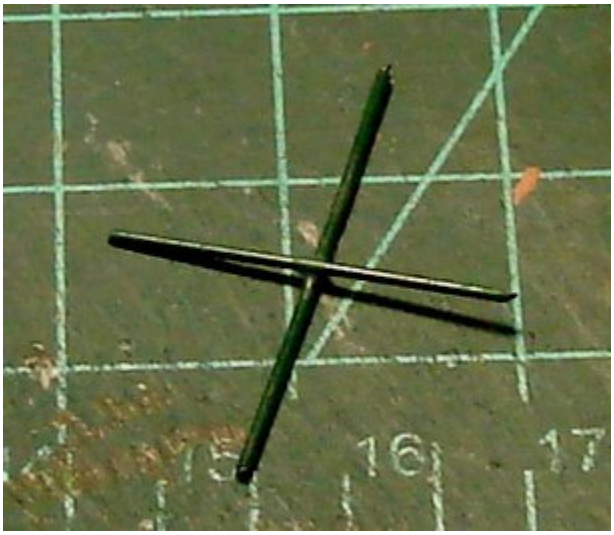
THE BASIC SAILS

If you have chosen to use the Basic Sails, follow these steps to complete your model.

1. Cut pieces of wire for the masts as follows:

Mainmast: 16 gauge wire, 58mm long.
Foremast: 16 gauge wire, 52mm long.
Mizzenmast: 18 gauge wire, 42mm long.
Bowsprit: 18 gauge wire, 25mm long.
Sprityard: 22 gauge wire, 20mm long.

2. Glue the Bowsprit and Sprityard together at their midpoints and allow them to dry.



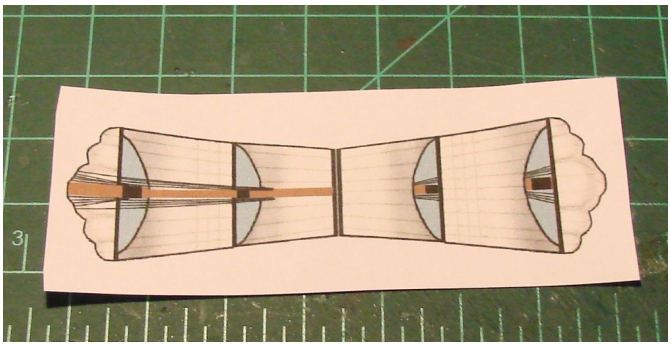
If using superglue or some very strong-bonding glue, no further reinforcement should be necessary for this assembly. If using plain white (PVA) glue, spread a little extra glue around the joint to strengthen the joint, and allow it to dry completely.

3. When the Bowsprit assembly is dry, put a spot of glue at each of the places marked in red in this photo:

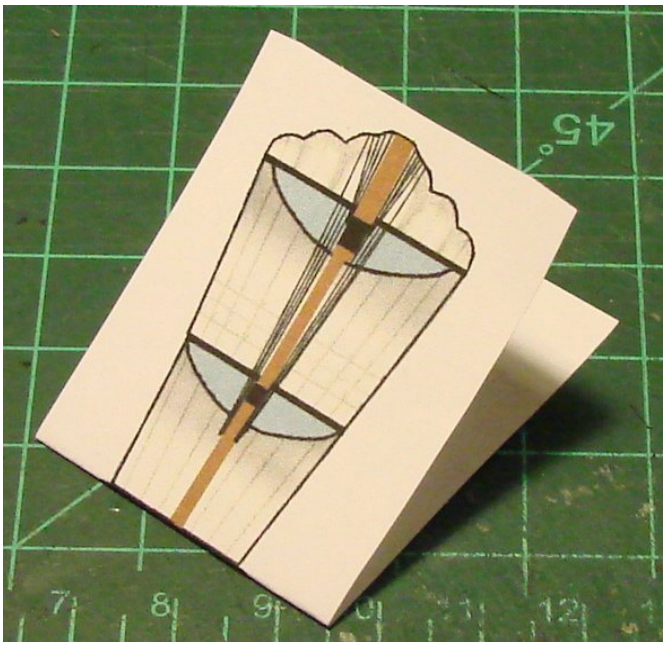
These are the points at which the Bowsprit will be attached to the hull. A stronger (and faster) bond can be achieved if the glue is allowed to almost completely dry, and then another spot of glue is added over the top before attaching the part.

Paint the Bowsprit assembly as shown, and glue it in place. To make the bond even stronger so the model will withstand the handling inevitable during a wargame, use a toothpick to draw a small band of white glue completely around the wire at each of the attachment points, and paint over the glue when it is dry.

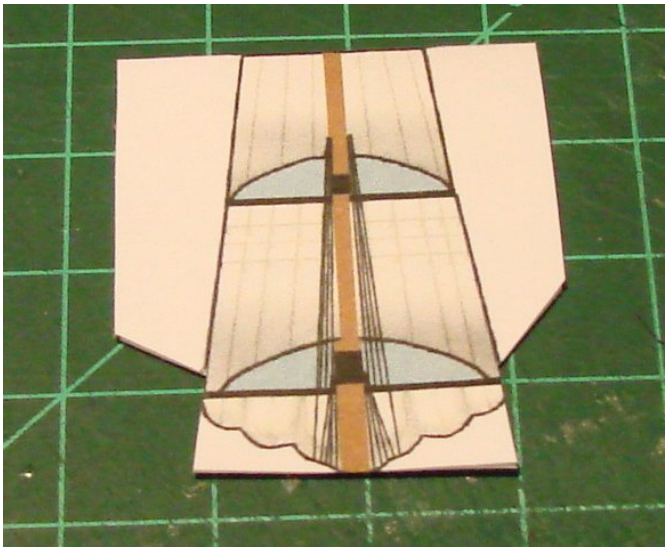
4. Next, cut out each of the sail parts.



