

Titanic's Hidden Deck

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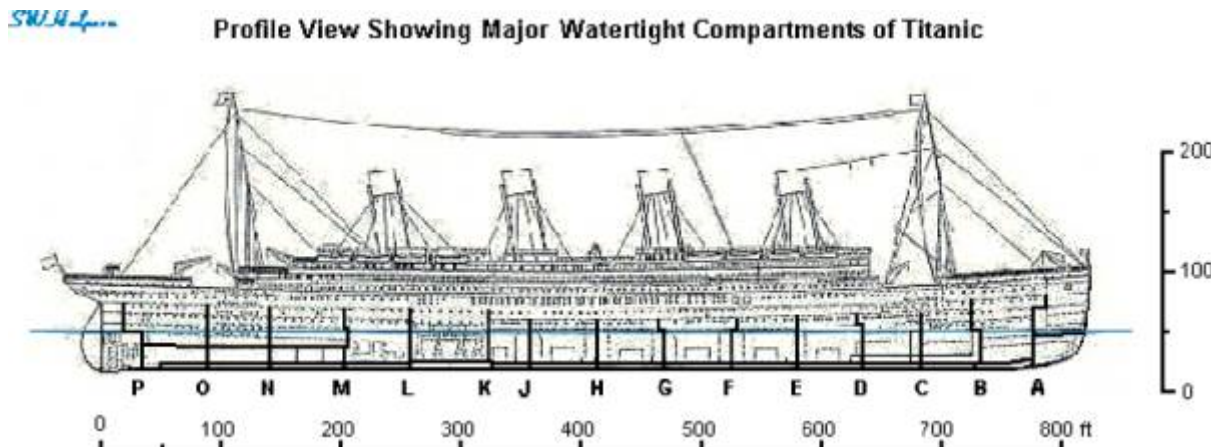
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An examination of Titanic's double bottom

Published plans of the *Olympic* & *Titanic* show deck arrangements from the Tank Top up to the Boat Deck. But there is one deck plan that doesn't normally show up, and that is the plan of the inner bottom, below the tank top level. Based on the description of the *Titanic*'s structural arrangement as given in several places in the Wreck Commission Report, and in diagrams and descriptions from the 1911 Engineer and Shipbuilder issues, and in many photos published in several books, one can draw up a plan of the inner bottom for these ships.

In total, there were 17 transverse watertight divisions on *Titanic*'s bottom, including those bounding the fore and aft peak tanks. With but a few exceptions, most of these transverse watertight divisions practically coincided with the 15 major watertight transverse bulkheads of the ship, those labeled A through H and J through P. (There was no bulkhead I.) As most people already know, the 15 major transverse bulkheads divided the ship into 16 major watertight compartments as shown Fig. 1.

