

LIST OF *TITANIC* AT 2:05AM

When lifeboat D was launched, about 2:05am, QM Bright said that the ship's forecastle was just going under. QM Rowe, whose boat C just reached the sea, said that *Titanic's* well deck was submerged. Based on these observations, we can determine the trim angle that the ship took on at that time from a set of waterline curves that were developed. This is shown in Figure 01 below.

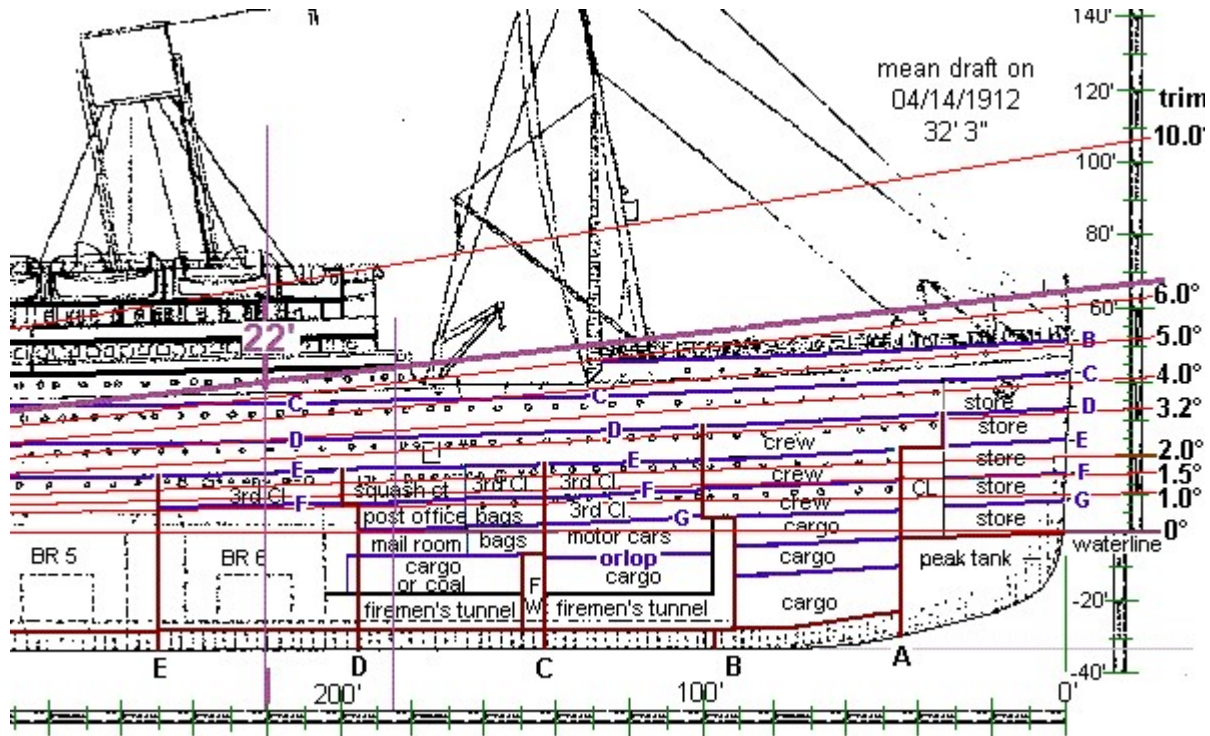


Fig. 01 – Waterline curves showing bow section.

Titanic was pivoting around point called the Apparent Floation Pivot Point as it trimmed down by the head over time. (http://www.titanicology.com/Titanic/Finding_the_AFPP.pdf). That point was about 585 feet back from the bow. The height of the boat deck above the waterline on the night of 14 April was taken at 60.5 ft (British inquiry report, p.7). B deck was exactly 9 ft below A deck, and A deck was exactly 9.5 ft below the boat deck. Thus B deck was $60.5 - 9.0 - 9.5 = 42$ ft above the intact (0°) waterline curve. As shown above, for the forecastle to become submerged, the waterline curve for 2:05am (purple) would just about cross the level of B deck just forward of the bridge, about 185 ft aft of the bow. The down tilt trim angle is given by:

$$\arctan [42/(585-185)] = 6^\circ \text{ (rounding off)}$$

Moving back along this waterline curve by 35 ft (to 220 ft from the bow), to where the forward part of boat D would be, the height of the waterline curve there calculates to:

$$H = (585 - 220) \tan (6^\circ) = 38.4 \text{ ft above the intact } (0^\circ) \text{ waterline}$$

Since B deck was 42 ft above the intact waterline, we find that at 2:05am, the height of the water on the ship's centerline would be $42 - 38.4 = 3.6$ ft below B deck when the forecastle went under. Or, since B deck is exactly 18.5 ft below the boat deck, the water level on the ship's centerline at 2:05am would have been $18.5 + 3.6 = 22.1$ ft below the boat deck.

Now that we know where the water was on the ship's centerline, we now have to calculate the angle of list so that boat D had to drop almost 10 ft to sea below. According to both Lightoller and Woolner, the water was just coming onto A deck by the open end by the fore part of A deck as boat D was being lowered. This is shown on the left side in Figure 02 below.



Fig. 02 – The list at 2:05am.

The max width of *Titanic* was about 92 ft. The distance from the ship's centerline to the edge of the deck is therefore half that amount, or about 46 ft as shown above. We have just seen that the water at 2:05am was about 22 ft below the level of the boat deck on the ship's centerline, also as shown above. To calculate the angle of list, θ , we make use of the triangle shown in orange, with adjacent side of length b , and opposite side of length a . From the figure above, we see that length b has to be 46 ft, distance from the ship's centerline to edge of deck, and the length of side a is simply:

$$a = 22.0 - 9.5 = 12.5 \text{ ft (the distance to the water below deck A on the ship's centerline).}$$

From the geometry of the situation, the angle of list for 2:05am is therefore:

$$\theta = \arctan (a/b) = \arctan (12.5/46) = 15.2^\circ$$

This is the list of the ship that would result in the situation as described.