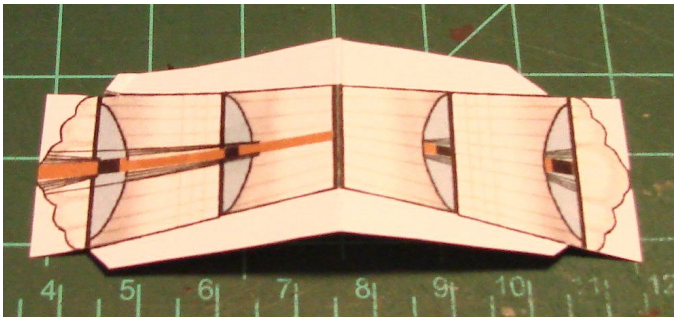
5. Fold the parts along the white line in the center. Make the crease very precise, or the graphics on the opposite sides of the piece will not line up. Tint the crease black to cover up the white line after folding.



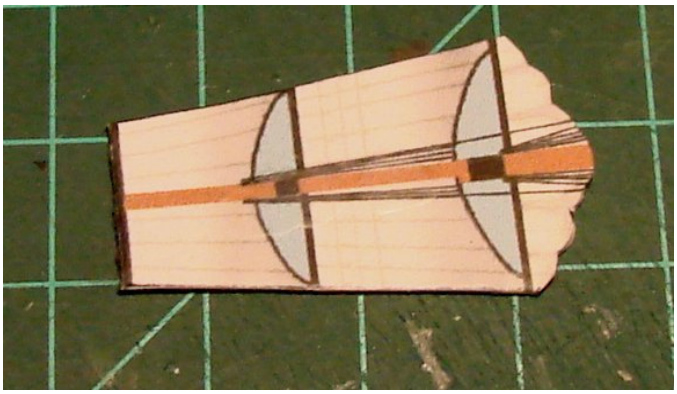
6. With the parts folded, cut straight across the bottom of the graphic, and partway up along each side, as shown. These cuts will allow you to align the graphics when the part is glued together.



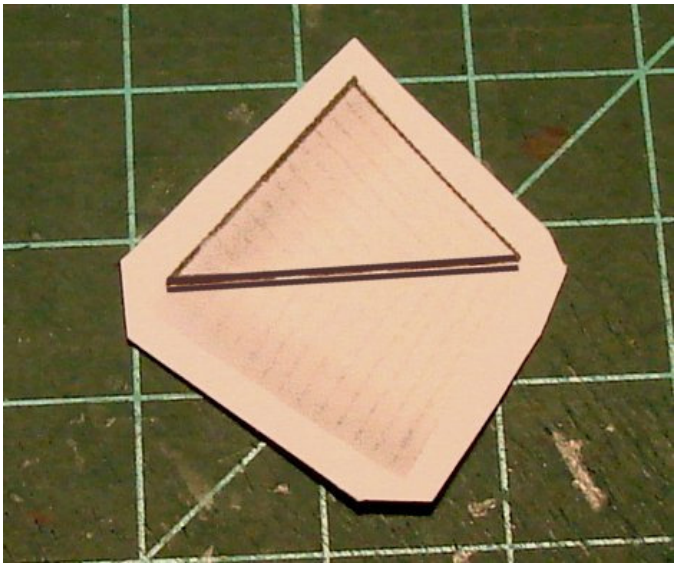
The part should now look like this, when unfolded.



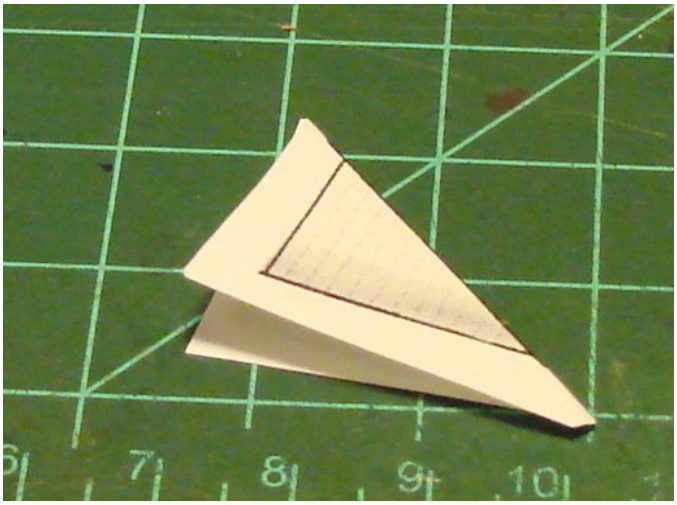
7. Spread a thin layer of glue over the whole unprinted side of the part and fold it together, using the cuts at the bottom to align the two halves. When the glue is dry, finish cutting out the part, making sure to completely cut away the black outlines along the sides and bottom.