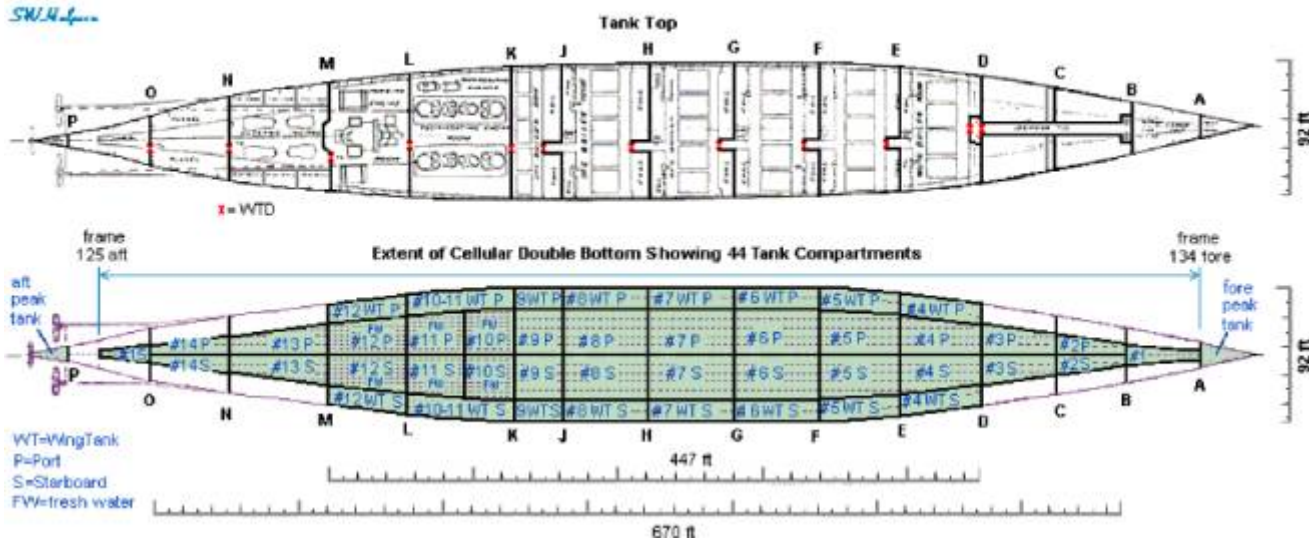
Figure 1



The tank top of the *Titanic* formed a watertight inner bottom about 5 feet above the top of the keel. The extent of the inner bottom was from bulkhead A, the first major watertight transverse bulkhead near the bow, to about 20 ft in front of bulkhead P, the last major watertight transverse bulkhead near the stern. In other words, the inner bottom extended for almost the entire length of the vessel except for a small distance at each end. The inner bottom was also subdivided by a watertight center keelson extending 670 ft from bulkhead B to bulkhead O, and two watertight longitudinal bulkheads located for the most part about 30 ft. from the center line amidships and extending 447 ft from bulkhead D to bulkhead M. Thus, between transverse bulkheads D and M, with the exception of the reciprocating engine room, each compartment had a cellular double bottom that was divided into four tanks, one tank to port and another to starboard of the center keelson, and two wing tanks, one on the port side and the other on the starboard side. Under the reciprocating engine room, there were also two wing tanks, but on each side of the center keelson there were two tanks, 2 on the port side and 2 on the starboard side. This was created by a watertight transverse division under the center of the reciprocating

engine room that extended out to inner sides of the wing tanks. Between bulkheads B and D and between bulkheads M and O, there was the watertight division at the center keelson only, forming two tanks under each major compartment there. Between bulkheads A and B and aft of bulkhead O to 20 feet before bulkhead P, there was only one tank under each compartment. The plan of the double bottom can be seen in Fig. 2 along with the plan of the tank top level itself.

Figure 2



The tanks of the inner bottom are labeled 1 through 15. Those divided by the center keelson have also a P or S designation, thus identifying the port from the starboard tank. The wing tanks between bulkheads D and M have a WT designation as well as a P or S designation as shown. These wing tanks were formed by a continuous margin-plate extending out to the hull plating on the ship's side. In these areas, *Titanic's* double bottom was extended up the ship's side to a height of 7 feet above the keel. In all, there were 44 tanks that made up the *Titanic's* double bottom. Cross sectional views of these tanks are shown in Figures 3 and 4

Fig 3. shows the cross sections for tanks 1, 2, 3, 4, and 5. The cross sections for tanks 6, 7, 8, and 9 under boiler rooms BR4, BR3, BR2, and BR1, respectively, are essentially the same as that for tank 5 under BR5, and are therefore not included.

Figure 3

Double Bottom Cross Sections (looking aft)

