

# The MSB Journal



**Fall 2016**  
[www.msbjournal.com](http://www.msbjournal.com)

## **The MSB Journal**

ISSN 1913-6943

Fall 2016

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On the Cover  
Troopboat (1758)  
National Maritime Museum

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# SCRATCH-BUILDING A POF MODEL OF HMS *SURPRISE* PART ONE By Gene Bodnar

## Introduction

This series of articles will describe one way to scratch-build a fully rigged plank-on-frame model of HMS *Surprise* (1796), with one side of the model fully exposed to display the interior structures of the vessel, and the other side fully planked and finished to be displayed as a fine model for display on a fireplace mantle or in a display case.

To build the model we will be using the detailed set of plans drawn by Karl Heinz Marquardt that are found in the book entitled *The Frigate Surprise* by Brian Lavery and Geoff Hunt. See Figure 1. The plans can be enlarged to any scale you wish by utilizing the Brava Reader program, which is available as a free download from the web. I will be using a scale of 1:48, which results in a model with an overall length of nearly five feet. Granted, it's a rather large model, but it allows the modeler to develop many details that are difficult, or next to impossible, on smaller scales. In fact, I will also be employing photos of the vessel found on the internet to glean details that are not found on Marquardt's plans, such as the somewhat elaborate stern decorations, for example.

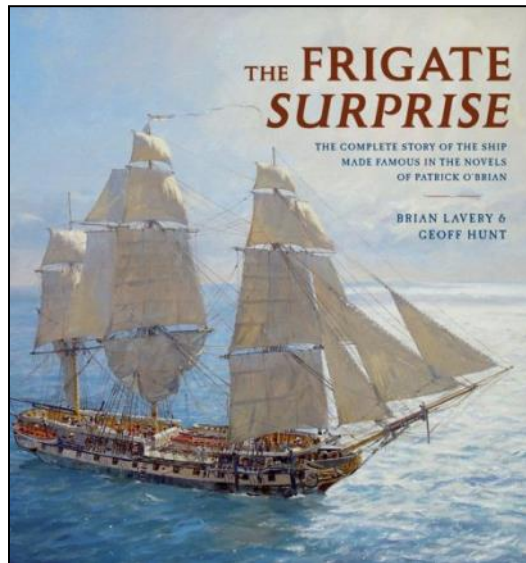


Figure 1. The Frigate *Surprise* by Brian Lavery

To further assist in the model's proper construction, the following three books will frequently be used as a reference and guide:

1. *The Construction and Fitting of a Sailing Man of War, 1650-1850*, by Peter Goodwin.
2. *The Arming and Fitting of English Ships of War, 1600-1815*, by Brian Lavery.
3. *The Masting and Rigging of English Ships of War, 1625-1860*, by James Lees.

These three books comprise well-detailed building instructions on just about every aspect of ship modeling, and they should be an integral part of every serious ship modeler's library.

## A Bit of History

*HMS Surprise* was built in Le Havre as a French Navy's corvette and launched under the name *L'Unite* on January 16, 1794. She took part in the battle of the Glorious First of June. After being repaired for damages suffered in the battle, she escorted merchant vessels along the coast of France.

In April, 1796, she was captured by *HMS Inconstant*. A year later, she was re-named *HMS Surprise* by the British and classified as a 28-gun sixth-rate frigate. Under Captain Edward Hamilton, she captured several privateers in the Caribbean, and later gained fame by leading a boarding party to retake *HMS Hermione* after an exceptionally bloody action in 1799.

After the Treaty of Amiens, the Royal Navy sold *HMS Surprise* out of the service at Deptford in February, 1802, and she was broken up.

## *HMS Surprise* in Fiction

Of course, *HMS Surprise* (Figure 2) was the ship chosen by Patrick O'Brian in his 21-volume series of novels of Aubrey-Maturin fame, which are quite popular reads for model shipbuilders as well as nautical fiction enthusiasts.

For the 2003 film, "Master and Commander," the role of the *HMS Surprise* was filled by the replica of *HMS Rose*, which was significantly modified for the role.



