

New Evidence of the Possible Danger of Loading Titanic's Lifeboats to Capacity

By Bob Read, D.M.D.

Introduction

One of the most repeated reasons given for the great loss of life during the Titanic disaster is that the officers were negligent for not loading more people in the lifeboats. It is not disputed that Titanic's lifeboats were for the most part not loaded to their nominal capacity. But what if they had been? How might that have altered the outcome of the disaster? In this article I will examine evidence from the British Board of Trade (BoT) that will strongly suggest that the outcome could have been worse if the boats were fully loaded during their launch.

The Board of Trade Evidence

The British Board of Trade Marine Department had the responsibility of inspecting, testing, and certifying vessels before they could carry passengers. Their surveyors were present from beginning to completion of a ship. Even after the completion of the ship, the BoT surveyors were in attendance during the sea trials of a ship to give final certification of the ship's safety and seaworthiness.

During these procedures the lifesaving equipment was inventoried and tested. Prior to the Titanic disaster, the testing of the deployment of lifeboats was more cursory. More time was spent measuring the individual boats and taking an inventory of their required equipment to make sure that the required lifeboat capacity was met. Usually just a demonstration of the launch similar to a lifeboat drill was performed. This usually involved just a handful of crew aboard the boat as it was lowered then retrieved.

Regulations regarding lifeboats were tightened after the Titanic disaster. Some of the regulations specified increased lifeboat capacity. In response to these new regulations, more boats were added to Titanic's surviving sister ship, Olympic. She underwent a refit at the Harland and Wolff shipyard from late 1912 to March 1913. Near the end of this refit, tests were performed on the new davits and lifeboats which had been added to Olympic. Much of the discussion in this article is based on the BoT official internal documents regarding these tests. At the end of this article is an appendix with the transcription of these BoT documents. These documents were transcribed because the originals were written in longhand which in many cases was a challenge to transcribe. The documents cover entries from several different BoT officials. Therefore this appendix should not be viewed as a single narrative. In this article the specifics of the BoT documents will be summarized in a more understandable form.

The Tests

In early March 1913 the BoT carried out tests of the newly installed davits and lifeboats aboard Olympic. These new davits and boats were installed amidships between the original groups of boats located fore and aft. These boats were smaller than the original 30 ft. lifeboats installed aboard Olympic and Titanic being nominally 27 ft. 5in. long. They had a nominal loading capacity of 51 persons. The tests were performed to see how the equipment performed with the boat fully loaded. At this point we enter a controversy. As is seen in the BoT documents, the requirement for testing boats and davits with a full load was only applicable to ships launched after March 1, 1913. While Olympic launched before the March 1, 1913 date, it was an unusual situation where new equipment was installed on a ship launched before the effective date of the regulations. The surveyor chose to apply the new regulations to the new equipment.

In order to simulate a fully loaded and equipped boat the water breaker in the boat was empty and there were two crew members in the boat in addition to 124 weights of 56 lbs. each. The specifics of the loading is detailed in the appendix. The boats were swung out to the gunwale. While the weights were being distributed, one of the davit arms was observed to be giving way. It twisted and was bent down until the eye of the davit was at the level of the operating screw when it stopped. Figure 1 is a recreation of the sketch which was included in the BoT documents.

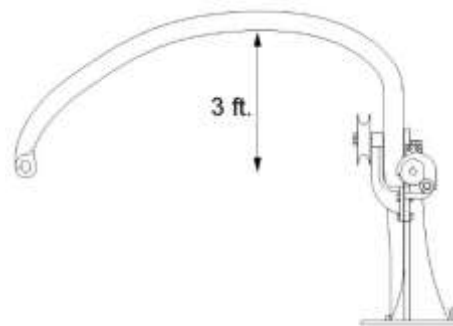


Figure 1

It was then determined that for safety reasons that the next davits and boat to be tested should be fully loaded before swinging out and that no crew should be on board. This next test proved to be catastrophic. The loaded, unmanned boat was swung out and lowered. When the boat had been lowered about 40 ft., one of the davit arms twisted and bent down, then broke about 3ft. 4in. above the pivot pins. This sudden stress was then transferred to the other davit arm which also broke about 4-1/2 in. above the center of the pivot pin. This caused the boat with the broken davit arms to fall to the water. This is shown in Figure 2.