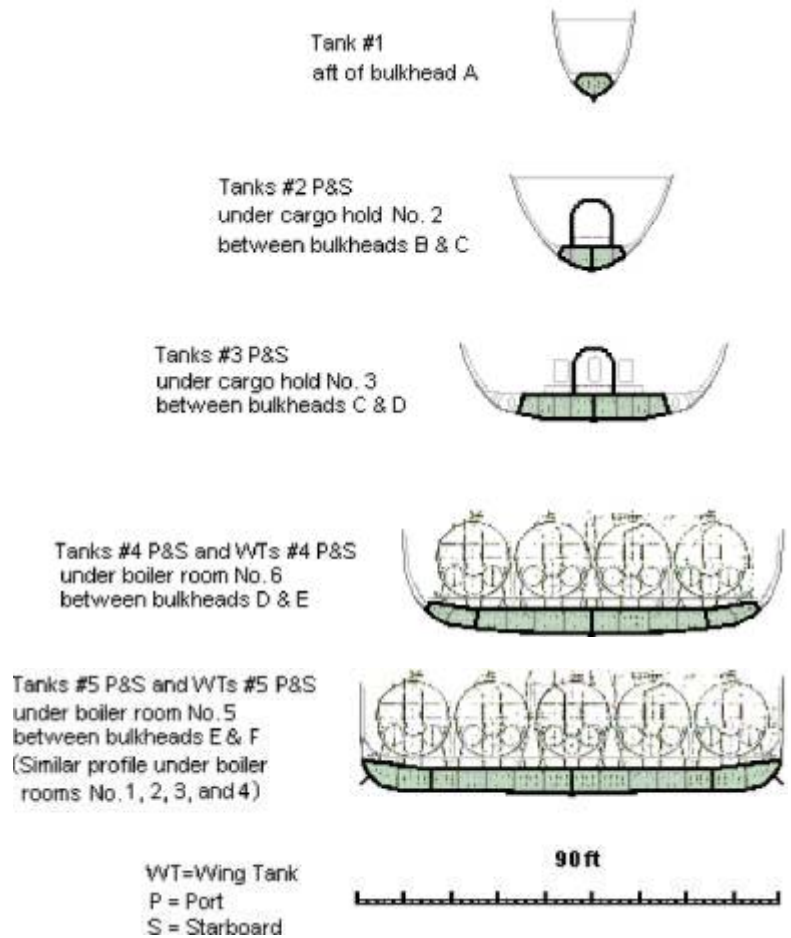


Fig. 4. shows the cross sections for tanks 11, 12, 13, 14, and 15. The cross section for tank 10 under the reciprocating engine room is essentially the same as that for tank 11 in the same compartment, and therefore not included.

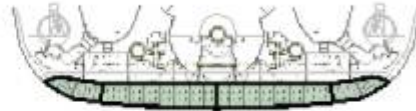
Figure 4

Double Bottom Cross Sections (looking aft)

Tanks #11 P&S and WTs #10-11 P&S
under reciprocating engine room
between bulkheads K & L



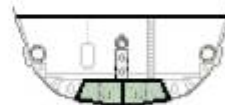
Tanks #12 P&S and WTs #12 P&S
under turbine engine room
between bulkheads L & M



Tanks #13 P&S
under electric dynamo engine room
between bulkheads M & N



Tanks #14 P&S
under shaft tunnels
between bulkheads N & O



Tank #15
under shaft tunnels
aft of bulkhead O



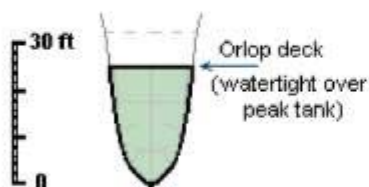
WT=Wing Tank
P = Port
S = Starboard



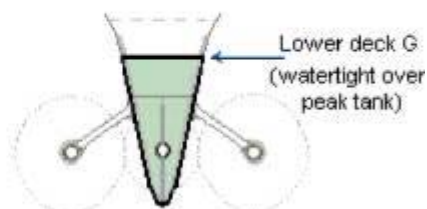
Cross sectional views for the fore and aft peak tanks, which are not part of the double bottom, are shown separately in Fig 5. These tanks could be used to adjust longitudinal trim by shifting water ballast fore and aft.