Figure 2. The Frigate *Surprise*

## Building the Keel, Stem, Sternpost and Deadwood

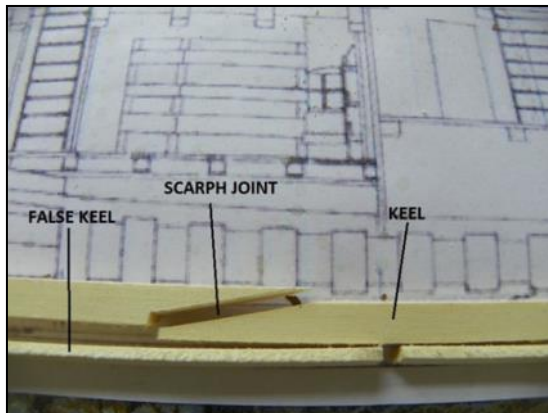


Figure 3. The Keel and False Keel

As with building an actual ship, we will begin the model by laying a keel. The width of the keel is found on the Lines Drawings plan, and all other elements for its construction are found on the Interior Profile plan. See Figure 3.

Note that I will be building the model almost exclusively of basswood. Of course, you may use whatever wood or combination of woods that you desire. The keel consists of 4 lengths of wood joined together with scarph joints. The forward length curves into the stem itself, as shown on the plan. The scarph

joints are best cut with an X-Acto knife. Now glue them together in a perfectly straight and flat line, clamping it to the edge of a perfectly flat table.

Next comes the stem assembly (Figure 4), which consists of 5 pieces: the gripe, the bobstay piece, the gammon piece, the figure piece, and the stempost. Draw the assembly on a piece of wood with the grain running in the same direction as the stempost. All 5 pieces should be cut out on a jigsaw as one single piece of wood, following the outline closely. Then cut out each of the 5 pieces separately. Remember to cut out the rectangular notches in the gammon piece, and to drill a hole in the bobstay piece. Sand each piece smooth. Now glue all the pieces together, and place a weight atop the assembly to keep it flat.

So far, your keel assembly should appear like the photos below.

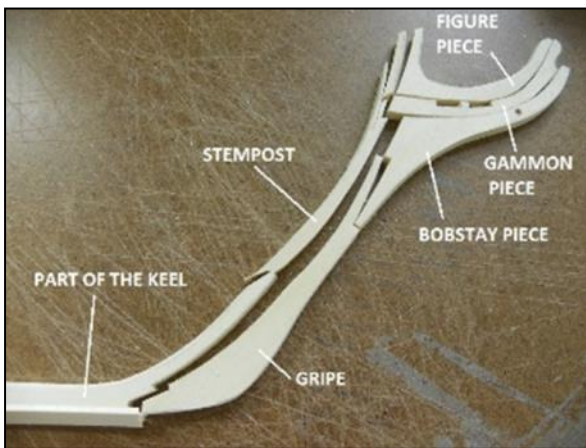


Figure 4. The Stem

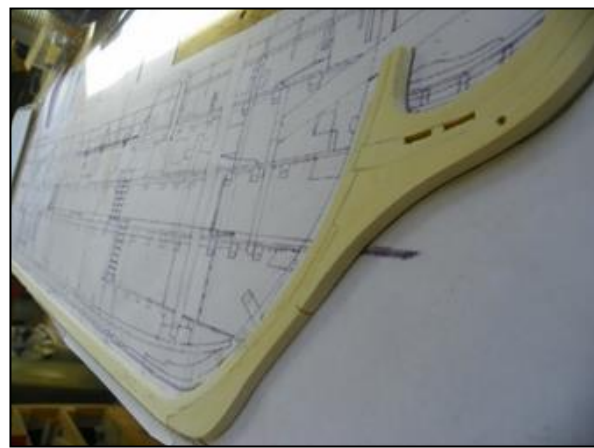


Figure 5. The Keel and Stem

The next item to make and install is the sternpost. It is simply a tapering piece of wood the same thickness at the keel that is set at a 10-degree angle to the keel and glued in place.

The next item to install is a rabbet (Figure 5) into which the planking material is set. Many folks like to cut the rabbet out of solid wood, but I have found it much easier to use the following method.

Cut a long length of 1/16" wood one-half as wide as your keel. Starting at the point where the sternpost meets the keel, glue and clamp or pin the rabbet piece exactly in the center of the existing keel, which will result in spaces on each side of the rabbet piece into which planking will rest. The rabbet piece should extend all the way to the top of the stempost.



Figure 6. The Keel and Stem

An integral part of the keel is a piece that rests atop the rabbet and extends from

the sternpost to the top of the curve of the bow. Cut a long length of wood to the same thickness at the keel. Glue and pin it in place atop the rabbet piece (see Figure 6). It will be necessary to bend the wood to the shape of the curve at the bow, which is accomplished by boiling the wood in water for a few minutes, then shaping it with your fingers.