8. Cut out the lateen sail for the mizzen mast.

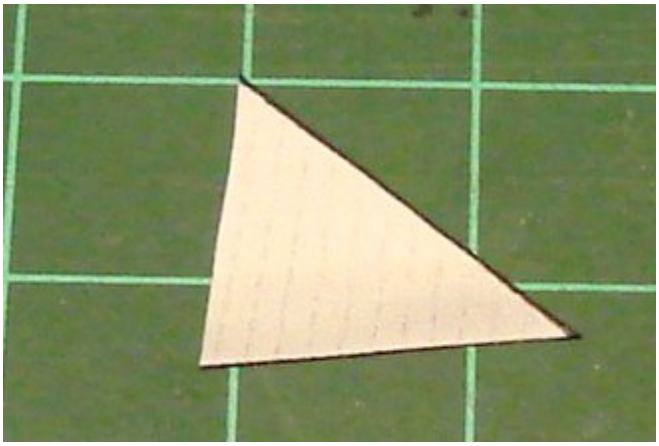


9. Fold it in half along the white line in the center, and tint the crease black.



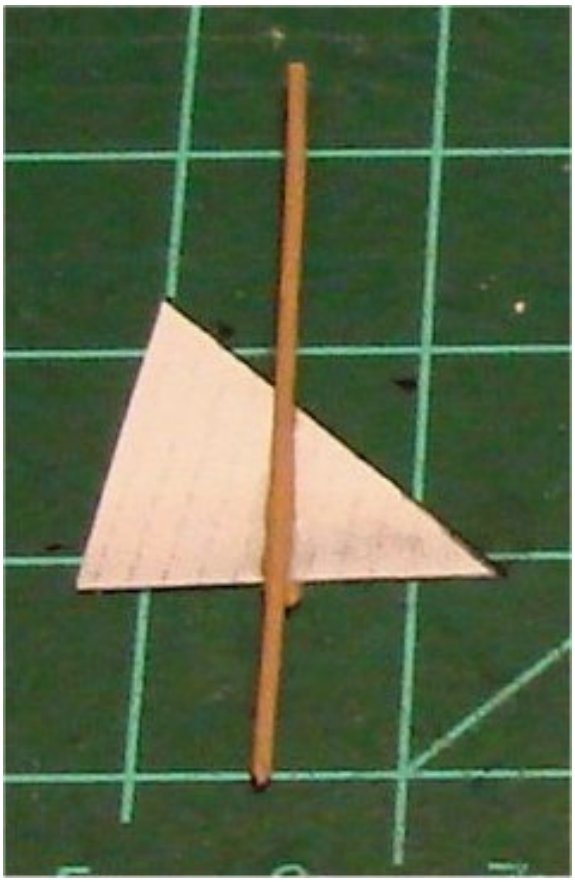
10. Spread a thin layer of glue over the whole unprinted side of the part and fold it together.

When the glue is dry, finish cutting out the part, making sure to completely cut away the black outlines along the side and bottom.



Now the sails are ready to be affixed to the masts.

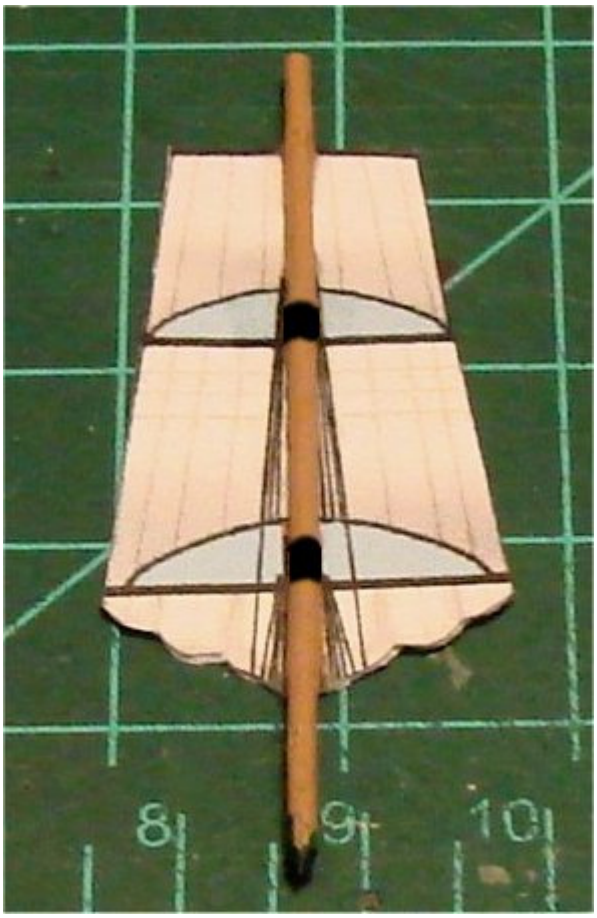
11. Draw a bead of glue down the middle of one side of the lateen sail, and attach it to the mizzen mast so that the yard crosses the mast 18mm from the bottom, and the lower edge of the sail is at a right angle to the mast.



The mast should be painted tan, either before or after the sail is glued to it. Gluing it first will result in a more durable bond.

12. Draw a bead of glue along the middle of each of the other sail parts, on the side that has the continuous tan mast graphic running the entire length of the part, and glue the masts in place with the lowest yard 18mm from the bottom end of the mast.

The larger part goes on the mainmast, the smaller one on the foremast.



The mast should be painted tan. A black band can be added where the mastheads would be, if desired, just above the lower and middle yards (they were held together by lashings of tarred rope).

13. Put a little glue on the bottom of each mast, and glue it into the hole drilled for it. Make sure the mast extends all the way through the deck, all the way to the ship's waterline, but no farther. Observe the masts from several angles to make sure they are vertical, and lined up with each other from bow to stern. Make any adjustments before the glue sets.

Allow to dry thoroughly.

14. When the glue on the masts is dry, turn the hull over and add a bead of glue around the place where the mast comes through the deck, and allow this to dry.

The ship is now ready for wargaming. It can be used as-is, or can be mounted on a base so that the players can handle the model without putting strain on the masts.

You may wish to add rigging to your ship; see the rigging tutorial on the Workbench page at www.warartisan.com/workbench. This greatly enhances the look of your models, and adds strength as well.

