

# Research and reconstruction of Wooden Ships



## 02.02 Lines Drawings II

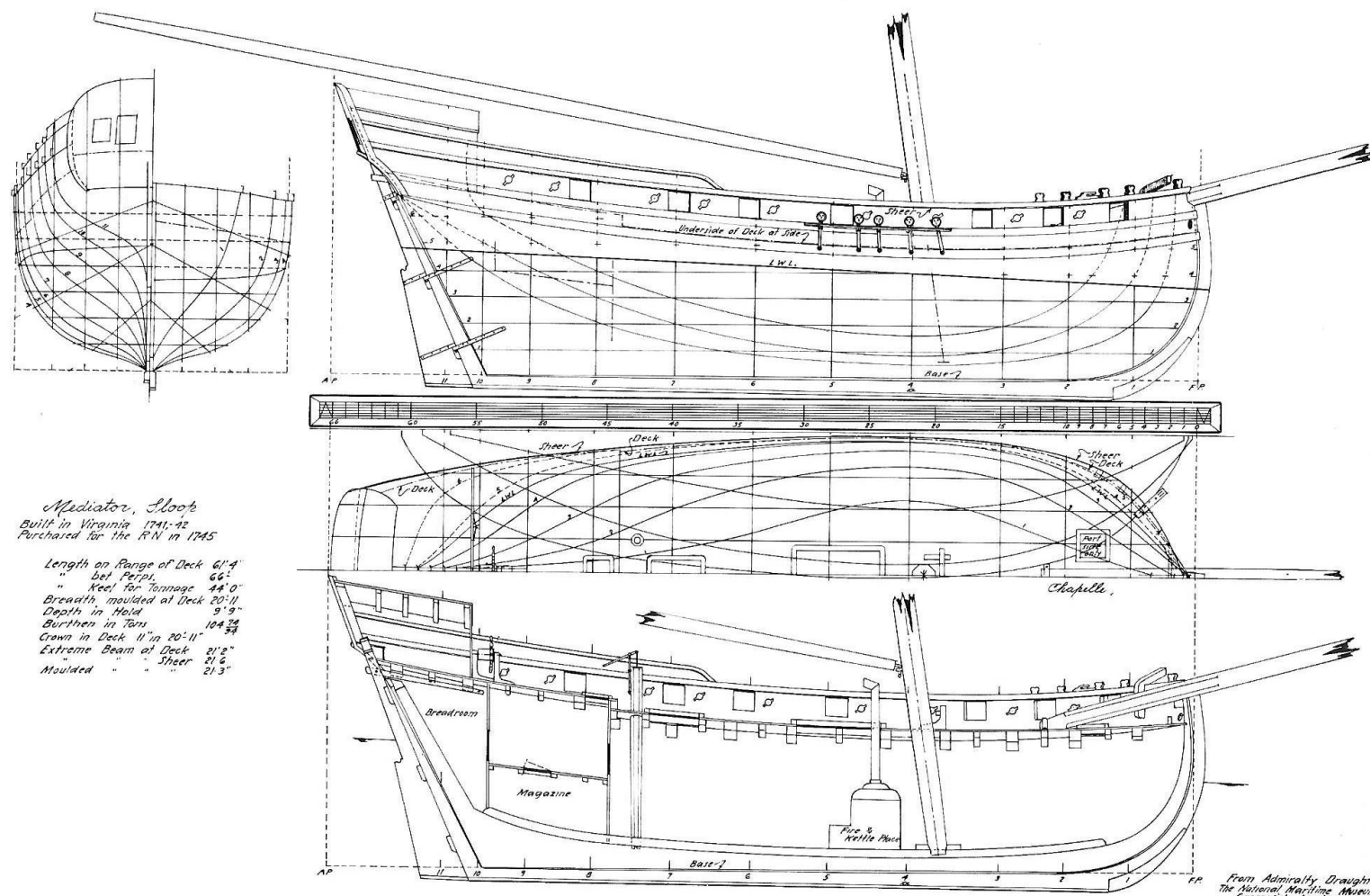
Filipe Castro  
Last edited: June 2020



# Lines Drawings



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



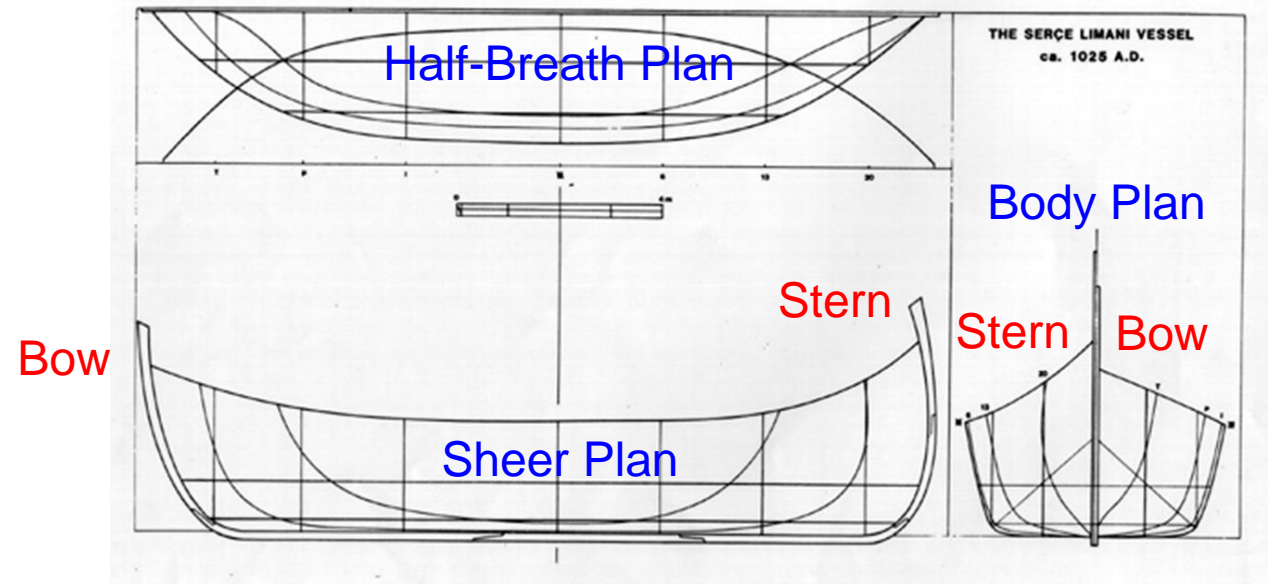
Chapelle, Howard, 1983. *The Search for Speed Under Sail 1700-1855*. London : Conway Maritime Press.