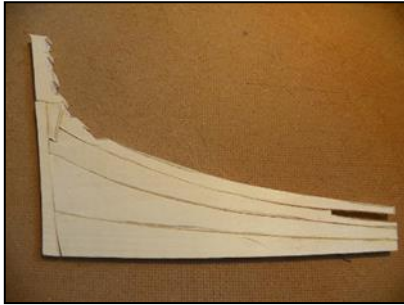


Figure 7. Stern Deadwood

Next cut out the pieces required for the deadwood at the stern (Figure 7), noting that the uppermost piece contains several notches for the transom knees. Glue all the pieces together and let dry. The edges that will rest at the keel and at the sternpost need to be tapered up to the imaginary bearding line to allow for the proper placement of the exterior planking in this area. Now glue the deadwood assembly in place at the stern, making sure that the entire structure lies flat.

Finally, the last elements that comprise the keel assembly are the deadwood pieces at the bow. Cut them out, and glue them in place at the bow area. (See Figure 8.)

Now sand the entire structure smooth. Remove any unwanted glue particles from the rabbet, and check to make sure the keel assembly is perfectly straight. Now locate and label each frame on your keel, which can be taken from the plans.

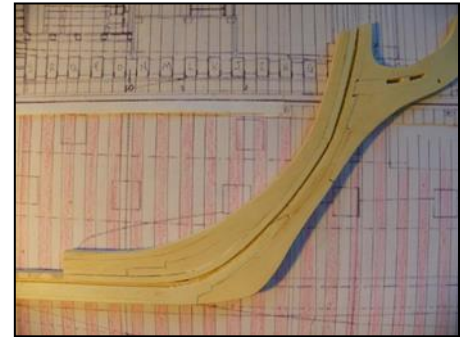


Figure 8. Bow Deadwood

## Preparing for Lofting Frames

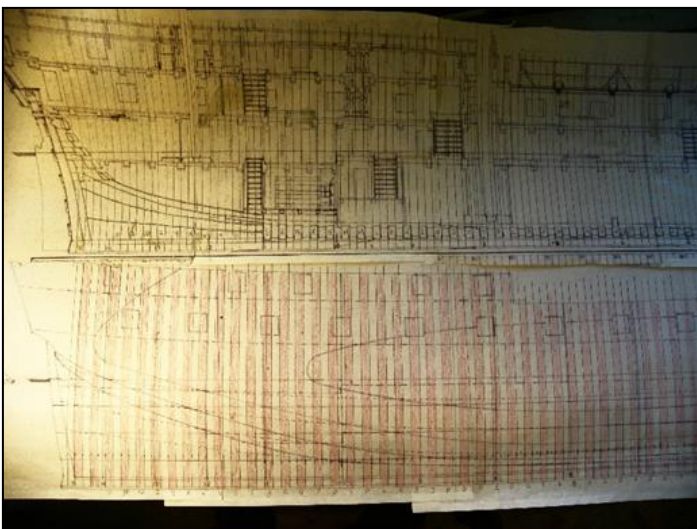


Figure 9. Locating Frames on Plans

The next step is to designate the location of the frames, which is found on the Interior Profile plan. Note that the load waterline is not exactly parallel to the keel. Therefore, draw a baseline that is parallel to the waterline. Then draw the location of each frame directly perpendicular to the baseline. Do this on the Profile Lines drawing and the Interior Profile plan. Locate and mark the midship frame, which you should designate with a circle with an X inside. Then number each frame going toward the bow 1, 2, 3, etc. From the midship frame going toward the stern, label each

frame A, B, C, etc. When you run out of letters, use AA, BB, etc. (See Figure 9.)

Now is the time to loft all frames. This will not be explained in this article. However, a highly detailed practicum on building the *HM Brig Eagle* is available as a free download on [www.msbjournal.com](http://www.msbjournal.com) where you will find every detail you need to know about lofting frames, and the instructions apply to any ship. An example is shown in Figure 10.

