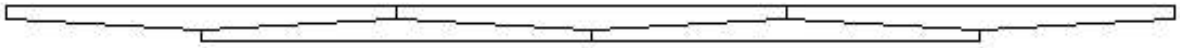
Principles of Butt Plan for HMS Victory

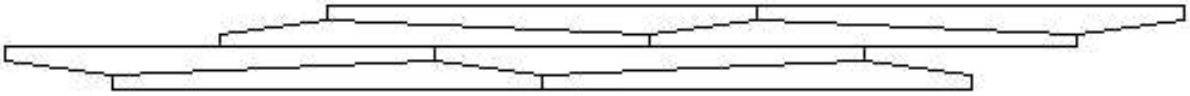
The Purpose of a butt plan is to achieve maximum longitudinal strength with available timber stocks.

It is assumed from historical evidence that the Victory was possibly planked using 'Top & Butt' method for the main wales and 'Anchor Stock' method on the channel wales.

The anchor stock planks are interlocked with a shift of butt pattern that is one half of the planks length over 2 strakes e.g. A 24 feet plank will have a 12 feet shift of butt. The width of the butt at the plank ends is usually 1/3rd of the width of combined width of the two strakes.



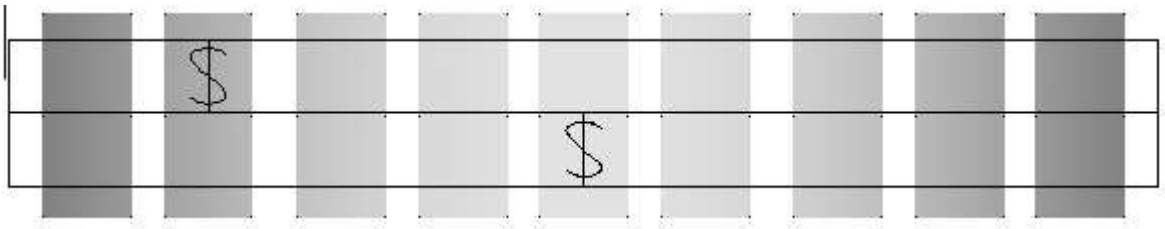
The top & butt planks are interlocked with a shift of butt pattern that is one quarter of the planks length over four strakes e.g. A 24 feet plank will have a 6 feet shift of butt.



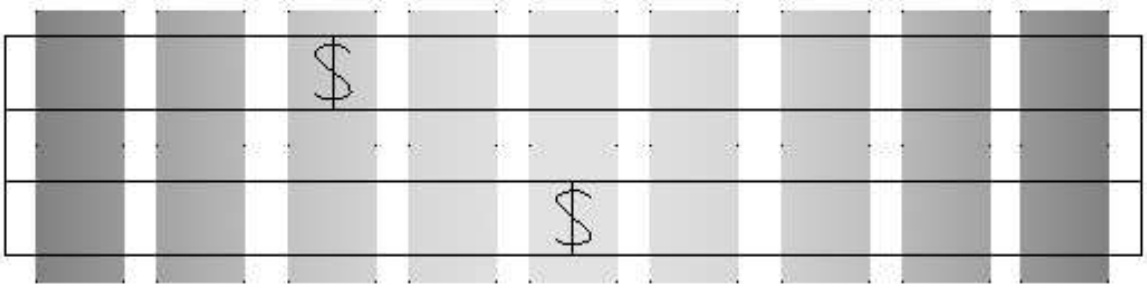
Plank length is determined by the availability of timber and the requirement to have a good shift of butt to avoid longitudinal weakness. Other factors such as gun port spacing will also need to be considered when producing a butt plan.