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



## 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  $\bowtie$ .



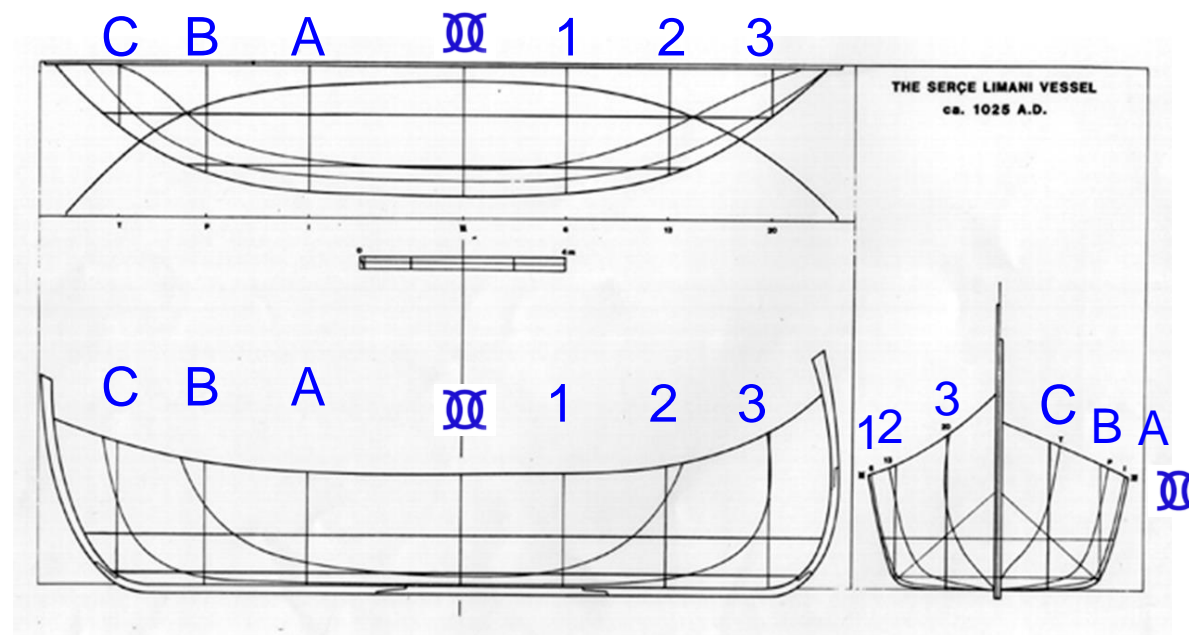
J. Rhicard Steffy Reconstruction of the Serçe Limani shipwreck



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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 **∞**.

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.



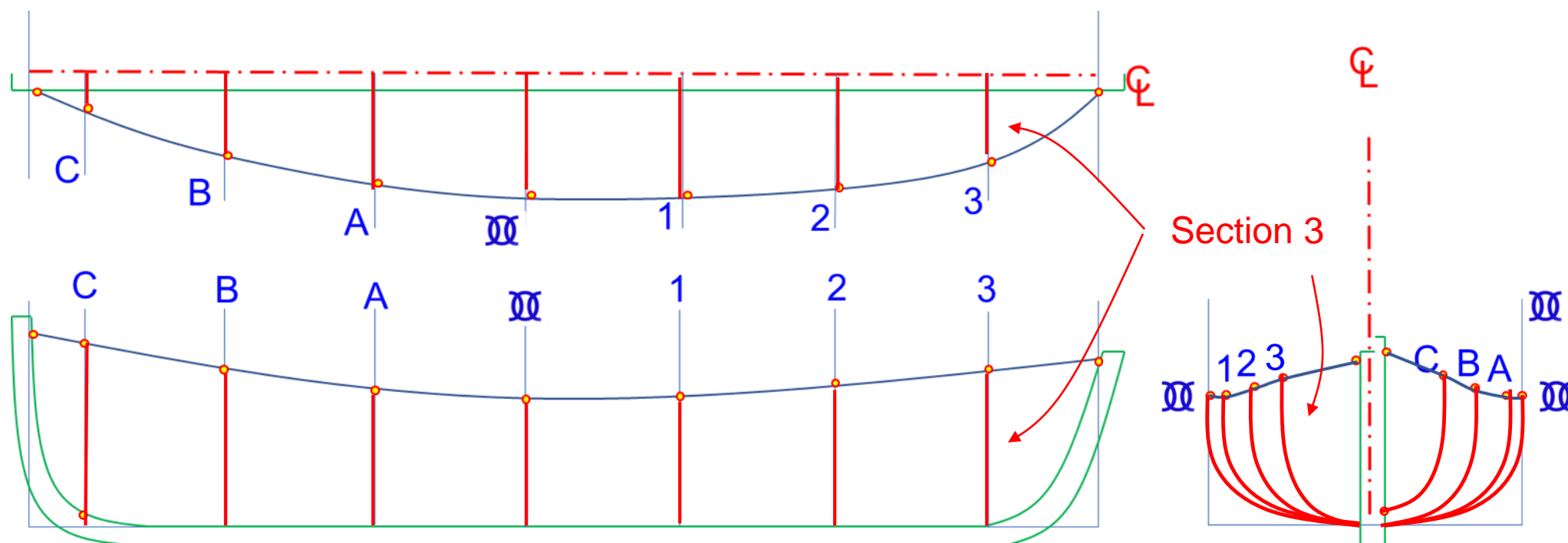
J. Rhicard Steffy Reconstruction of the Serçe Limani shipwreck



# Lines Drawings



Last slide from the pervious class: we have seen in 02.01. that once we have defined the keel, posts, sheer, and sections of a vessel, the following process is to fair the lines, and that this is done by sectioning it longitudinally, in horizontal parallel planes (waterlines), and in vertical parallel planes (buttock lines).