It appears that the tests with full loads were abandoned at that point. In the documents, a surveyor asks whether the davits could be certified as satisfactory if they could be successfully

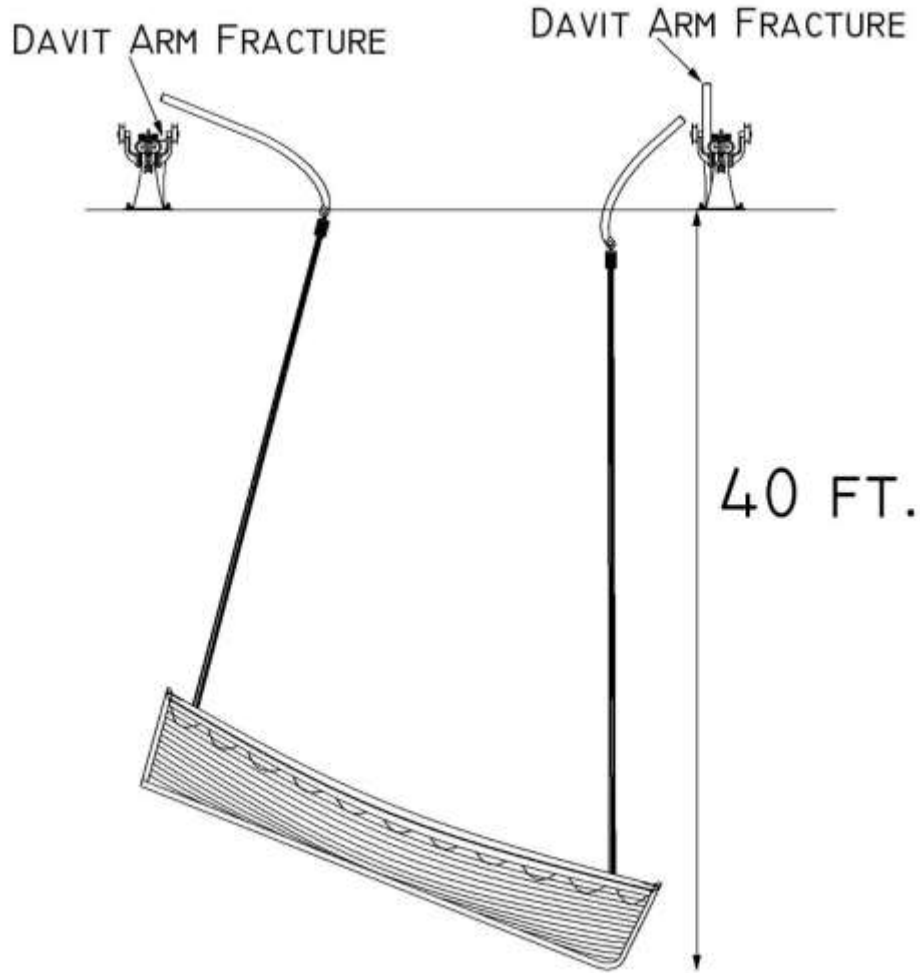


Figure 2

lowered with a load of only 10 persons and full equipment. This was proposed as a compromise to the new rules regarding testing lifeboats and davits with full loads.

We do not have all the correspondence, but internal BoT documents urged that officials of the White Star Line be approached regarding these failures so that they could make corrections even though they were not required to do so by regulation. We do not know if the White Star Line was approached regarding this matter or whether they made any corrections. It is beyond doubt that the White Star Line would have been aware of the results of these test from Harland and Wolff employees who were in attendance. Whether any official notification happened is not known.