General minimum requirements for planking wooden vessels are as follows;

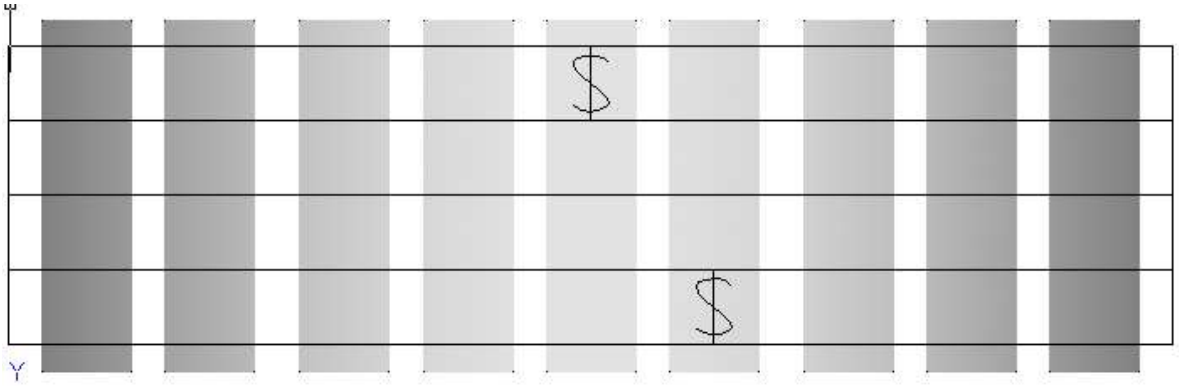
A butt between two plank strakes should not be closer than two frame spaces between.



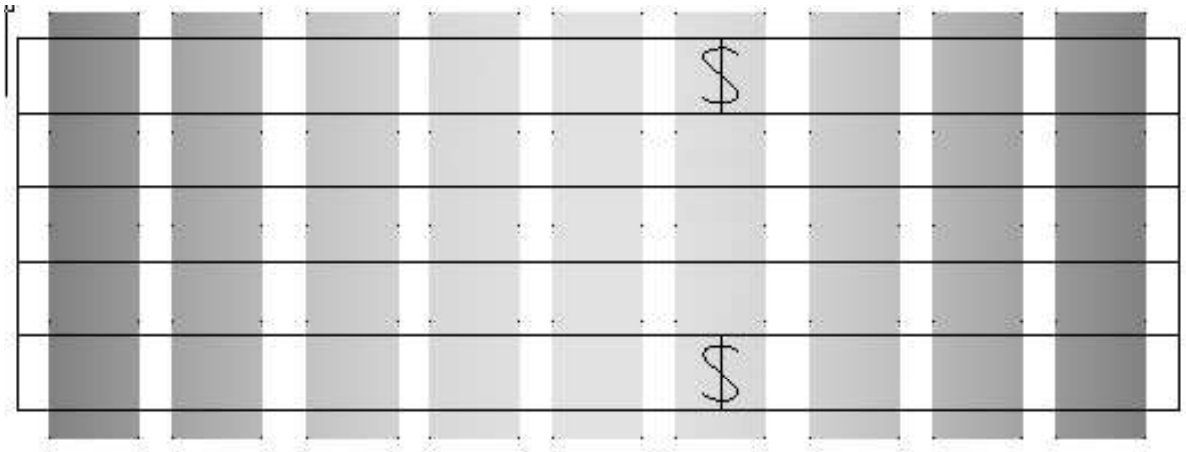
If a butt is to be positioned with one strake between it should not be closer than one frame space between



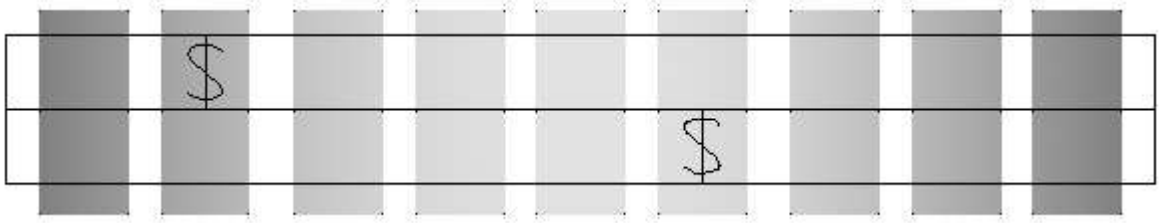
If a butt is to be positioned on the next frame it should not be closer than two plank strakes between