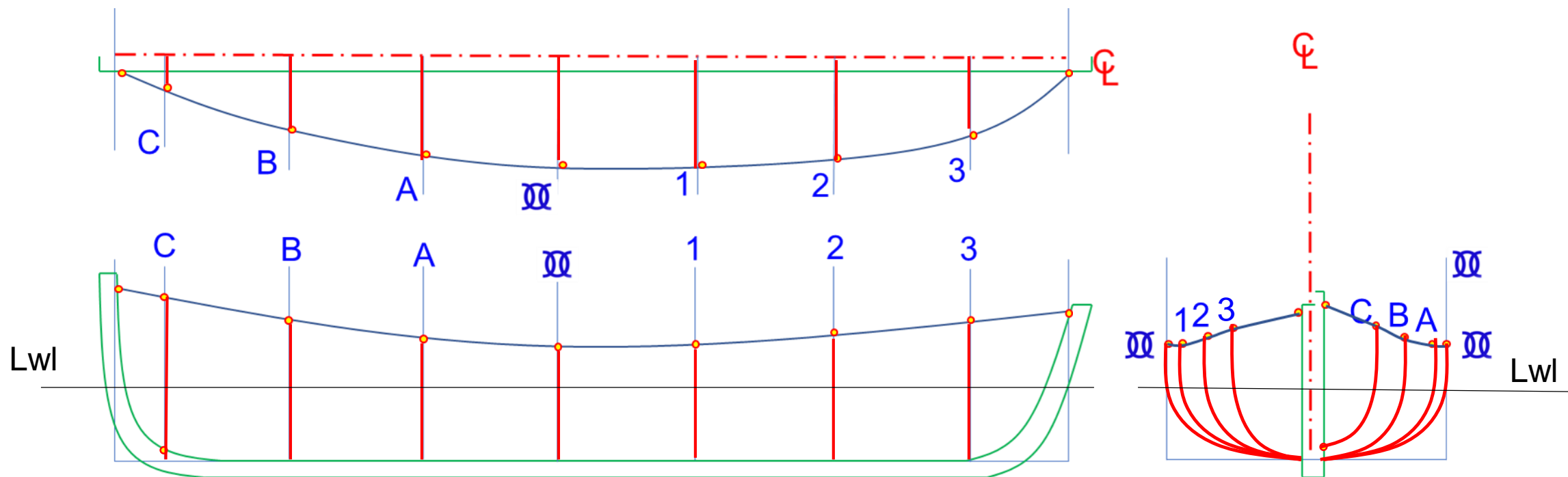




# Lines Drawings



Tracing the waterlines. For the purpose of this class we will trace two waterlines and consider the upper one the load water line, which for this exercise is parallel to the plane that contains the keel.

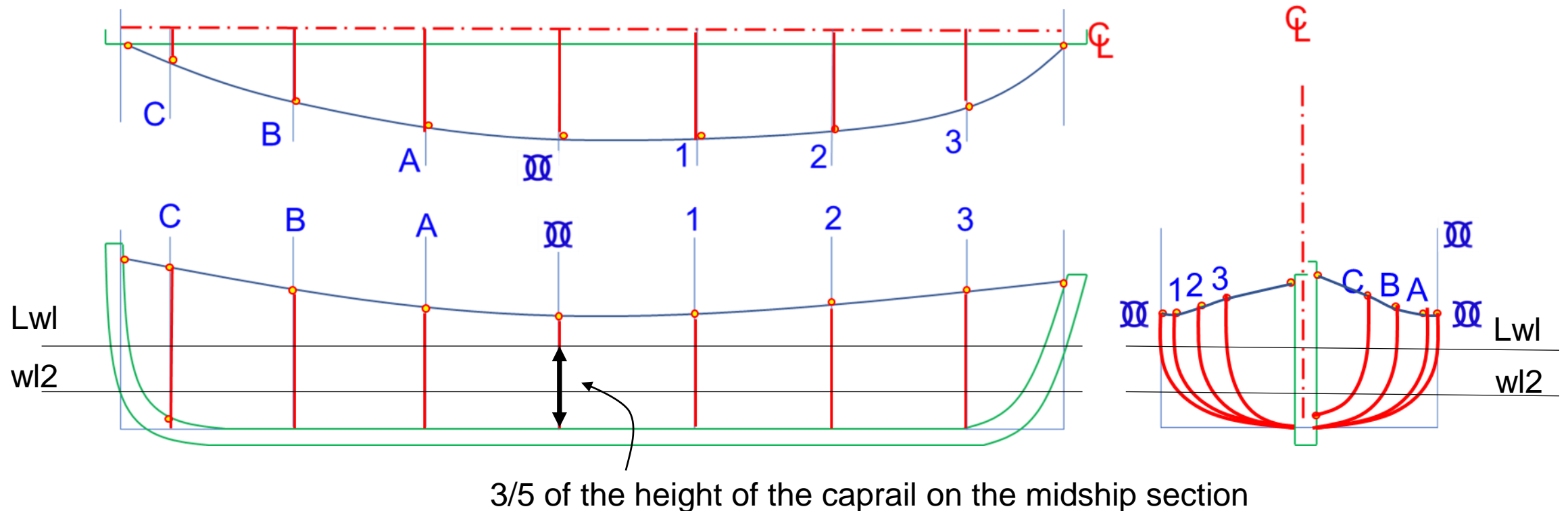




# Lines Drawings



A good rule of thumb is to place the load waterline at about  $\frac{3}{5}$  of the height of the caprail over the upper surface of the keel (base line) and place waterline 2 halfway, so that they are equidistant. Waterlines are lines in the body and sheer plans.