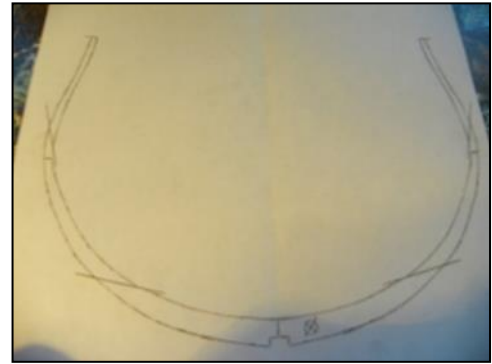


Figure 10. Lofted Midship Frame

Each frame of the *HMS Surprise* consists of a floor, two futtocks, and two top timbers, as shown in Figures 10 and 11. Once you have lofted a particular frame, in this case a square frame, you will need to cut out each of the 5 pieces, following the grain of the wood for the length of each piece. Locate the four scarph joints as well. Draw each piece on a piece of wood, but allow extra wood all around the piece. Then join the five pieces together and rubbercement them on your lofted frame pattern, and also use Elmer's Carpenter's glue to join each of the scarph joints together. When the glue dries, dowel each scarph joint with small bamboo dowels, as shown in Figure 11. After the glue dries, you can cut out the entire frame on your jig saw. Remove the paper pattern and sand smooth.

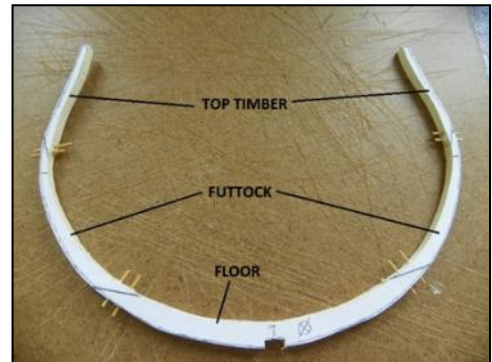


Figure 11. Constructed Midship Frame

Repeat this process for several of the square frames, trying to cover a wide range of the square frames on the keel. About 10-12 frames should be enough to start building the building jig, which is next. It is also important to note that as the frames approach the stern or as the frames approach the bow, there is an ever-increasing bevel to incorporate into each frame.

### Building the Building Jig

The purpose of the building jig (Figure 12) is to hold the keel and frames in an upright and perfectly level position so that the final shape of the hull will be identical with the shape shown on the plans. It consists of a base, a second piece of wood or Masonite cut out with a hole that represents the shape of the vessel at its load waterline, and several pieces of wood to hold them together at a precise height away from each other. It can be constructed from any type of material you have available, but I like to use Masonite for the base and waterline piece, and scrap pieces of wood to hold them together.

The base and the top piece should be about 6" longer and about 6" wider than the hull. On the top piece, it is necessary to locate and label all the frame positions, just as you did on the plans. Then draw the load waterline on this piece, as you take it from the lines drawing. Cut out the waterline on a jigsaw or bandsaw.



On the base piece, draw a longitudinal line directly down its center. On each side of this centerline, place small stopper blocks of wood on each side of this line so that your keel assembly will rest perfectly between them all along the centerline. Set the keel assembly in them, and test to ensure a snug fit.

Now make about 8 or 10 lengths of wood that will hold the top piece the precise height above the base. This measurement is taken from the plan. Measure the distance from the top of the base piece to the bottom edge of the top piece. This represents the length of the 8 or 10 pieces. Cut them out and glue them in position all around the base piece about an inch away from the waterline that you cut out in the top piece. Finally, you will glue the top piece in position directly on top of each of the 8 or 10 upright pieces. Here, you must work rapidly so the glue doesn't set before you position the frames on the keel assembly. Place the top piece in position on top of the glued 8 or 10 pieces. Immediately begin to fit the finished frames into their precise locations. Use a T-square as you do so to make sure they are precisely perpendicular to the base piece. Move the top piece, when necessary, so make sure all of these frames are in perfect position. Once you are satisfied that all is proper, place heavy weights on the waterline piece, and let it dry. At this time, you can also install all the frames you've finished by placing a small amount of glue in the frame notch and placing it back in position on the keel. Always be sure that each frame goes into its precise position and is perfectly upright.