The politics of these tests will not be a subject which will be examined in this article. It is of greater interest to examine how the results of these tests affect how the events of the Titanic disaster might have played out. Before discussing the implications of these tests as they relate

to the Titanic disaster, a few objections which might be made to trying to relate these tests to the disaster will be dealt with.

Possible Objections

The type of davits tested were not the exact same ones which were used aboard Titanic.

This is true but there are probably more similarities than differences. Both davits were made by Welin. While different than those used for the 30 ft. lifeboats, they were selected to accommodate the size and anticipated load of the smaller boats. There was no major difference in the design of the two types of davits. The davits used on Titanic were of the "double acting" type. This means that the davit arms could rotate inboard from vertical to lift a boat inboard of the main boat. The davits tested on Olympic were "single acting" meaning they could only lift boats directly under the davits when the arms were in the vertical position. The davit arms could not be rotated inboard from vertical. This difference in davit type did not affect the strength of either type of davit.

Surely Welin would have done sufficient testing to ensure adequate strength of the davits used aboard Titanic.

If this were true, then how can the failures of the Olympic davits be explained?

There were some of Titanic's boats which were heavily loaded which did not have davit failures during launching.

The problem with this argument is that we really don't know for sure how heavily Titanic's boats were loaded. Estimates of loading have generally proven to be too high. Generally, we know that loading was below capacity.

The failures could have been anomalies.

If there had been a metalurgically defective davit arm, it could be considered an anomaly. When two tests are performed with the same loads and both have types of failures which are similar, then the failures can't be considered anomalies.

After the Titanic disaster, Welin probably received a great number of davit orders from various passenger shipping lines to augment the number of lifeboats on their vessels. Because of increased production pressures post-disaster, quality control at Welin could have been compromised resulting in the defects in the new Olympic davits.

This is probably the most plausible objection. The only counter to this objection would be that there is no evidence that the original davit arms of Titanic for the 30 ft. boats ever underwent testing at full capacity loads before the disaster. There is also no evidence that Olympic's davit arms for the 30 ft. boats were ever tested at full capacity.

All we have are the results of tests of the new davits on Olympic. The question is whether Welin is given the benefit of the doubt for the adequacy of the original davits or not. If they weren't tested at full capacity after the Olympic failures then the question becomes "why?" On what basis would anyone be so confident in their possible performance that they would waive testing? One would reasonably suspect that any decision not to test the original davits was not based on full confidence in their adequacy.

Edit.: Since this article was originally published, there has been a possible objection raised which has to do with the British Wreck Commissioner's Inquiry testimony by Edward Wilding. Mr. Wilding was one of the chief designers of Titanic and was familiar with all aspects of her construction. The question will be given below.

Edward Wilding of Harland and Wolff testified that he had witnessed a test of a full load launch of Olympic's original lifeboats.

Mr. Wilding did mention this test in his testimony as follows:

20491. Will you just address yourself a little to that question?

- I remembered when that point was first raised that I had actually seen one of the lifeboats on the "Olympic" in the air loaded with a weight which would correspond to the passengers, and I wrote for the date. On the 9th of May, 1911 - that was shortly before the "Olympic" left Belfast - we put into one of the lifeboats of the "Olympic" half-hundredweight weights distributed so as to represent a load equal to about 65 people, and then we raised and lowered the boat six times. It was done with the object of testing the electric boat winches, not with the object of testing the boat. I happened to see it coming up one time myself after the weights had been removed (the boat was lowered without weights into the water.), and there was nothing the matter with her; she was watertight. I do not think there was any doubt the boats were strong enough to be lowered containing the full number of passengers, and I think that it was in the evidence of Wheat that he lowered a boat with about 70 in her. I think that confirms our Belfast test.