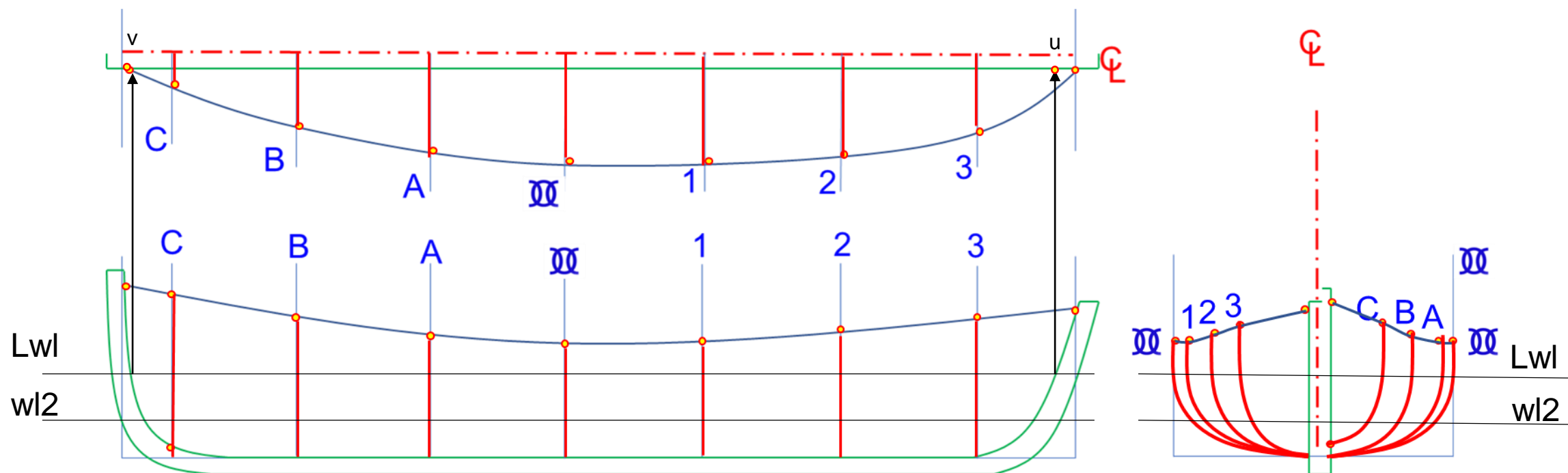




# Lines Drawings



The next step is to trace the waterlines on the half-breath plan and fair them through an iterative process, which entails going back and changing the section lines in order to obtain a smoother hull surface. The first step is to plot the points where the waterline starts and ends on the posts: points v and u.

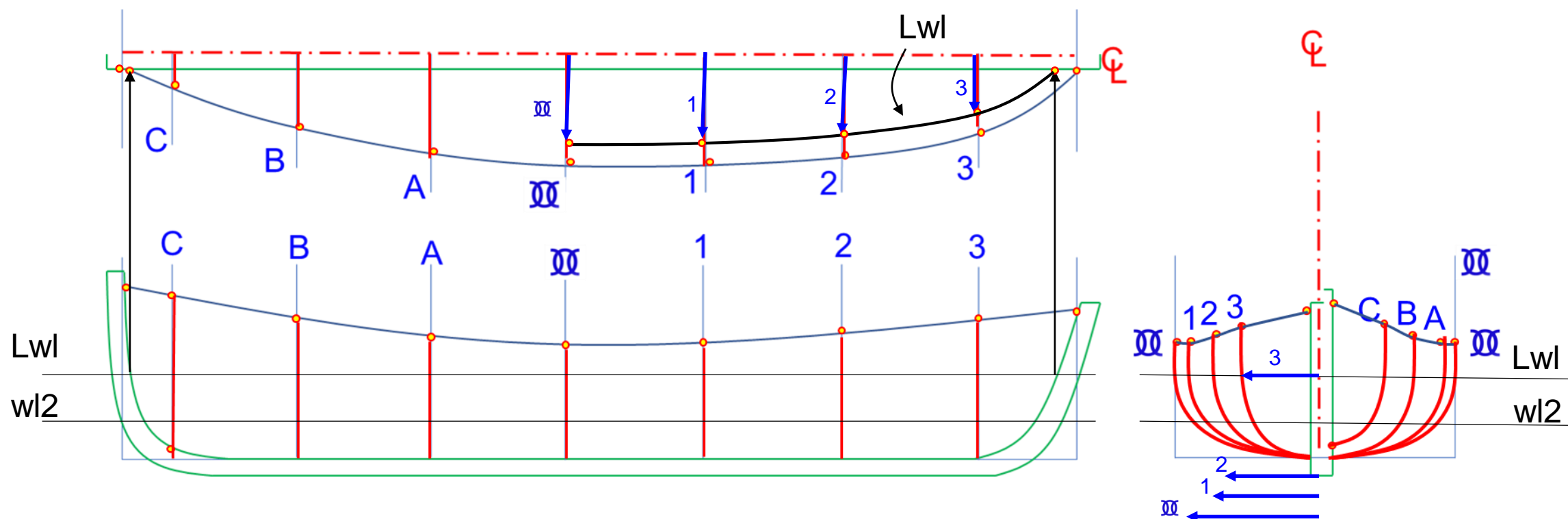




# Lines Drawings



The way to trace the waterlines on the half-breath plan is by measuring offsets along the waterline planes on each section. We will trace the load waterline first.







# NADL

Figure 1 consists of two schematic diagrams, (a) and (b), illustrating the proposed method for the design of a curved beam.

(a) Top view: This diagram shows the beam profile in the horizontal plane. The beam is represented by a black curve. The coordinate system is defined by the horizontal axis  $Lwl$  and the vertical axis  $w/2$ . The beam is divided into segments labeled A, B, C, 1, 2, and 3. Points A, B, and C are marked on the beam profile. The beam is shown in a curved shape, with the ends of the beam at the top and bottom. The beam is shown in a curved shape, with the ends of the beam at the top and bottom.