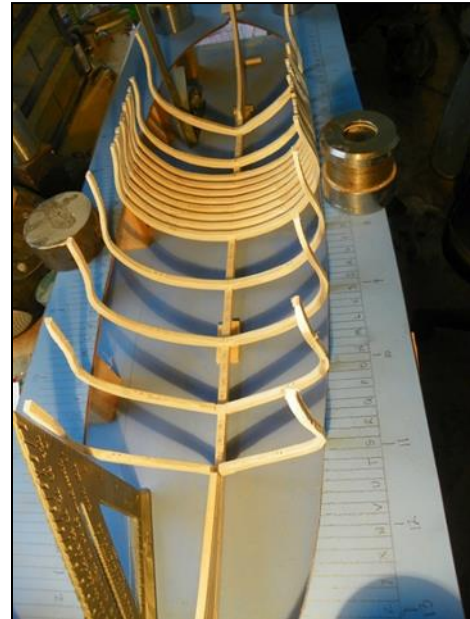


Figure 12. The Building Jig

You are now ready to finish all the remaining square frames – those that rest directly on the keel and are not attached to any deadwood.

In Part Two, we will discuss half frames, cant frames, the keelson, and planking the interior of the vessel.



## The Modelers Tool Chest

### Rotary Tools & Accessories



Rotary tools are a very handy item in any workshop. They can conduct tasks from shaping to drilling to cutting.



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Prep School Course, Bluenose  
Freshman Course, Armed Virginia Sloop  
Freshman Course, HMAV Bounty  
Freshman Course, HMS Pegasus/HMS Fly  
Sophomore Course, Constitution  
Sophomore Course, Vanguard  
Junior Course, Rattlesnake  
Junior Course, HMS Victory  
Senior Course, Hannah

**Check out our website for  
more information**

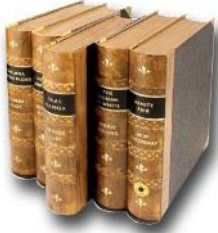
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Freshman Course  
Armed Virginia Sloop



# The Book Nook

Books of interest for the Model Ship Builder  
and nautical enthusiasts

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## Assortment of Dutch Shipbuilding Resources

From the Collection of Wayne Tripp

In a departure from the previous practice of specific book reviews, I thought I would offer a selection of documentary resources related to Dutch ship building (although I will admit that it is possible that other nations may have snuck in as well).

The Dutch had a long and successful history as mariners, maintaining a dominance over the seas for many years. It could be argued that a number of the innovations and improvements in ship design and construction developed and implemented by the Dutch served as a model for other sea faring nations.

In the following listing, there are two categories of sources listed. A “primary” source represents one that was written contemporary (at the same time) as the events concerned – it is original source documents. Many of those listed in below are in the original language, and are provided via Google Books as part of the amazing and ongoing effort to scan in for future generations old and vanishing books, manuscripts and more. It is important to realize that one shortcoming of this is that any foldout charts, drawings &c. are lost – only the exposed (when folded) portion is scanned.

The second category of materials is what is termed “secondary” sources. These represent published works (and occasionally unpublished) which are based on the information in primary sources. An example would be Anderson, R.C. 1927. *The Rigging of Ships: In the Days of the Sprintsail Topmast, 1600-1720*. Courier Corporation. There is no effort in this listing to separate the two types (for the most part, this will be evident by the publication dates), nor to review the relative strengths of the various secondary sources (some, as will be seen, provide a more thorough documentation of sources and detailed footnotes than others. This, however, is not necessarily the measure of the value, since the ability of the author to interpret and present information is also important).

So, then, for your review and discussion may I offer the following resources concerning Dutch Shipbuilding. Happy reading!

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[Chapter 34 Use of Pine Sheathing on Dutch East India Company Ships in N. G% C3% BCnsenin- in ed. Between Continents Proceedings of the twelfth International Symposium on Boat and Ship Archaeology Istanbul 2009 ISBSA 12 pp. 241 251](https://www.academia.edu/2276273/Chapter_34_Use_of_Pine_Sheathing_on_Dutch_East_India_Company_Ships_in_N._G%C3%BCnsenin-ed_Between_Continents_Proceedings_of_the_twelfth_International_Symposium_on_Boat_and_Ship_Archaeology_Istanbul_2009_ISBSA_12_pp._241_251)

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## Nautical Terms and their Origins

### Starboard

The Vikings called the side of their ship its board, and they placed the steering oar, the "star" on the right side of the ship, thus that side became known as the "star board." It's been that way ever since. And, because the oar was in the right side, the ship was tied to the dock at the left side. This was known as the loading side or "larboard". Later, it was decided that "larboard" and "starboard" were too similar, especially when trying to be heard over the roar of a heavy sea, so the phrase became the "side at which you tied up to in port" or the "port" side.