You can also add naval ensigns to decorate your models. There is a sheet of printable ensigns on the Ships page of the website. Download the file (make sure you get the one that matches the scale of the model you are building; in this case, 1:900), and print it out on plain paper. Cut out the desired flag, fold it in half on the line and glue the halves together, aligning the edges as carefully as possible. You can paint or tint the white edges when the glue is dry. Give the flag a few ripples while the glue is drying to show the effect of the wind, then glue it to the mast.

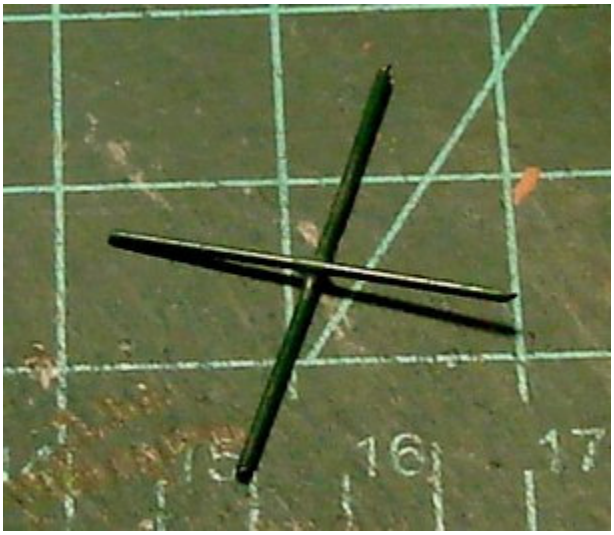
THE ADVANCED SAILS

The Advanced Sails require a little more time and effort than the Basic Sails, but they give your models a much more convincing appearance. To make the Advanced Sails, complete the following steps:

1. Cut pieces of wire for the masts as follows:

Mainmast: 16 gauge wire, 58mm long.
Foremast: 16 gauge wire, 52mm long.
Mizzenmast: 18 gauge wire, 42mm long.
Bowsprit: 18 gauge wire, 25mm long.
Sprityard: 22 gauge wire, 20mm long.

2. Glue the Bowsprit and Sprityard together at their midpoints and allow them to dry.



If using superglue or some very strong-bonding glue, no further reinforcement should be necessary for this assembly. If using plain white (PVA) glue, spread a little extra glue around the joint to strengthen the joint, and allow it to dry completely.

3. When the Bowsprit assembly is dry, put a spot of glue at each of the places marked in red in this photo:

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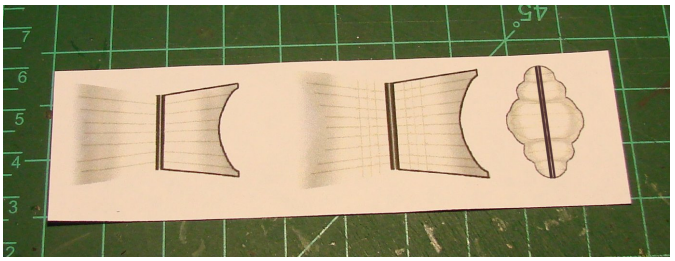
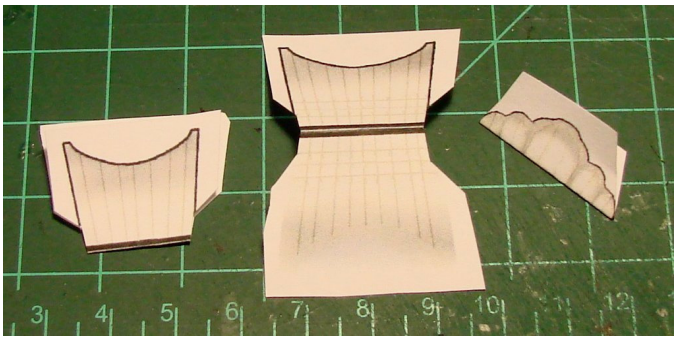
These are the points at which the Bowsprit will be attached to the hull. A stronger (and faster) bond can be achieved if the glue is allowed to almost completely dry, and then another spot of glue is added over the top before attaching the part.

Paint the Bowsprit assembly as shown, and glue it in place. To make the bond even stronger so the model will withstand the handling inevitable during a wargame, use a toothpick to draw a small band of white glue completely around the wire at each of the attachment points, and paint over the glue when it is dry.

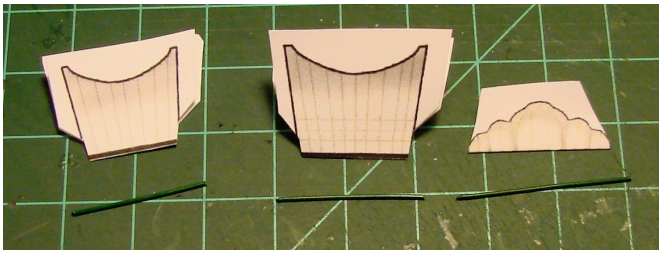
4. Cut out the sail sets for each mast. The mainmast and foremast are constructed in identical ways, so we will cover those first and do the mizzen afterwards.