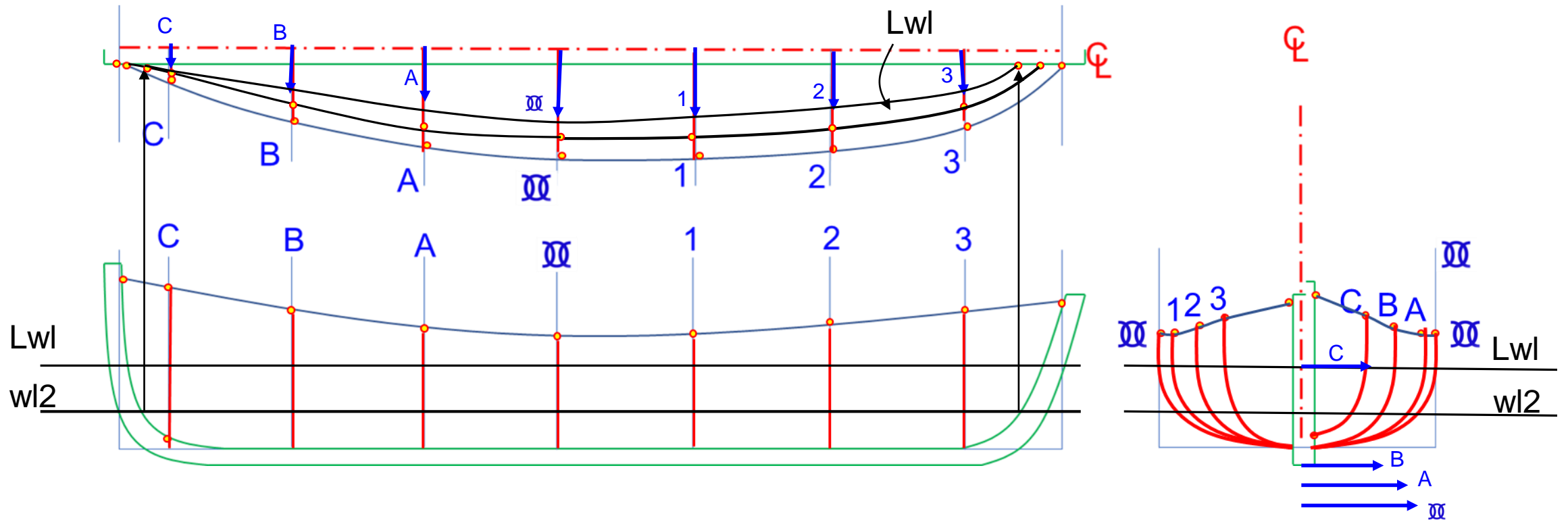
(b) Side view: This diagram shows the beam profile in the vertical plane. The beam is represented by a black curve. The coordinate system is defined by the horizontal axis  $Lwl$  and the vertical axis  $w/2$ . The beam is divided into segments labeled A, B, C, 1, 2, and 3. Points A, B, and C are marked on the beam profile. The beam is shown in a curved shape, with the ends of the beam at the top and bottom. The beam is shown in a curved shape, with the ends of the beam at the top and bottom.



# Lines Drawings



The process is now exactly the same to the bow and the lower, waterline 2.

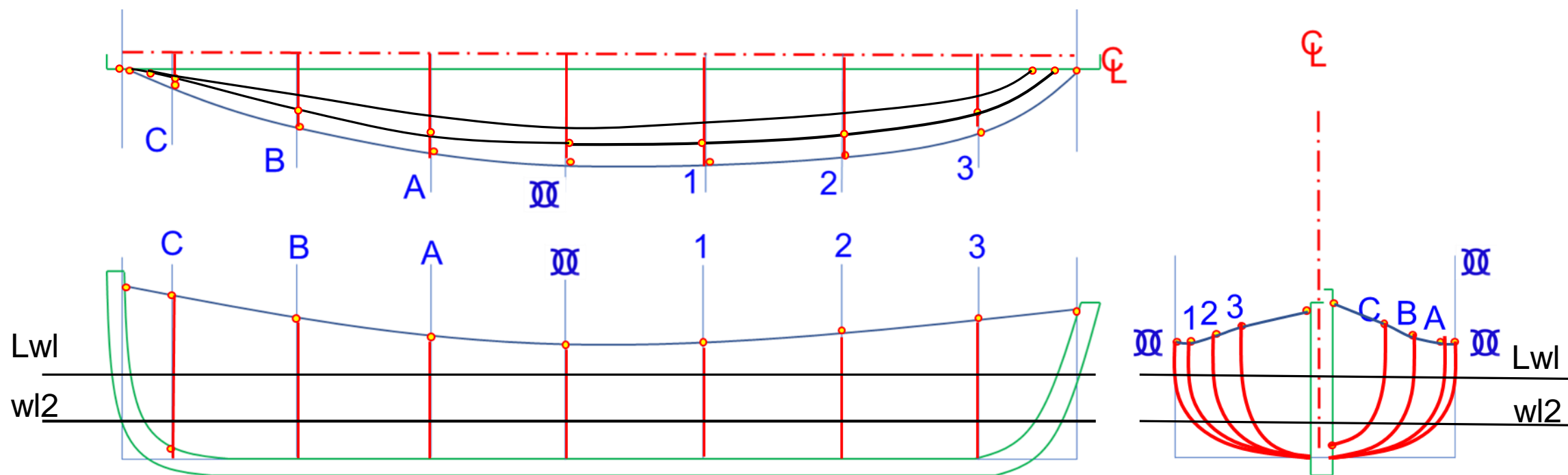




# Lines Drawings



The process is now exactly the same to the bow and the lower, waterline 2. Once the waterlines are faired and the sections are adjusted to the waterlines' shapes, the next step is to draw the buttock lines.