The question arises as to what weight should be given Mr. Wilding's testimony as regards a full capacity test of the launch of Olympic's boats. Setting aside questions about the truthfulness of Mr. Wilding's testimony, of how much worth is it? First and foremost is that there is no indication that this test was documented in writing anywhere. This prevents any examination of the specifics of the test, especially what weight they deemed an average for each occupant. It is not clear that Mr. Wilding himself was supervising the test and how familiar he was with the specifics of the test. This appears to have been a Harland and Wolff test with no supervision by any representatives of the BoT. Given these facts we have only the testimony of Mr. Wilding on which to base any objections that the boats had been test launched with a capacity load. The reader will have to decide for himself what weight to give to Mr. Wilding's testimony. It seems clear that the BoT had not deemed it necessary to do full load lifeboat tests on boats of vessels launched before March 1, 1913.

Implications

Very little is known about the tests done on Titanic's davits for her 30 ft. boats. The following excerpt is from an entry by Thomas Carlton of the Marine Department of the BoT on March 20, 1913:

It is not reported what tests have been made of the davits originally fitted. If not already tested to the full load this I think should be done, but the loads in the first instance should be carefully applied and no one should be in the boat until it has been proved that the davit arms are sound and good and in every way sufficient.

The question would arise why an official of the BoT wouldn't know what tests would have been performed on Olympic's original davits or that it hadn't been reported. If the tests on the original davits had not been recorded, one can only assume that they had not been performed. At the time Titanic's davits were inspected, there had been no recent history of a major passenger liner disaster. Certainly there was nothing at the time which would cause surveyors to be concerned with testing the strength of the davits. Their concern was whether the davits were functional. So it is likely that the loading of the lifeboats consisted of only a handful of crew sufficient to handle the boat in the water. It is almost certain that no more was known about the strength of Titanic's davits than was known about Olympic's original davits at the time her new davits were tested and had failures.

With the failure of Olympic's new davits, it seems reasonable to assume that the same kind of failures were possible and perhaps likely if Titanic's lifeboats had been loaded to their nominal capacity before lowering. When Titanic's officers were interrogated during the post disaster inquiries about why they didn't load the lifeboats to capacity before launching, the consensus seemed to be that they didn't think it would have been safe. This must have been an intuitive belief because none of the inquiries performed any full load tests and there is no record of any such tests performed by Harland and Wolff.

For the sake of discussion, let us assume that Titanic's officers were ordered to load the lifeboats to their nominal capacity before lowering. On the night of the disaster, passengers were already reluctant to enter the boats. Can you imagine the effect on passengers watching if there were davit fractures like the ones in the Olympic tests? If passengers witnessed equipment failure which caused the death of many or most of the occupants of a lifeboat, it seems inconceivable that any would want to board a boat and hang suspended in the falls with their lives dependent on the equipment. If you are the captain or one of the officers, you are now faced with a dilemma. You've just had a catastrophic failure of a davit arm or arms. How much would the load need to be decreased to reach a safe level of loading? If you overload you risk the lives of all in the boat. If you underload, many who could otherwise be saved would face almost certain

death if they had no place in a boat. After an incident of failure, it may have been nearly impossible to coax anyone into a boat. In that case, the eventual loss of life could have been even greater than it actually was.

The Titanic disaster has always been filled with second guessing about what could have been done to either avoid the disaster or to minimize the loss of life. These exercises may make for interesting discussions but they don't do anything to change what happened. In the case of the actual disaster, it was clear that there was no comprehensive plan for loading the lifeboats. Ideally such a plan would have included the use of multiple accommodation ladders so that the boats could have been loaded while in the water. Sufficient lifeboat capacity would also have been essential. Even with these provisions, there is always the real possibility of another disaster scenario which doesn't fit even the most meticulous planning.

Conclusion

The tests of lifeboat loading and davit performance aboard Olympic in 1913 had potentially serious implications for how events unfolded during the Titanic disaster. What may have prevented a greater disaster was the common sense and intuition of Titanic's officers who did not fully load her lifeboats before launching. This would be something for which they would be eventually criticized.