## Heraldic Ship Badges



### U.S. Navy USS Arleigh Burke (DDG 51)

**Shield:** Azure, within an orle or bordured of bezants, 23 visible, an armored fist wielding a mace, both Argent, and a canton of three bars, Azure Or and Gules, fimbriated Or.

**Crest:** On a wreath of the colors, Or and Azure, on a grassy knoll St. George in full armor Proper, a birch sprig on his helmet, with mantling Argent charged with a cross or upon the cross of St. George and mounted on a war horse Argent, harnessed Azure, spearing with a golden lance a sea dragon Gules gorged with a collar Azure bearing two Gold mullets, and the number 31 appearing on a harness ornament.

**Motto:** On a scroll Azure doubled Or the motto "FAST AND FEARED" in Gold letters.

**Seal:** The coat of arms emblazoned upon a white oval enclosed within a blue collar edged on the outer edge with a gold rope and inscribed with the words "USS ARLEIGH BURKE" at the top and " DDG 51" in base all in gold letters.

#### Symbolism

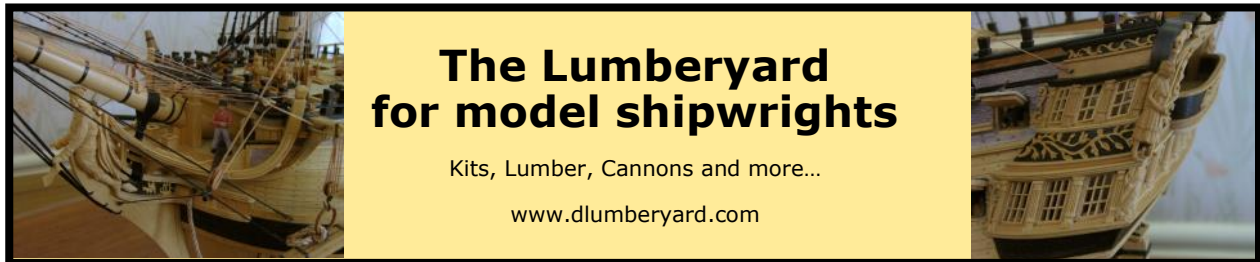
**Shield:** Blue and gold represent the Navy. The orle, symbol of distinction, stands for the outstanding achievements in battle of Admiral Burke against the naval power of Japan, a formidable foe. The fist and mace symbolize the offensive and defensive power of the new destroyer. The mace, also a symbol of authority, represents Admiral Burke's outstanding service as Chief of Naval Operations. It also refers to Admiral Marc Mitscher, an in-



fluent figure and mentor, for whom Admiral Burke served as Chief of Staff. Admiral Burke's Destroyer Squadron 23, represented by the bordure of 23 bezants, was the only United States Destroyer Squadron awarded a Presidential Unit Citation signified by the canton of blue, yellow, and red. The bezants also refer to the year 1923 in which Arleigh Burke was graduated from the United States Naval Academy at Annapolis. Twenty-three also reflects Admiral Burke's distinguished service on the staff of the Chief of Naval Operations as OP-23.

**Crest:** The mounted figure of St. George recalls Admiral Burke's celebrated victory in the Battle of Cape St. George over Japanese naval forces. His mantle bears a gold cross for the Navy Cross awarded to the Admiral. The birth branch on the helmet represents Admiral Burke himself, a reference to his name derived from the Scandinavian patronym Bjorkegren. The red sea dragon symbolizes Japanese naval power assaulted by the forces under Commander Burke's command. It is gorged with the two gold stars he was awarded for outstanding service. The lance implaling the dragon signifies ordnance on target. The capabilities of the new destroyer, the most powerful and survivable ever built, are signified by the full armor and equipment of the warrior St. George. The Admiral's nickname "31-knot Burke" is recalled by the number 31 on the horse's harness.