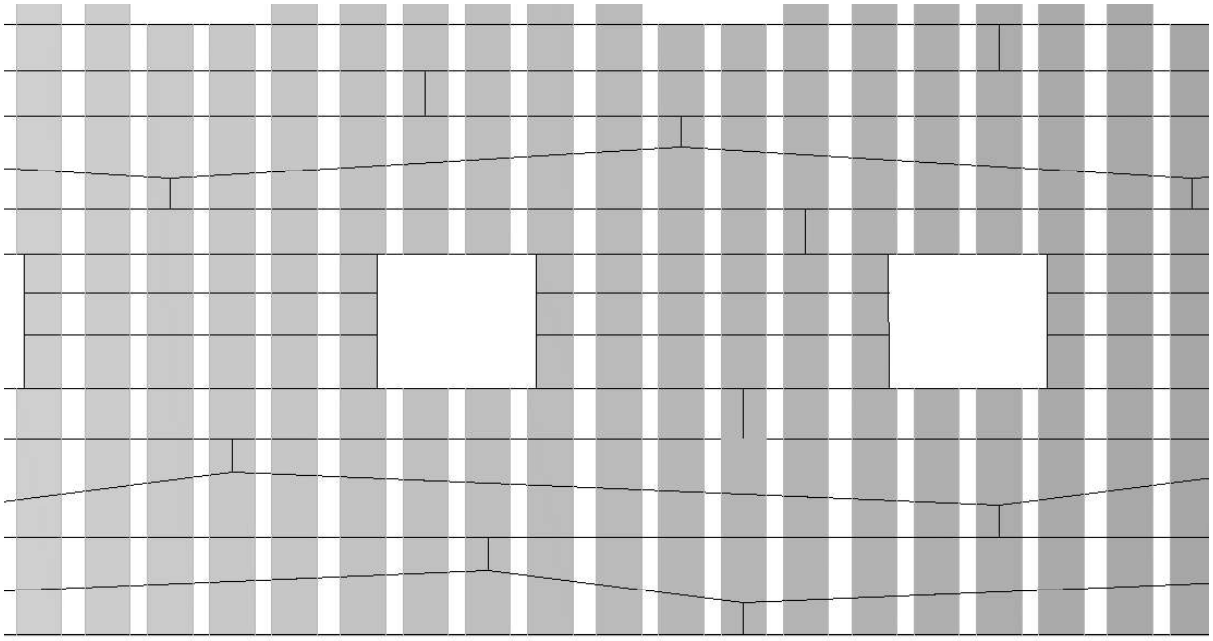
If a butt is to be positioned on the same frame it should not be closer than three plank strakes between.



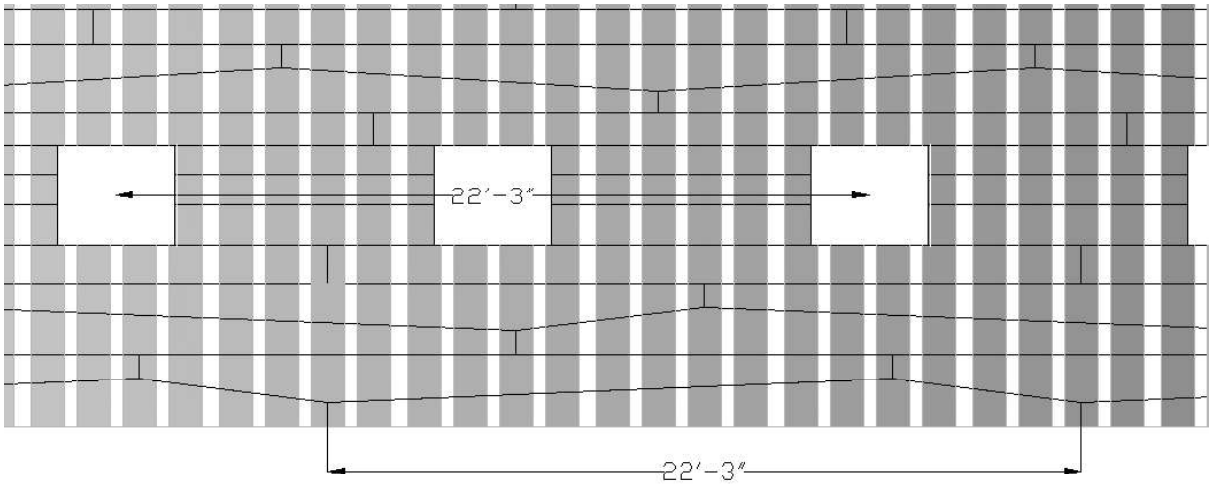
The frame spaces on Victory are approximately 16” apart which translates to a 4 feet shift of butt. This system on a vessel with greater frame spacing is sufficient but it is a little too close for Victory’s shift of butt. If three frame spaces were between butts then a 5 feet 6 inch shift could be achieved.