There has been no shortage of candidates selected to shoulder blame for the Titanic disaster. Among these have been the officers of Titanic. The evidence from the 1913 Olympic davit tests suggests that the intuition of the officers in not loading the lifeboats to capacity may have been valid. We will probably never know for certain but the Olympic davit test evidence at least casts doubt on the adequacy of Titanic's davits.

It is not the purpose of this article to manufacture controversy as was done with the "brittle steel" controversy, and the "defective rivets" controversy. No purpose is served by examining or speculating about the quality of 100 year old davit arms. The evidence offered here has been from tests performed on brand new davits less than a year after the disaster. The reader will have to decide what weight to give this evidence in the speculation about the adequacy of Titanic's davits. I suppose the acid test is if you were attending the Olympic tests in 1913 and had seen the new davit failures and were asked to be aboard a fully loaded 30 ft. boat as the original davits were tested, would you?

Appendix

Transcribed Text of Board of Trade Documents Describing the 1913 Tests of New Davits Aboard *Olympic*

Board of Trade. E.S.C. 1347 1913. M 9054 Consultative Branch

Date of Paper

10-3-1913

Date when Registered

11-3-1913

(Transcription note: Dates are given as: Day-Month-Year)

Belfast

“Olympic” 131346 – davit castings by Kohlswa Verkstadshoutiv and Nydquist & Holm – L. 24 2

Minutes

The results of the tests are such as may be passed.

The elongation in the cases of tests Nos. 631 and 126Y is below that required, but if the Surveyor is otherwise satisfied, no objections need be raised.

(Signature) A. Boyle 11-3-13

*The Surveyors, Belfast
3-13*

(Signature) Mr. Carruthers 12-3-13

Noted. These davits have been fitted on board the S.S. Olympic, O.N. 131346 and a test of which turned out to be unsatisfactory was made this day of two sets. It was arranged that one boat of each size on board this vessel was to be loaded with its full equipment and with weights equal to the number of passengers for which it was certified. A boat 27-2' x 8-7' x 3-6' certified for 51 persons, was the first one tested & with the full equipment of a Section A boat, but without the water breaker filled & with two men on board, the boat was swung out to the gunwale & the weights, 56 lbs. each, were passed on board. It was assumed each person would average 140 lbs. & 124 weights of 56 lbs. were placed on board. This allowing for the two crew on board already but with empty water breaker was assumed to be equal to full equipment and 51 persons. The boat with equipment is estimated to weigh 1 ton 10 cwt. There was therefore a total weight

of about 10,500 lbs. on the two davit arms or say 2.34 tons on each arm. The weights had just been placed on board & were being distributed a little better about the boat, when one of the arms was observed to be giving way, twisting & bringing the flat side of the arm to the front, after giving a little it suddenly bent down until the eye at the end of the arm was at the level of the operating screw, when it stopped. The middle portion of the bend is almost 3 ft. above the center of the pin on which the arm pivots. The rough sketch will give an idea of the appearance of the arm after bending. This arm is no. 12732, a test from which is shown on attached S.24. It was now arranged that all the davits should be tested with full equipment on board & weights representing the full number of persons & another boat of the same dimensions was loaded swinging in the davits, but not swung out, full equipment and 7168 lbs. on board, no men on board. The boat was then swung out & lowered about 40 ft. when one of the davit arms twisted and bent down., about 3' – 4" above the pivot pins & broke, the sudden stress this set up on the other arm broke it 4- ½" above the center of the pivot pin & the boat & broken pieces of davit arms fell into the water.

The section of the last arm to break was quite sound & as shown here. The section of the first one to break was very defective & as shown in rough sketch. There was only 5/8" solid metal for 5" of the web with bad blow holes at each end as shown. The davits are of the type P2 & are 11'-4" from the center of pivot pin to the eye.