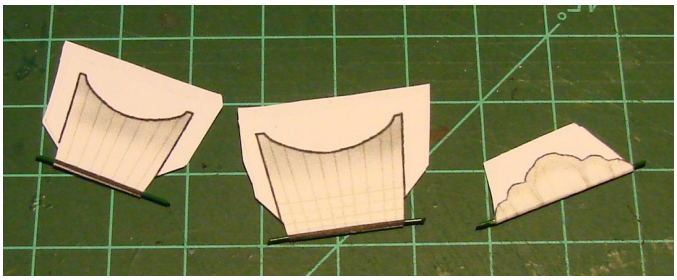
5. Separate the sails for the mast on which you are working. Fold each one along the white line in the middle, and tint the crease black. With the sail folded, cut a short distance along each side, beginning at the crease, and then remove that portion of the edge by cutting away from the sail. The following photo shows, from left to right; the topgallant sail, still folded; the topsail, opened up; and the course.



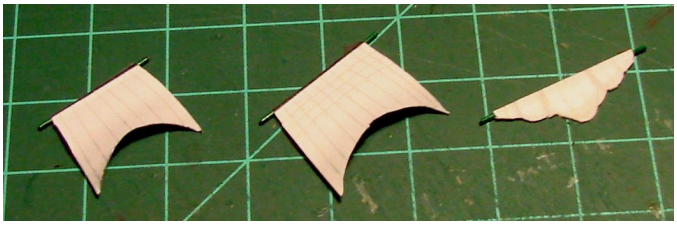
6. Cut a piece of 22 gauge wire, a few millimeters longer than the creased edge of each sail. The exact length isn't critical, as we'll be trimming them later.



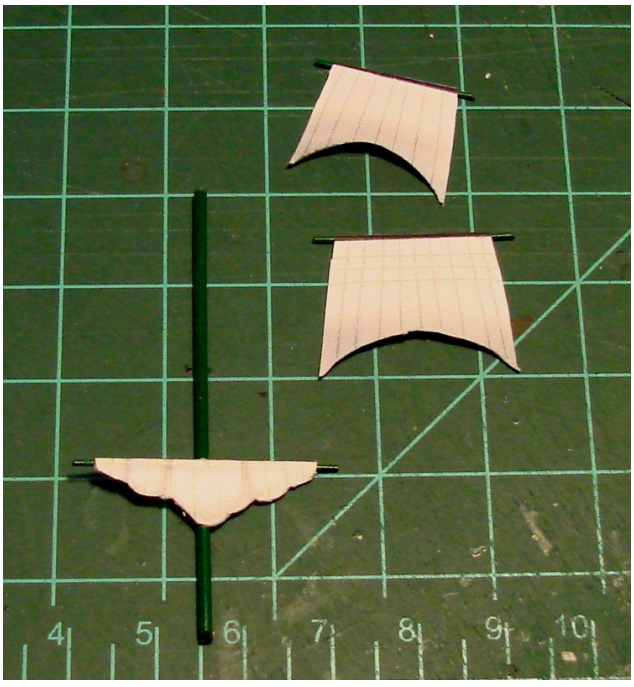
7. Spread a thin layer of glue on the unprinted side of each sail. Insert the wire into the crease and glue the sail together folded over the wire. Running a fingernail along the sail just below the wire will ensure that it is seated firmly in the crease. Allow the glue to dry.



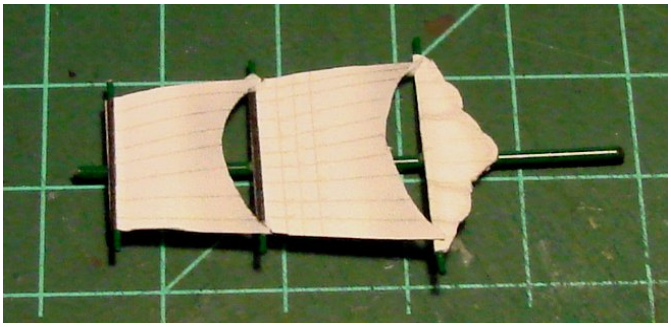
8. When completely dry, finish trimming the edges of the sails, making sure to completely remove the black outlines. Give each part a slight curve by squeezing in on the lower points of the sail. Trim the ends of the yards so that they extend just a couple millimeters beyond the paper, and are equal on both ends.



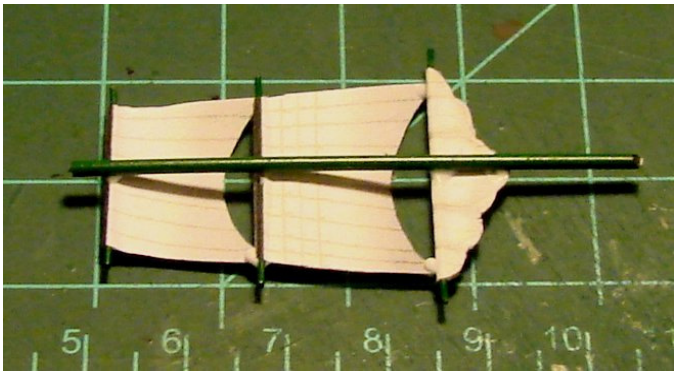
9. Glue the brailed course to its mast so that the yard crosses the mast at a point 18mm from the bottom.



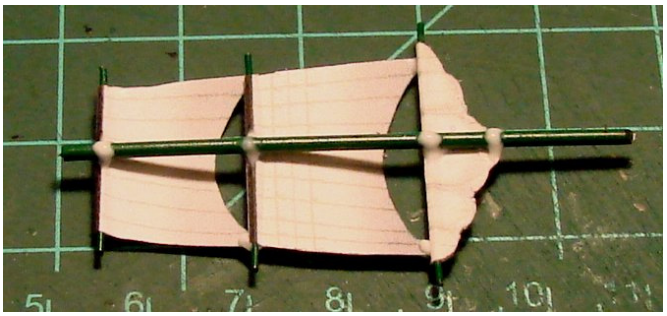
10. Next, put a dot of glue in the center of the topsail yard and at the lower points of the sail, and glue it in a position where the points are just overlapping the yard below it. Repeat this for the topgallant.