Butts should not be positioned immediately above or below gun ports preferably two planks should be between a gun port opening and a butt. This factor is important to maintain longitudinal strength throughout the ship and also suggests that plank length is closely tied into gun port spacing.

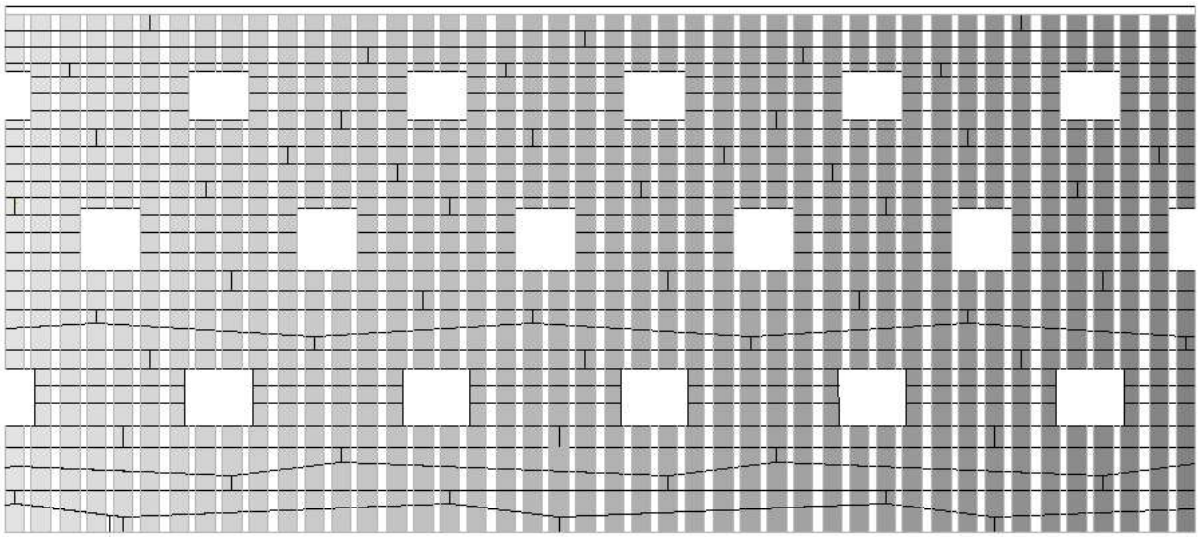


Amidships Victory's gun ports are approximately 11 feet 11/2" inch centre spacing. To achieve a suitable butt plan that avoids butts being positioned too close to gun ports it is possible that the length of plank needs to be in multiples of gun port centres. Plank length in this case would be approximately 22 feet 3". The distance between gun port centres varies a little in HMS Victory and plank lengths will vary slightly to suit.