Figure 5

**Fore peak tank looking aft
from ahead of bulkhead A**



**Aft peak tank looking forward
from aft of bulkhead P**

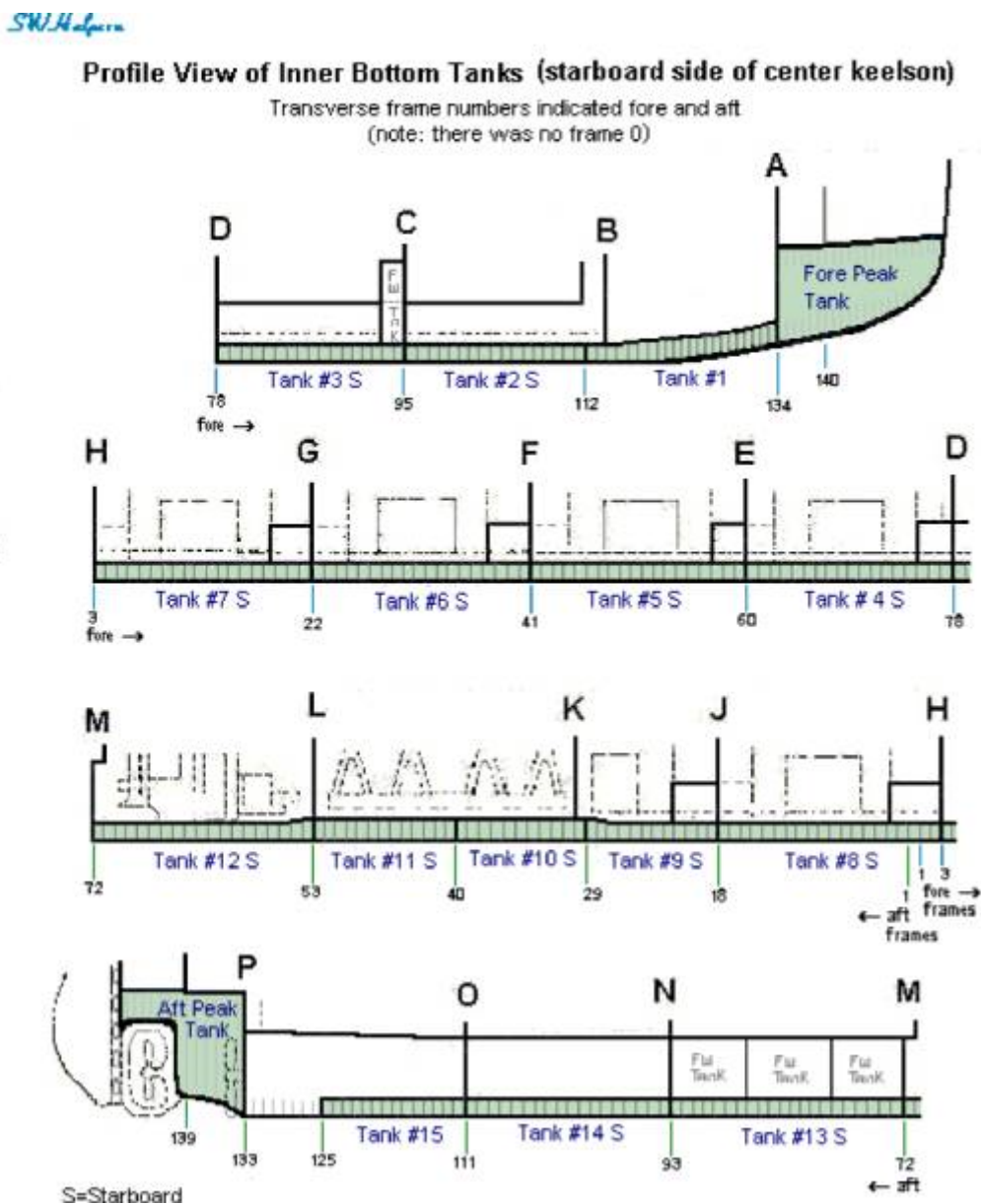


As can be seen from these cross sections, the double bottom in the machinery spaces was divided into four cellular compartments transversely by a watertight center keelson and a pair of watertight longitudinals on each side about 30 feet from the center line amidships. The cellular double bottom had a floor at every frame. The height of the double bottom at the center keelson was 63 inches, except in way of the reciprocating engine room, where it was increased to 78

inches. Besides the continuous tank girders mentioned above, there were five intercoastal tank girders amidships on each side of the center, and additional girders fitted beneath the engine rooms. Above the double bottom, the vessel was constructed on the usual transverse frame system, reinforced by web frames that extended to the highest decks. The frames were spaced 3 feet apart except at the ends where the spacing was reduced to 24 inches forward and 27 inches aft. They are generally of channel section, 10 inches deep amidships, and of angle-irons and reverse bars at the ends. At intervals there are heavy web-frames, and in the machinery space extra strength is provided by an increased number of web-frames. There was also an external bilge keel, about 300 feet long and 25 inches deep fitted along the bilge amidships on both sides of the ship.

A profile view of the double bottom tanks showing the frame numbers can be seen in Fig. 6, along with their relation to the 16 main watertight compartments formed by the 15 main transverse bulkheads.

Figure 6



In all, there were 46 watertight compartments in the ship's bottom, 44 within the cellular double bottom, plus the fore and aft peak tanks. Fourteen of these compartments had 8 inch suction, 23 had 6 inch suction, and three had 5 inch suction connected to a 10 inch ballast main suction. Six compartments, tanks 10 P & S, 11 P & S and 12 P & S, under the reciprocating and turbine engine rooms, were used exclusively for fresh water. There were 4 inch suction to the

FW pumps.

The following table lists tank capacities in tons and their usual content. In this table: WT = wing tank, WB = water ballast, FW = fresh water, P = Port, and S = Starboard.