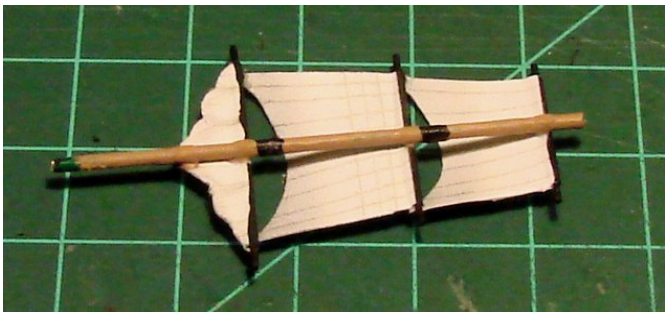
This is how the mast should appear from the back:



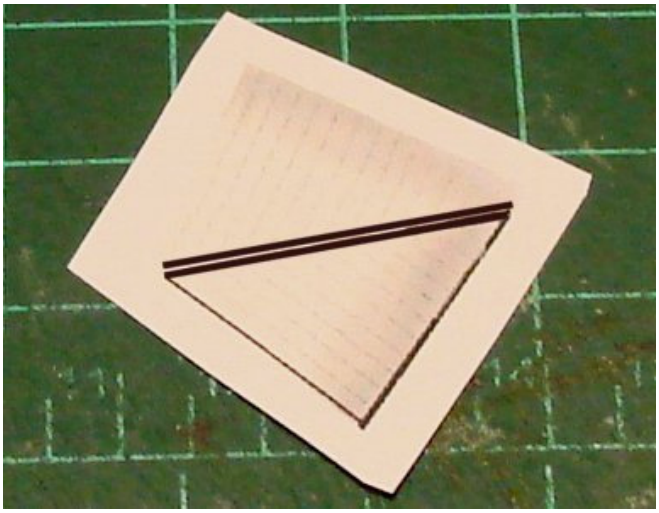
11. To make sure that the sails are secured to the mast, use a toothpick to draw a band of glue around the mast, from one side of the yard to the other. This “banding”, since PVA is a very tough, rubbery polymer, will help the model withstand the rough handling that wargame miniatures sometimes get in the heat of battle.



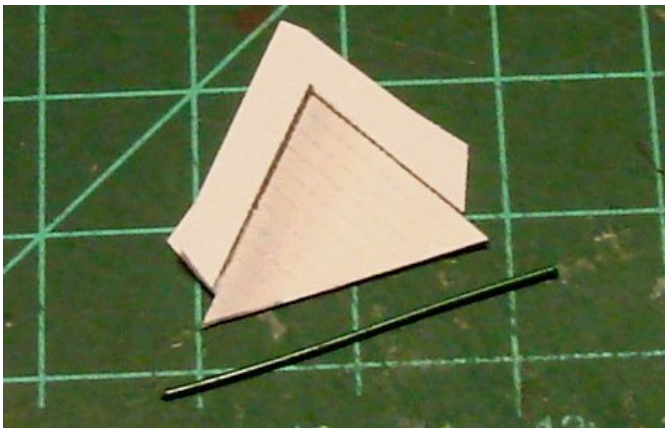
12. When the glue is dry, paint the mast tan. A black band can be added where the mastheads would be, if desired, just above the lower and middle yards (they were held together by lashings of tarred rope). Also paint the exposed ends of each yard black.



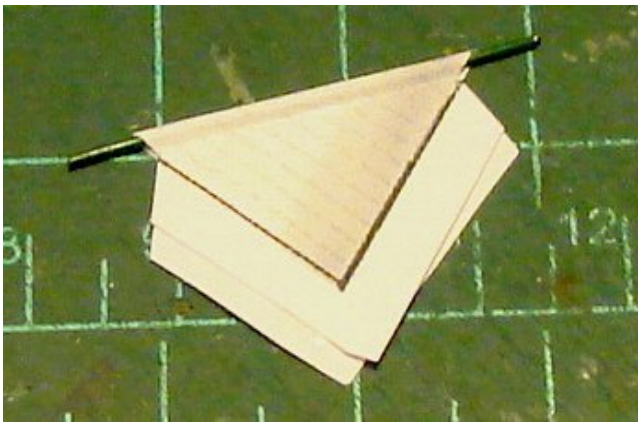
13. Cut out the lateen sail for the mizzen mast.



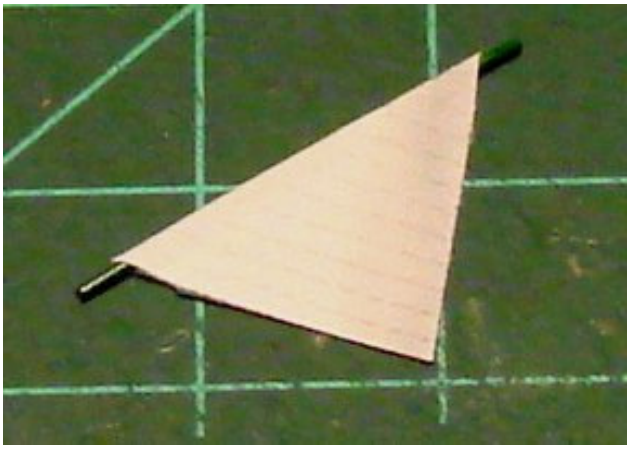
14. Fold it in half along the white line in the middle, and tint the crease black. Cut a piece of 22 gauge wire for the yard, a few millimeters long than the crease.