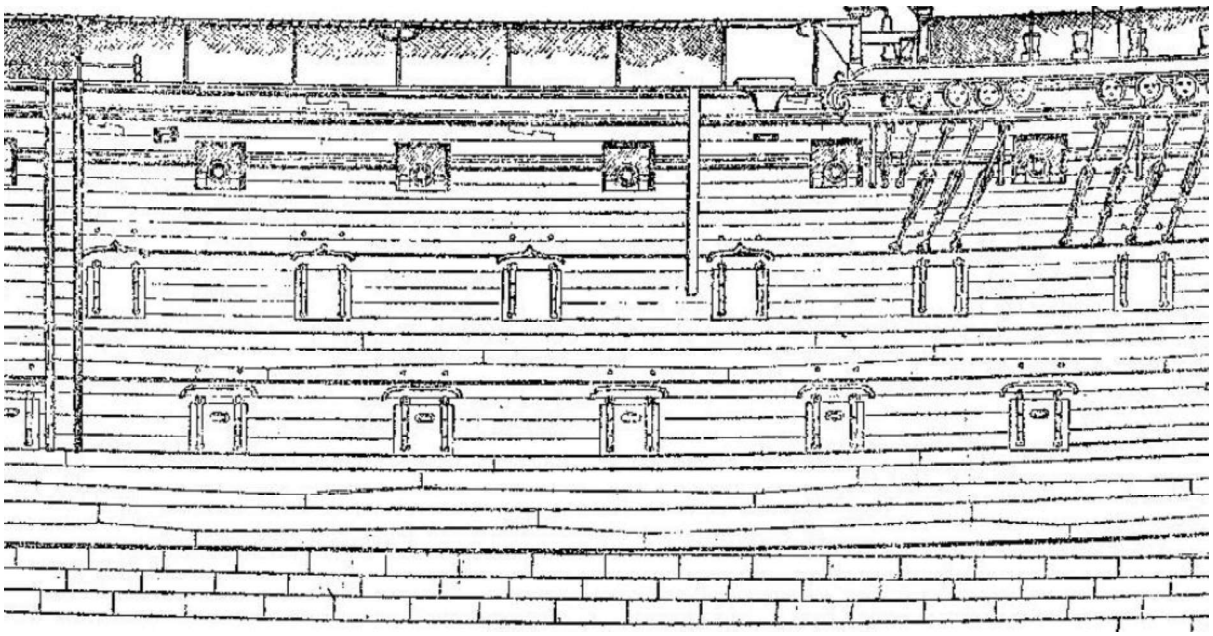


The butt plan will however vary from the perfect model a little in Victory because the gun ports do not follow the plank shear line. The deck layers and corresponding gun ports are laid with less sheer than the external hull planking strakes. This difference in sheer is also compounded by the hog of the ship.

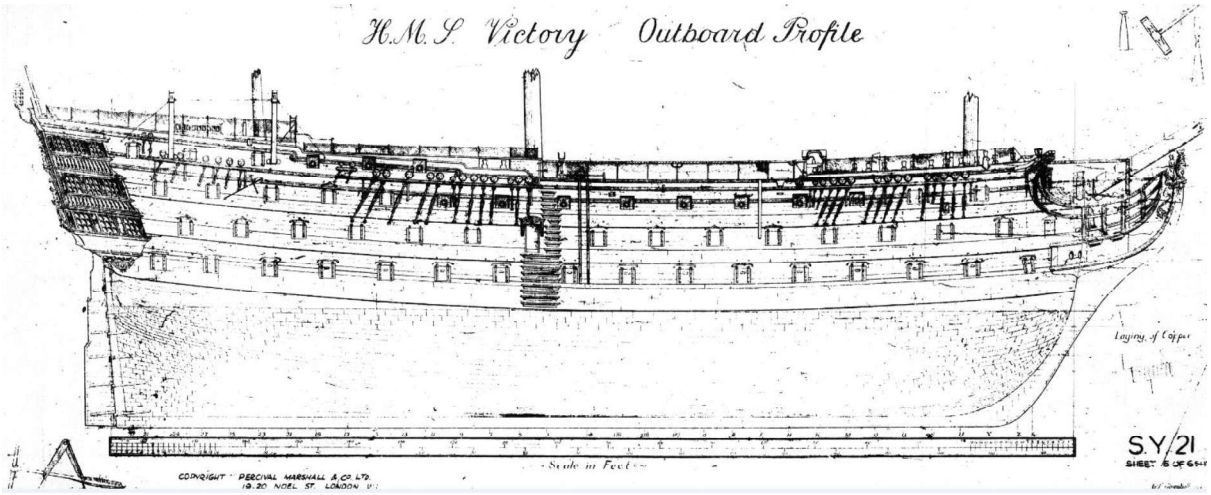
The drawing below is a butt plan on a diagrammatic midship profile of HMS Victory. The butt plan takes in to account the information and general rules on planking from the preceding text and drawings.