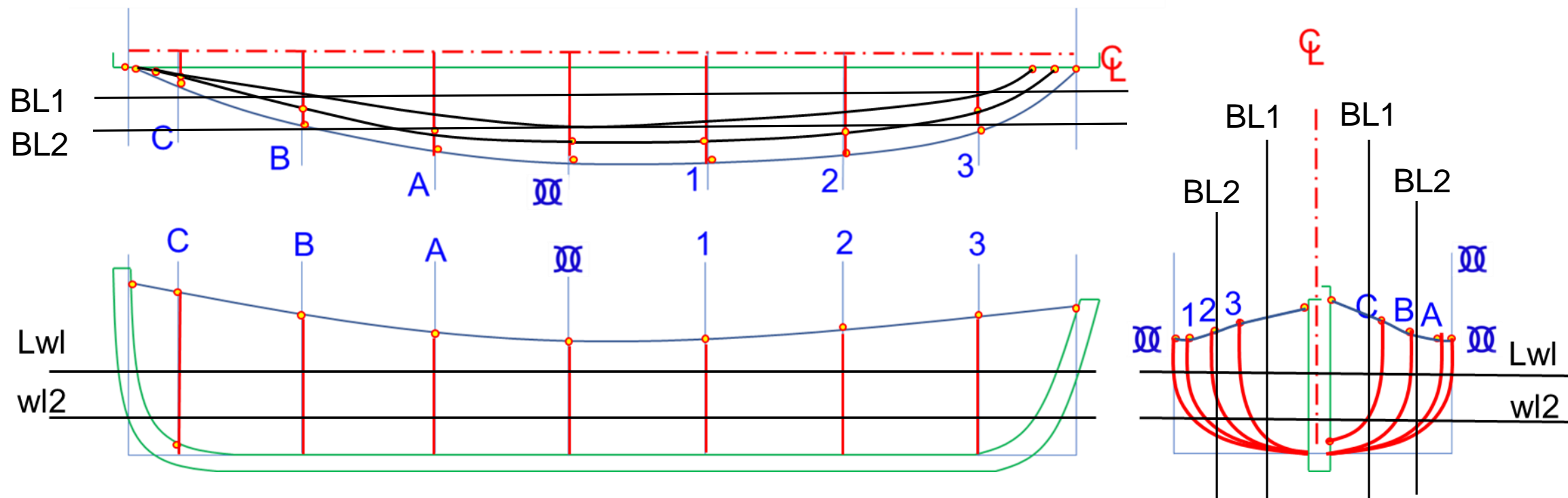




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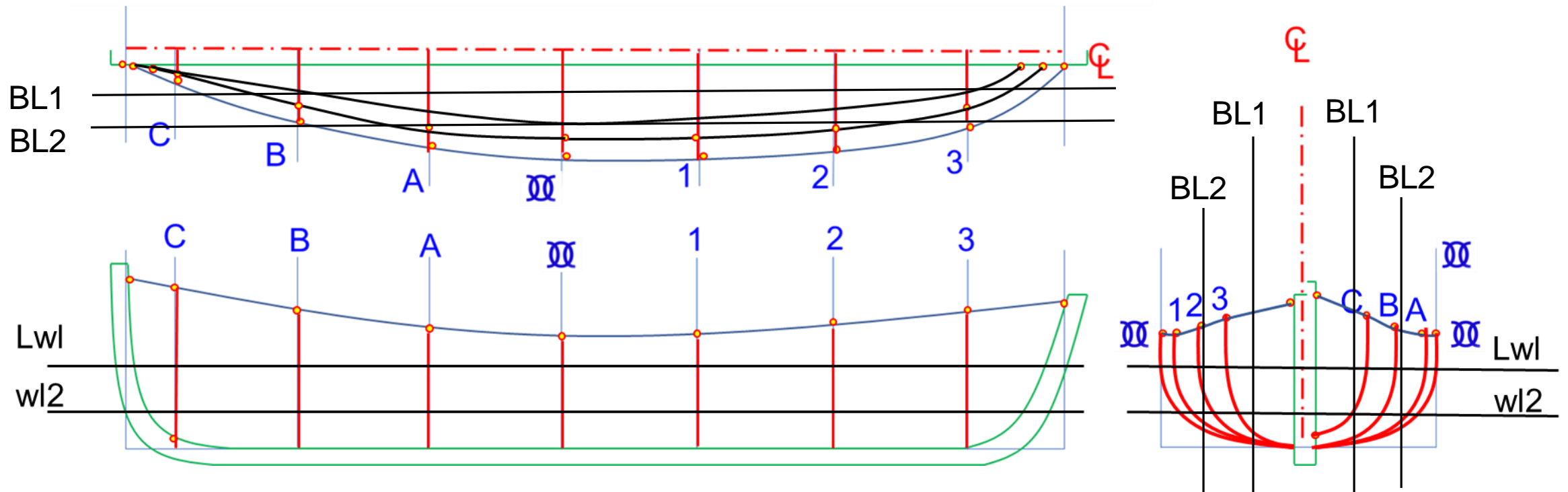




# Lines Drawings



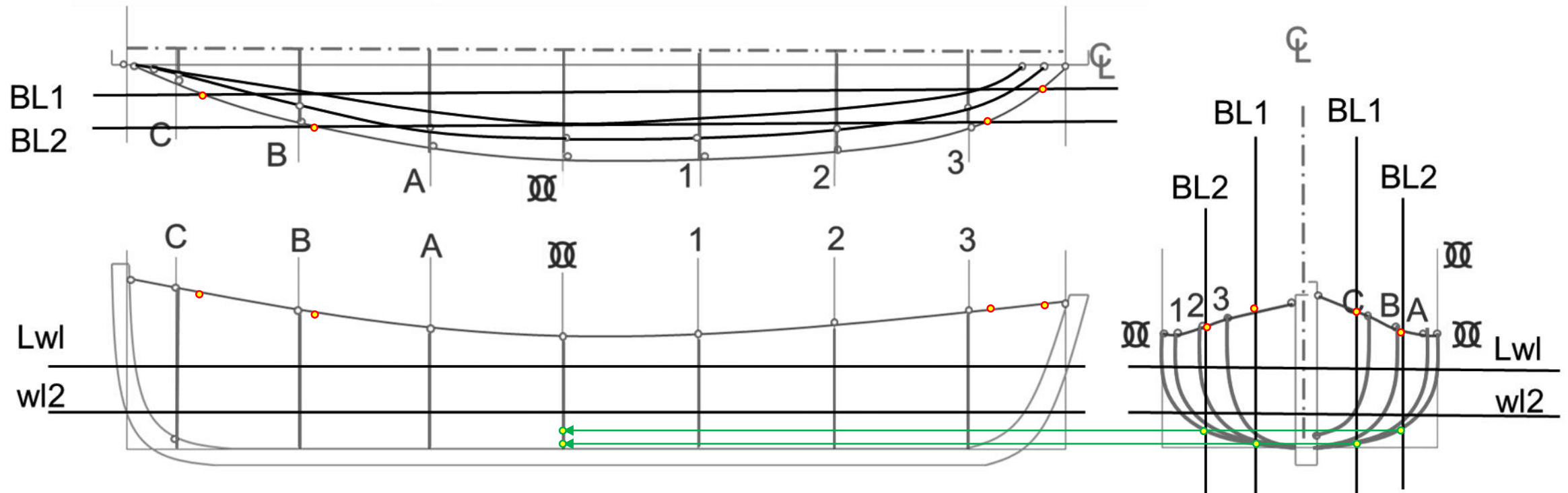
The buttock lines appear as straight lines on the body and half-breath plans, and must be traced on the sheer plan.