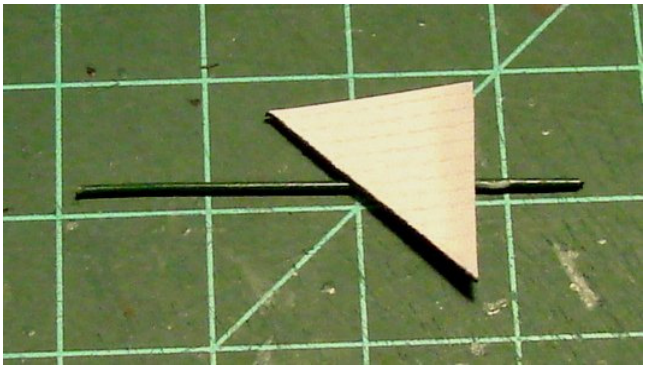
15. Spread a thin layer of glue on the unprinted side of the part and fold it over with the wire firmly in the crease. Allow the glue to dry thoroughly.



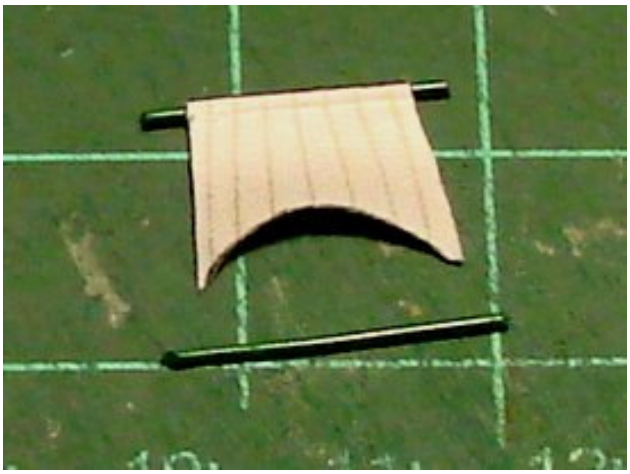
16. Trim the rest of the sail's edges, making sure to completely remove the black outline. Trim the wire so that only a couple millimeters extends beyond the sail on each end.



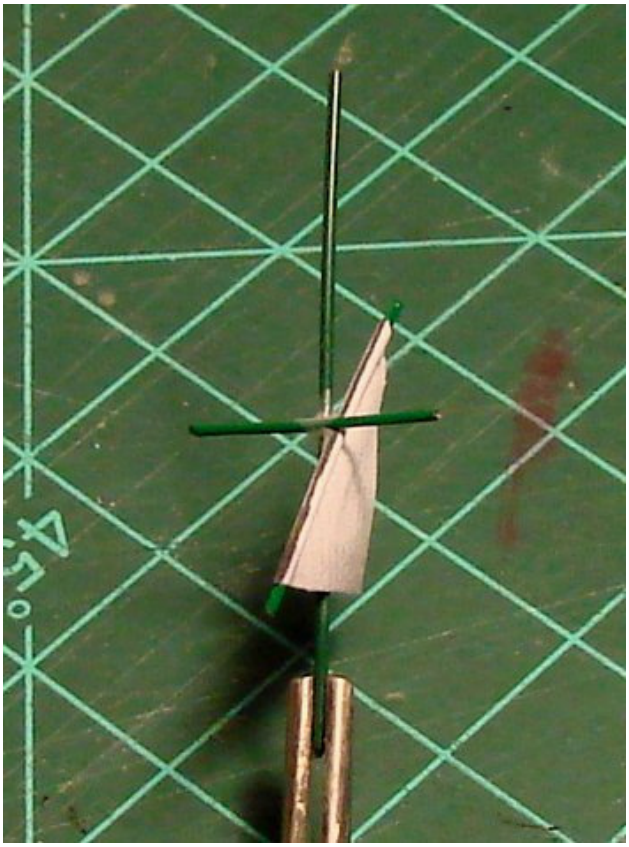
17. Glue the lateen to the mizzen mast so that the yard crosses the mast 18mm from the bottom, and the lower edge of the sail is at a right angle to the mast.



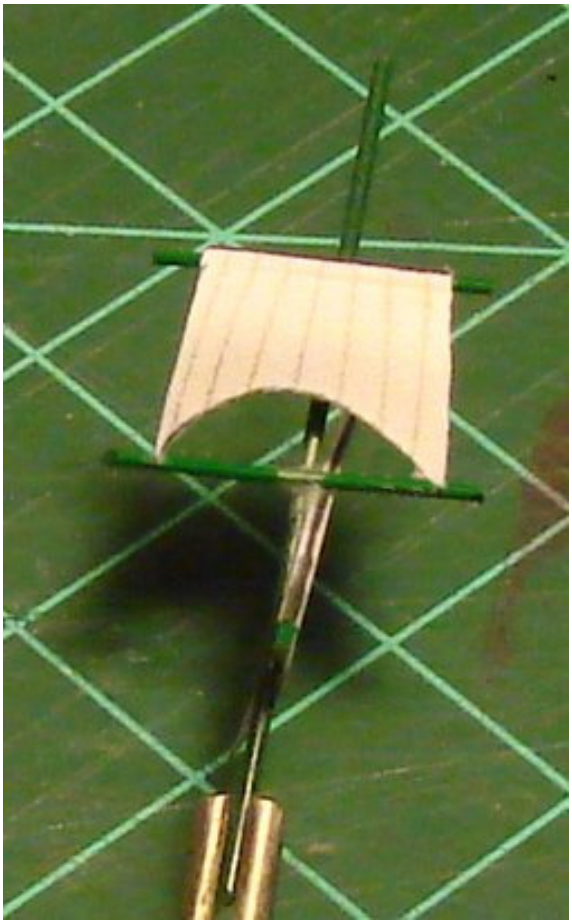
18. If a mizzen topsail is desired (and these were not always in use, especially in battle), make the sail the same way the other square sails were made. Cut a piece of 22 gauge wire for the lower yard (known as the "crojack" or "barren" yard, since it didn't carry a sail of its own) a little longer than the distance between the lower points of the sail.