The drawing below is similar to the diagrammatic midship profile of HMS Victory above but it a drawing by G F Campbell and published by Percival Marshall in 1955. Campbell's drawing is interesting because it possibly predates the removal of the copper sheathing below the waterline and the major replanking and reframing work to the ship sides. What is clearly evident from the drawing is the existence of top and butt planking for the main wales and anchor stock planking for the middle wales. Also of note the butt joins in the anchor stock and top and butt appear too close to the gun ports.



The full profile drawing of HMS Victory by G F Campbell clearly shows how the gun ports at the stern and bow cut into the wale strakes. It may be necessary to slightly increase standard plank lengths where plank stakes become interrupted by gun ports at the bow and stern to avoid short planks which are undesirable and are a weakness to the structure.



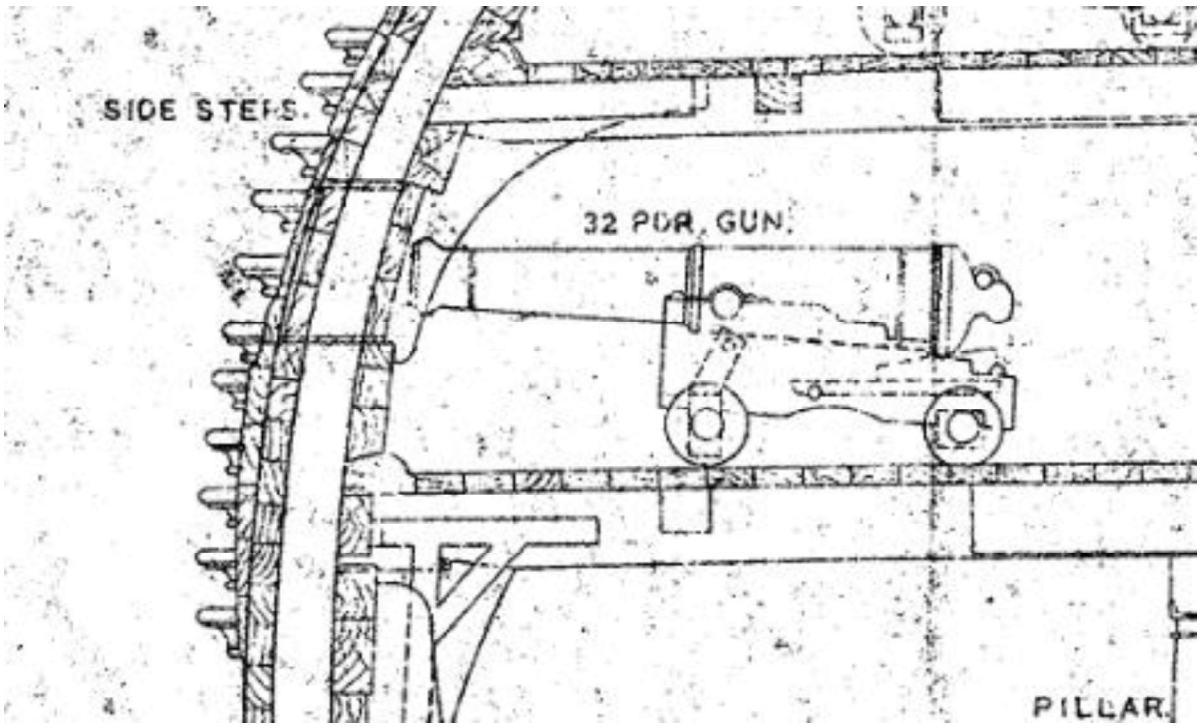
Plank widths also need to be considered when producing a butt plan because the shear of the outer planking is different to the internal deck shear.

The existing shear of HMS Victory may have been adjusted to disguise the substantial hog along the length of the ship.