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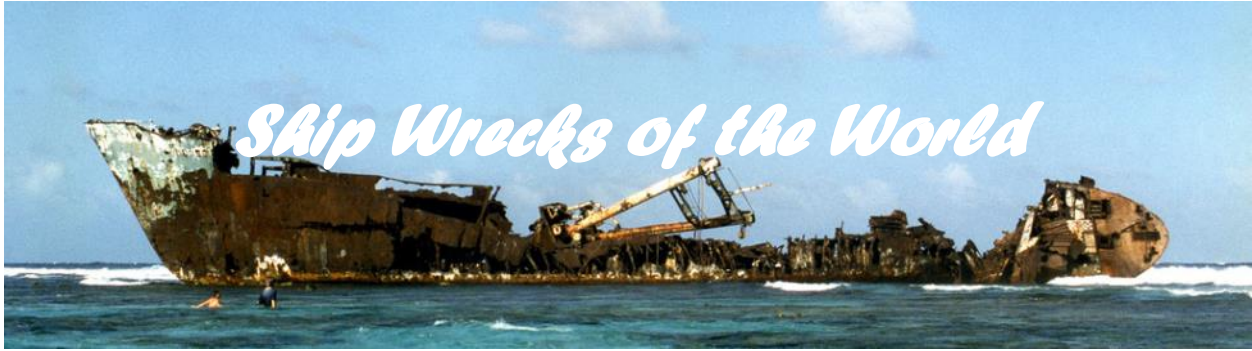
### **Troopboat (1758) 1:24 scale**

A contemporary full hull model of a troopboat (1758) complete with a full complement consisting of 20 sailors rowing and 46 Marines, including a drummer. At this scale, the hull measures 36 feet in length by about 10 feet in the beam and would have an approximate tonnage of 12 burden. It has been built in clinker fashion with a round bow and a square transom stern, with the lower planking varnished and the sheer strakes painted in red and black. The troopboats were carried in specially adapted transports hired by the Admiralty, and could be partially dismantled so that they would nest on top of each other for easy storage. They were used for landing soldiers on enemy shores, in particular the French coast in 1758 and also at the capture of Havana and St Lucia. A half-pound swivel-gun mounted on the bow gave added protection when going ashore under fire. This model is one of a set of four troopboat models on loan from Greenwich Hospital (SLR0499, SLR2538, SLR2539).

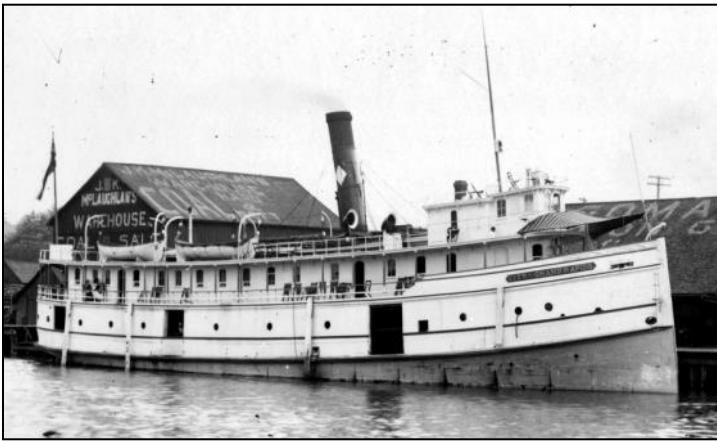
Materials:

bone; brass; cork; fur; paint, silk, clay; paper; silver; wood

Measurements: Overall model: 130 x 491 x 370 mm



## ***City of Grand Rapids***



Gross tonnage: 399  
Length: 37.34 m  
Breadth: 7.5 m  
Depth: 2.83 m  
Type: Propeller coastal steamer  
Built: 1879 at Grand Haven, Michigan

The *City of Grand Rapids* was a double-decked steamer working the coastal trade between Owen Sound and the villages of Manitoulin Island and the Bruce Peninsula on the Canadian Great Lakes. On the evening of October 29, 1907, fire broke out aboard the Grand Rapids while docked in Little Tub Harbor. Under the command of Captain Alex Craigie, the tug *Clucas* took the burning vessel in tow, pulled it out of the harbor, and released it. The *City of Grand Rapids* then drifted into Big Tub Harbor. It continued to burn, and eventually came to rest at the head of the harbor, where it burned to the waterline, rolled to starboard and sank.

The Wreck Today -The *City of Grand Rapids* lies in 0 to 3 meters of water, just south of the *Sweepstakes* at the head of Big Tub Harbor. The bottom of the iron-sheathed hull is intact and filled with coal used for the boilers, as well as silt. The charred tips of the frames can be seen on both the starboard and port sides. Lying on the bottom and clearly visible mid-way along the starboard side is part of the smoke stack and a metal frame from the piano that once entertained the guests onboard. The steam engine crankshaft, connecting rods, part of the boiler, driveshaft, pumps and shaft coupling are all present. The rudder and propeller from the wreck were removed in 1968 and are on display outside of the Tobermory and St. Edmunds Township Museum.