I beg respectfully to ask if the davits of the vessel can be passed if they prove satisfactory with a weight equal to 10 persons and full equipment. It appears from the new rules, Rule 7 (2) that it is the case of vessels launched on or after 1st March 1913 that must have gear of sufficient strength to lower a boat with full equipment & full number of persons. The vessel is to leave Belfast on Friday or Saturday. It would be a great convenience if you could wire me tomorrow or as early as possible, your decision.

(Signature) F.

Carruthers, 18-3-13

The Engineer Surveyor in Chief, London

All the davit arms are represented by the tests on attached [illegible]. I could not get the number of the two which broke last.

(Signature) F.

Carruthers, 18-3-13

This paper refers to the failure of two sets of new Welin davits recently fitted on this vessel when being tested to the full weight of the boat, passengers & stores. In one case the davit bent down but did not fracture, but in the other case the arm was not sound & fracture occurred after the arm had bent down some little distance, the full load of 4.7 tons being then on the set of davits.

According to General Rule 7 Sec. 2, of the new Regulations, the strength of davit falls and blocks & all other gear required for lowering the boats shall be to the satisfaction of the Board of Trade, but the requirement that the strength shall be such as to carry the full number of passengers for which the boat measures applies to vessels launched after 1st March 1913. This vessel was new in 1911 but has recently been receiving extensive alterations to the hull at Belfast, being largely reconstructed. The Surveyor raises the question as to whether these davits may still be considered sufficient to lower the boats with 10 men in them, this number being really more than sufficient to safely handle the boat while being launched.

The davits are relatively as strong as those fitted on other vessels – a very large number of which have been fitted in the past and are sufficient to safely lower the boat with 10 men in provided the castings are of good average soundness.

These davits as already mentioned are not apparently those originally fitted on the vessel, but additional ones to meet the new requirements. According to the rule in the new regulations regarding the date of launching the vessel, the davits should I think be passed, but each arm should be tested by a load of 1-3/4 tons which is approximately equal to the full load of the boat & 32 persons. The arms should be carefully inspected & any not wholly satisfactory should be rejected.

If the Board approves the Surveyor should be informed accordingly.

It is not reported what tests have been made of the davits originally fitted. If not already tested to the full load this should I think be done, but the loads in the first instance should be carefully applied & no one should be in the boat until it has been proved that the davit arms are sound & good & in every way sufficient.

The owners, ship's officers, & the Surveyor at Southampton & Liverpool should I submit know what the davits are capable of doing, & it is for further consideration whether in a vessel of this class the owners should not be approached to fit davits capable of safely launching each boat fully loaded with the full number of persons for which it measures. The only alterations would probably be in the davit arms & the present davit arms could be used on other vessels for smaller boats.

(Signature) Thomas Carlton

20/3/13

The Assistant Secretary

M. Department

Urgent

Board of Trade. M 9054 1913 Marine Department

Date of paper: Mar. 20, 1913

Date when registered: Mar. 20, 1913

Previous Paper: 7910

E.S.C.

L.S. Applications

"Olympic" O.N. 131346

Davit castings by Kohlswa Verkstadshoutiv and Nydquist & Holm

Surveyor Report

Urgent

(Minutes)

The Olympic is leaving Belfast on Saturday. Two faulty davits. The Surveyor asks whether they may be reckoned as approved for the purpose of lowering a boat with 10 men. The E.S.C. suggests approval in certain circumstances. The paper should go to Belfast at once.

(Signature) M. Lodge

I have spoken to Capt. Young about this and it is agreed that the davits may be passed on the conditions proposed by the E.S.C. marked (1) within. Proposals marked (2) & (3) are also agreed to. As regards (4) it should be suggested to the owners that in their own interest it would be desirable that davits capable of bearing the full load should be fitted.

(Initialed) A.H.Y. 20-3-13