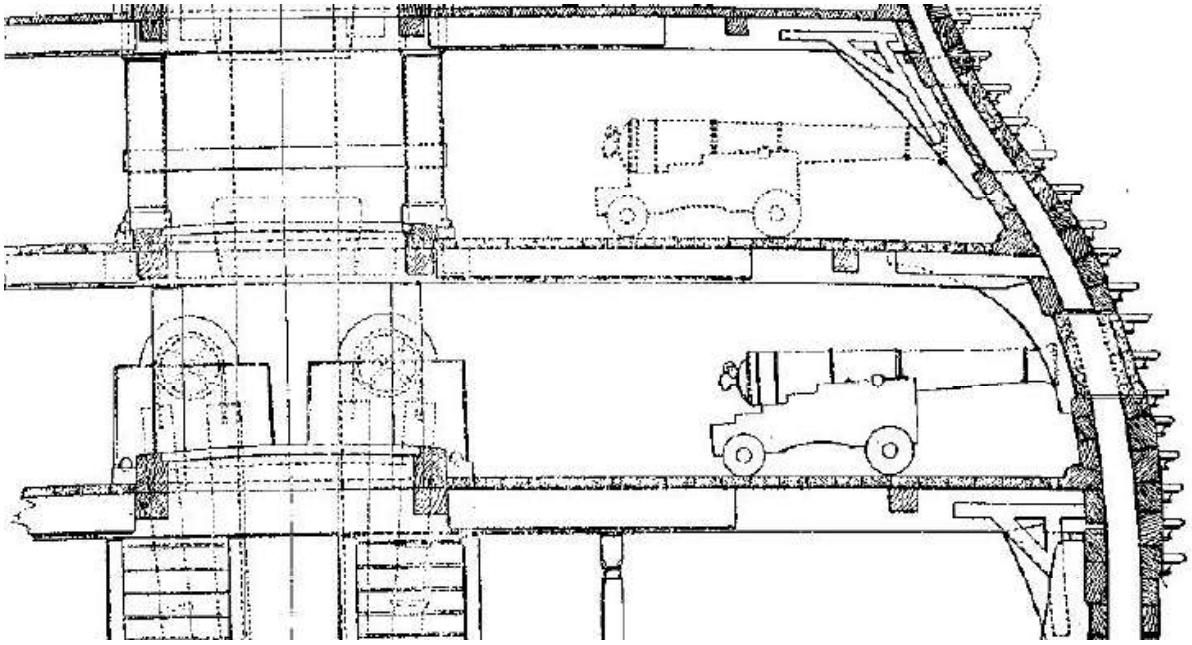
The present planking arrangement is of laminated construction with the wale planks overlaid to make up the required thickness. The overlaying of the planking does not correspond with the underlying plank strakes

This drawing dating from 1993 clearly shows different plank strakes underlying the outer planking.

The part of a section drawing is from Building, Restoration and Repair by A R Bugler published in 1966 and it also shows the overlaid planks.



This section is a drawing by G F Campbell from 1955 clearly shows solid planking. It predates Buglers drawing above and it may be assumed that it is historically more accurate



There appears to be some discrepancy from the available information to determine the exact thickness and widths of HMS Victory's planking.

Andrew Baines in his 'Notes on historic planking techniques and specifications' included planking descriptions from David Steel's book 'The Elements and Practice of Naval Architecture' which broadly tie in with information described in above text and drawings.

To carry out an exact butt plan that can be used to plan for and carry out the replanking of the ships sides the following further information would be required.

- Cad drawings of the external profile port and starboard
- Cad drawings of sections through the ship at stations
- Further historical research (National Maritime Museum, HMS Victory, Records from past restoration works etc.)

There are existing cad drawings such as the one below but they are profiles of the inboard faces of Victory and are not suitable to produce a butt plan.

The cad profile drawings are required so that plank strakes can be accurately plotted to achieve suitable shear lines and positions of gun ports when establishing a butt plan.

Section cad drawings are required to plot plank widths and thickness at stations along the length of the ship. The plank width at each station can be plotted on the profile drawing and checked for fairness.

Further research of archives and drawings may reveal more accurate historical information regarding plank lengths, widths, thickness and style.