# Lines Drawings

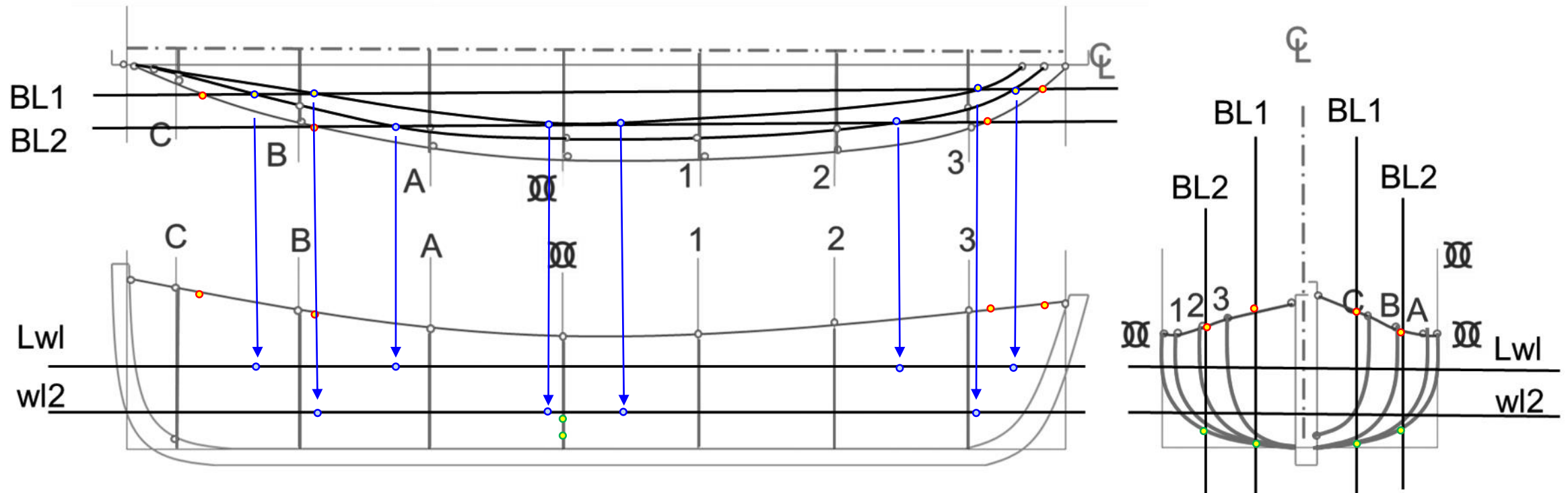
The second step is to mark the points where the buttock planes hit the lower hull on the midship section:





# Lines Drawings

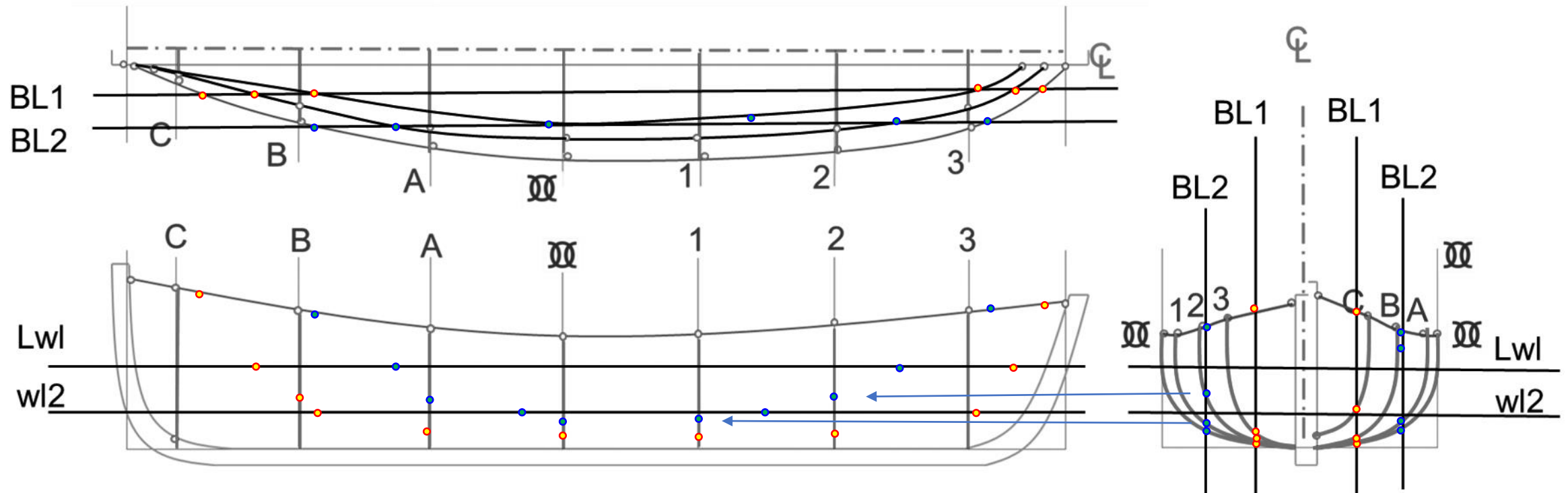
The third step is to mark the points where the buttock planes hit the waterlines:





# Lines Drawings

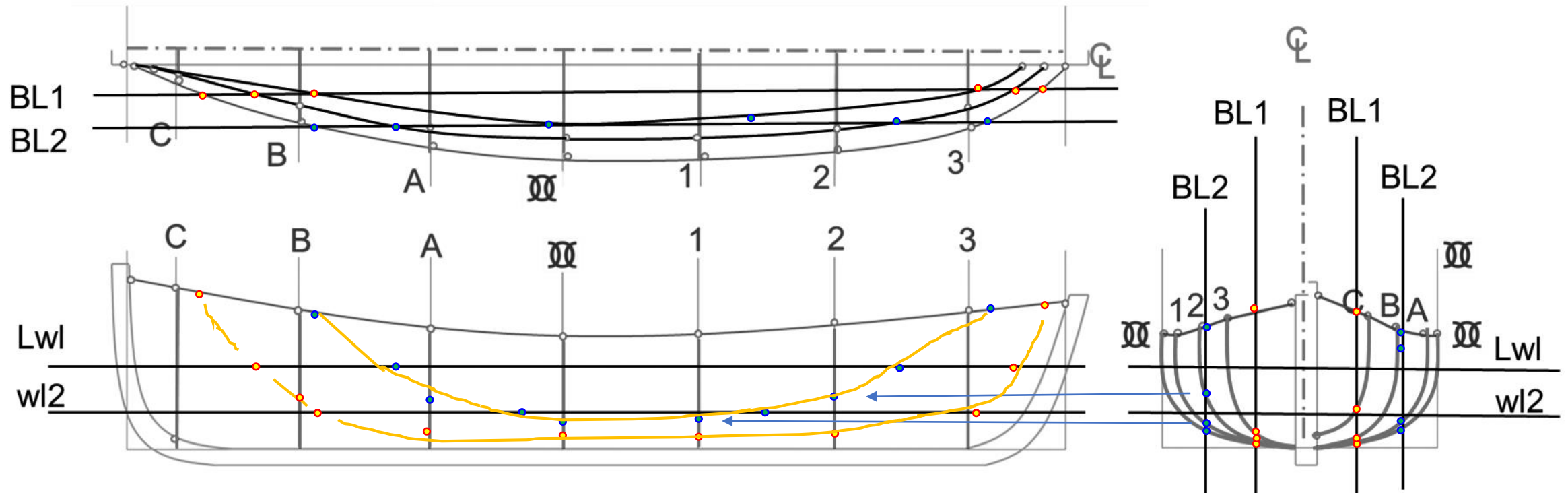
The forth step is to mark the points where the buttock planes hit the sections:





# Lines Drawings

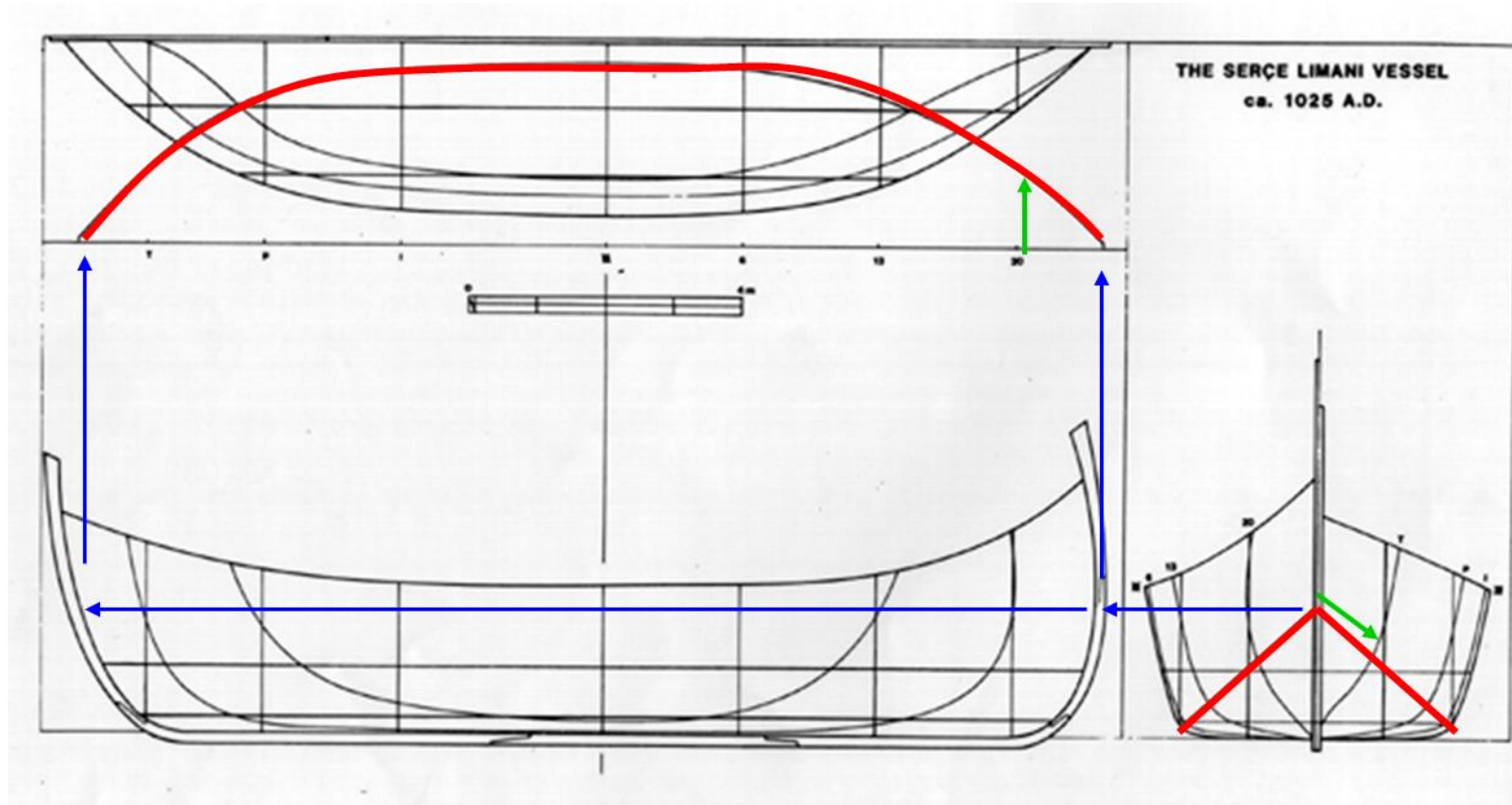
The fifth step is to fair the buttock lines through an iterative process, going back to the waterlines, then the sections, until the ship lines are fair.





# Lines Drawings

In the next class we will look at diagonals and basic hull calculations.





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