Research and reconstruction of Wooden Ships



02.01 Lines Drawings I

Filipe Castro Last edited: June 2020



Lines drawings are a method to create a 2D representation of a 3D object.



Plate 10. Chesapeake Bay built sloop MEDIATOR of 1741, designed for the West Indian trade.

Chapelle, Howard, 1983. *The Search for Speed Under Sail 1700-1855*. London : Conway Maritime Press.



A set of lines is a collection of projections of the intersections of a hull and a series of parallel, orthogonal planes.





Archaeologists use lines drawings to try to reconstruct the forms of old watercraft.





Unless extensive hull remains are accurately recorded, lines drawings from shipwreck remains are conjectural. They should be used as an educated guess and a working hypothesis, not definitive reconstructions.





The normal reconstruction process entails three phases:

- 1. The development of a set of lines drawings;
- 2. The development of a set of construction drawings; and
- 3. Intact stability tests to assess the plausibility of each reconstruction attempt.

Reconstructing shipwrecks from archaeological remains is an iterative process that is best done publicly, to incorporate pier review of each step and decision taken.





Computers have changed the reconstruction process radically in the past decade, and should be used without prejudice.

It is important to learn how to draw by hand, but there is nothing we can do today with a pencil and an eraser that cannot be done with a computer mouse.





Engineers use several types of projections. This is a widely accepted and tested process, and all the archaeologist has to know is what kind of projection he will use and follow the rules.



First angle projection (Europe): the object is in a box and each view is pushed through and projected in the plane furthest from it.









Third angle projection (US): the object is in a box and each view is projected in the plane closest from it.





Images: Wikimedia commons

In general, representations of the faces of a volume are self-evident.



In general, representations of the faces of a volume are self-evident.





Floor timber faces. Cais do Sodré shipwreck.











J. Rhicard Steffy Reconstruction of the Serçe Limanı shipwreck

Conventions:

- 1. Bow always represented to the left;
- 2. Plans called Sheer, Body and Half-Breath;
- 3. Sections named A, B, C, etc., to the bow and 1, 2, 3, etc. to the stern;
- 4. Midship section marked with the symbol \mathfrak{M} .

In this phase of your learning curve it is best to make the midship section the lowest and widest point of the caprail (or sheer) line.



J. Rhicard Steffy Reconstruction of the Serçe Limanı shipwreck



Conventions:

- 1. Bow always represented to the left;
- 2. Plans called Sheer, Body and Half-Breath;
- 3. Sections named A, B, C, etc., to the bow and 1, 2, 3, etc. to the stern;
- 4. Midship section marked with the symbol \mathbf{M} .



J. Rhicard Steffy Reconstruction of the Serçe Limanı shipwreck







The first step is to determine the length and breath of the vessel we want to draw. Lines drawings represent the inner surface of the hull planking: the posts are drawn outside the end lines.





The first step is to determine the length and breath of the vessel we want to draw. Lines drawings represent the inner surface of the hull planking: the posts are drawn outside the end lines.









To trace we have to define a few basic lines, starting with the keel and posts, which have to be represented in the three plans.





The next step is to draw the sheer line. It must be defined in two of the views (preferably half-breath and sheer plans) and deduced in the third view.





To draw the sheer line on the body plan we need to place sections on the sheer and half-breath plans. It is better to place the sections at even intervals.





To draw the sheer line on the body plan we need to place sections on the sheer and half-breath plans. It is better to place the sections at even intervals.





Once placed and numbered the sections on the sheer and half-breath plans, it is possible to draw the sheer line on the body plan using offsets.





Once placed and numbered the sections on the sheer and half-breath plans, it is possible to draw the sheer line on the body plan using offsets.





Once placed and numbered the sections on the sheer and half-breath plans, it is possible to draw the sheer line on the body plan using offsets.





Now the sheer line is traced on all three views and we can start tracing the sections on the body plan. Because the sections appear as straight lines on the half-breath and sheer plans, we have complete freedom to trace the sections. Don't forget: the midship section is supposed to be symmetrical.





Midship section:





The midship section is going to determine much of the shape of the hull. The remaining sections should be traced as narrower versions of the midship frame.





Section A.





Section B.





Section C. Note that the bottom of section C hits the stem, and therefore must be traced as such.





Section 1:





Section 2:





Section 3:







Once the sheer and the sections are traced in the three views, we need to fair the drawing by sectioning it longitudinally, in horizontal parallel planes (waterlines), and in vertical parallel planes (buttock lines).

This process will be explained in the part two of this section of the class.

Image from Pinterest





Steffy, J. Richard, 1994. *Wooden Shipbuilding and the Interpretation of Shipwrecks*, College Station: Texas A&M University Press.