19. Glue the crojack to the mizzen mast just where the lateen yard is attached, and at right angles to it. Band it securely to the mast.



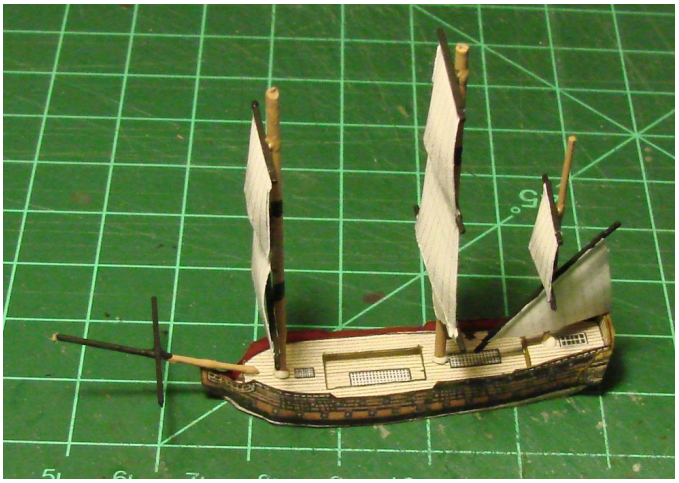
20. Mount the mizzen topsail in the same manner as the topsails on the other masts.



Paint the mast tan, and the crojack and the exposed ends of the topsail yard black.

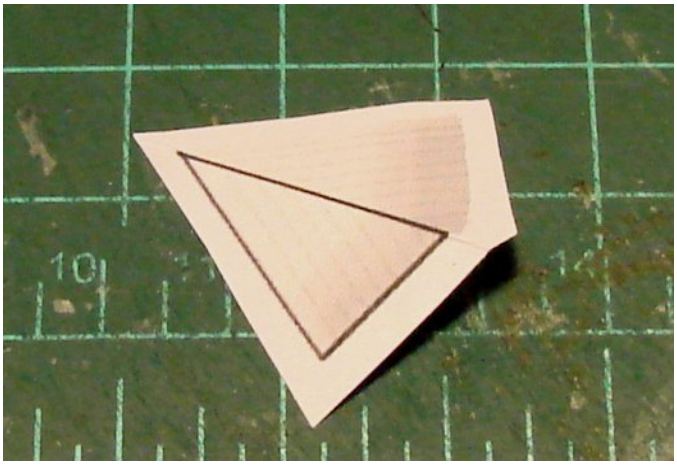
21. Put a little glue on the bottom of each mast, and glue it into the hole drilled for it. Make sure the mast extends all the way through the deck, all the way to the ship's waterline, but no farther. Observe the masts from several angles to make sure they are vertical, and lined up with each other from bow to stern. Make any adjustments before the glue sets.

Allow to dry thoroughly.

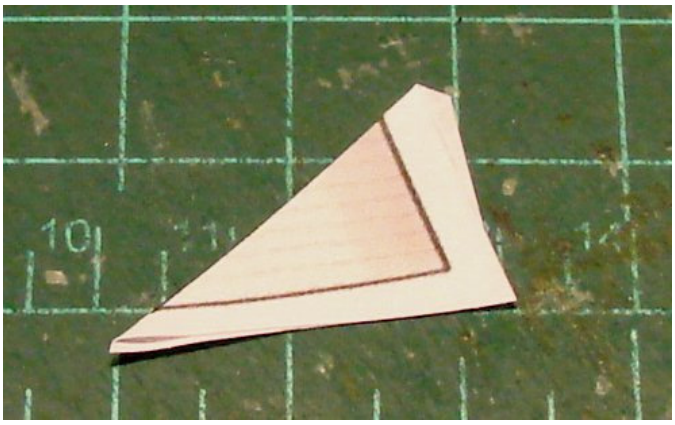


22. When the glue on the masts is dry, turn the hull over and add a bead of glue around the place where the mast comes through the deck, and allow this to dry.

23. Headsails were not always in use, but their presence on the model gives it a very attractive appearance. Cut one or two (as desired) from the sail parts sheet, and fold along the center line.



24. Spread a thin layer of glue on the unprinted side of the part, and fold it over. When the glue is dry trim the part, making sure to completely remove the black outline from the uncreased edges.



25. Mounting the headsails will require the addition of some rigging, namely the forestays to which they were bent.

See the rigging tutorial on the Workbench page at www.warartisan.com for the method of doing this.

When the glue holding the forestays is dry, run a bead of glue along the crease of the headsail, and attach it to the stay.

Last, but certainly not least, you will want to rig your model to give it more of the authentic appearance of a sailing man o' war. The rigging tutorial will give you simple step-by-step instructions on how this can be accomplished.

You can also add naval ensigns to decorate your models. There is a sheet of printable ensigns on the Ships page of the website. Download the file (make sure you get the one that matches the scale of the model you are building; in this case, 1:900), and print it out on plain paper. Cut out the desired flag, fold it in half on the line and glue the halves together, aligning the edges as carefully as possible. You can paint or tint the white edges when the glue is dry. Give the flag a few ripples while the glue is drying to show the effect of the wind, then glue it to the mast.