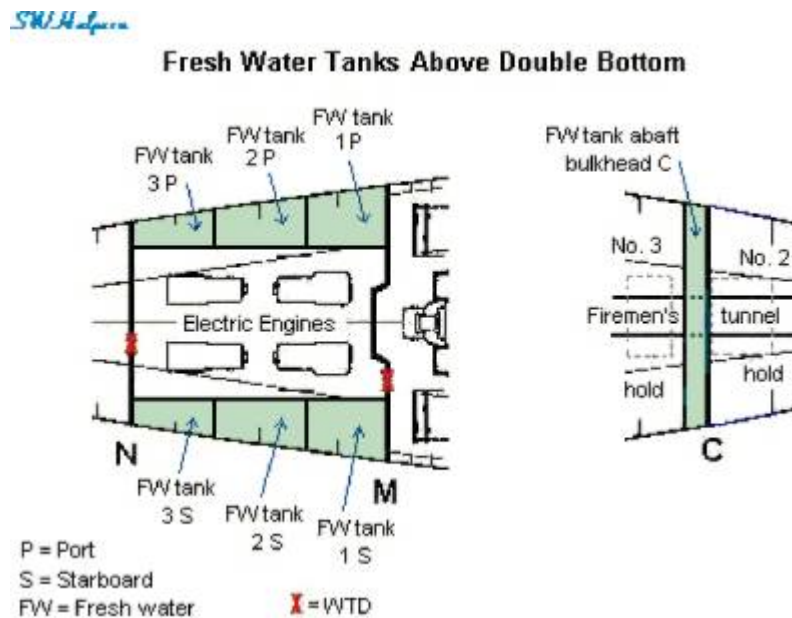
| Table 1 | | |
|--------------------------------|----------------------------------|--------------------------|
| Tank Number or Name | Total Capacity (tons) | Usual Content |
| | [P&S totals] | |
| Fore Peak | 190 | WB |
| #1 | 71 WB or 69 FW | WB |
| #2 | 113 WB or 110 FW | WB |
| #3 | 210 WB or 204 FW | WB |
| #4 | 314 | WB |
| #4 WTs | 122 | WB |
| #5 | 408 | WB |
| #5 WTs | 164 | WB |
| #6 | 445 | WB |
| #6 WTs | 186 | WB |
| #7 | 456 | WB |
| #7 WTs | 198 | WB |
| #8 | 482 | WB |
| #8 WTs | 200 | WB |
| #9 | 272 | WB |
| #9 WTs | 98 | WB |
| #10 | 304 | <i>FW</i> |
| #11 | 338 | <i>FW</i> |
| #10-11 WTs | 182 | WB |
| #12 | 360 | <i>FW</i> |
| #12 WTs | 100 | WB |
| #13 | 271 WB or 263 FW | WB |
| #14 | 118 WB or 114 FW | WB |
| #15 | 37 WB or 36 FW | WB |
| Aft Peak | 115 | WB |

The total water ballast capacity of these tanks, including the peak tanks and those used for fresh water only, was 5754 tons.

Besides these tanks, the *Titanic* had other tanks for carrying fresh water above the double bottom. There were three pairs fresh water tanks located on the sides of the electric dynamo

room. These six tanks held 792 tons of fresh water. The capacities of each individual tank, going from fore to aft, was 155 tons, 149 tons, and 92 tons on each side. There was also a fresh water tank located just aft of bulkhead C extending up to the Orlop deck level with a capacity of 170 tons. In total, the fresh water capacity of the seven FW tanks above the double bottom was 962 tons. See Fig. 7. (These FW tanks are also identified in the profile views of Fig. 6 above.)

Figure 7



In summary, the *Titanic's* inner bottom was made up of a total of 44 separate watertight compartments creating a cellular double bottom, most of which was about 5 feet in height, and extending for most of the ship's length except for the extreme ends. Most of these were water ballast tanks, but several were used for carrying fresh water, and a few could be used to carry either. Over a length of 447 feet amidships, the double bottom met the hull plating on the ship's side about 7 feet above the keel. This formed a set of 8 pairs of wing tanks in addition to nine pairs of inner tanks under the machinery spaces. The wing tanks offered protection past the turn of the bilge in this part of the ship. Outside of this area, there was not as much protection since the double bottom was not extended out to the ship's side plates, ending before the turn of the bilge.

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