

(No. 5473.)

“OROTAVA” (S.S.)

The Merchant Shipping Act, 1894.

IN the matter of a formal Investigation held at Westminster Town Hall on the 1st, 2nd, 3rd, and 4th days of February 1897, before R. H. B. MARSHAM, Esquire, assisted by Captains KNOX and RONALDSON and Mr. J. H. HALLETT, C.E., into the circumstances attending the sinking of the British S.S. “OROTAVA,” in the Tilbury Dock, Thames, whereby loss of life ensued.

Report of Court.

The Court, having carefully inquired into the circumstances attending the above-mentioned shipping casualty, finds, for the reasons stated in the annex hereto, that the cause of the casualty was that the vessel having taken a heavy list to starboard when the forward circulating pump discharge valve was open, water flowed through the pipe into the condensers, the doors of which were open, and from thence into the engine room department.

Dated this 5th day of February 1897.

(Signed) R. H. B. MARSHAM, Judge.

We concur in the above report.

(Signed) HENRY KNOX, Captain }  
R.N., }  
A. RONALDSON, } Assessors.  
J. H. HALLETT, C.E., }  
Engineer, }

Annex to the Report.

This inquiry was held at the Town Hall, Westminster, on the 1st, 2nd, 3rd and 4th days of February 1897, when Mr. Mansel Jones appeared on behalf of the Board of Trade, Mr. S. Scrutton, instructed by Messrs. Parker, Garrett, and Holman, represented the Pacific Steam Navigation Company, the owners of the “Orotava,” and Mr. Nelson, the chief officer of that vessel. The second officer and chief engineer were present, but were unrepresented by solicitor or counsel.

The “Orotava,” official number 96,348, is a British screw steamship, built of steel at Barrow-in-Furness, county of Lancashire, by the Naval Construction and Armaments Company in 1889, who also supplied her with her engines and boilers. Her gross tonnage is 5552.10 tons and her net tonnage 3095.76 tons. Her length is 430 ft., breadth 49.3 ft., and depth 34.2 ft. She is fitted with three inverted direct-acting triple-expansion engines of 1030 horse-power combined. She is owned by the Pacific Steam Navigation Company, of 31, James Street, Liverpool, Mr. Henry Ward, of Riversdale Road, West Kirby, in the county of Cheshire, being the registered manager.

The Company are practically uninsured to the extent of 100,000l., there being on her but one policy of 15,000l. Since she was built she has been employed in the passenger trade and mail service between London and Australia. She was fitted in accordance with all the requirements of the “Merchant Shipping (Life-saving Appliances) Act, 1888,” and was in every respect a first-class ocean-going steamer.

Experiments as to the statical stability of the steamer were made at Barrow-in-Furness by the builders in accordance with their contract for specification, and the results, with a table of curves of stability, were placed by the owner’s orders in the chart-room for the easy reference of any inquirer connected with the departments of the vessel, and which were stated by the scientific advisers to be much fuller than usually supplied. There was also a model of the tanks fitted with pegs to indicate which were full and which empty. This model, as well as the papers relating to the ship’s stability, were produced in Court.

The “Orotava” arrived at the Tilbury Docks from Australia on the 3rd December last, and after discharging her cargo she went into dry dock, prior to which the doors were taken off the condenser for the purpose of examining and cleaning the same. During this operation some 3000 tubes were drawn.

In addition to eight coaling ports she had two circulating pump discharge-valves, together with a ballast discharge-valve; these latter were immediately connected with the primary cause of the casualty and were on the starboard side of the vessel. The after discharge valve was 36 inches, and the forward one 46 inches above the water level. The vessel was drawing 24 ft. 6 ins. aft and 17 ft. forward.

She had a bunker capacity of 1867 tons, but never more than 1427 tons were carried. She had about 200 tons of coal left from her previous voyage when she commenced coaling on the present occasion. The lower reserve bunkers were never filled on her outward voyage; the upper reserve bunkers were filled for the purpose of being worked out before she got to Colombo, where cargo could be put into them.

On Saturday, 12th December, the third officer took charge of the vessel. In the afternoon coaling ceased about 3.30 p.m., when she had a list of about 1½ degrees to port, which was rectified by pumping out water ballast. She remained upright until Monday morning, coaling recommencing between 7 and 8 o’clock of that day.

It is now desirable to refer to the water ballast tanks. From the plan produced she was fitted with a fore trimming tank to contain 32½ tons and an after trimming tank to contain 15½ tons. These were ordinarily used for trimming purposes only.

According to the evidence, on the 14th December the “Orotava” was at her loading berth with a dummy pontoon and coaling barges on each side of her. In the morning the coaling operation was resumed, and at noon the chief officer was in charge of the vessel and the second engineer in charge of the engine-room.

At about 3 p.m. the chief officer went on shore leaving the vessel in charge of the second officer, when the chief officer informed him that the tanks on the port side were filled with the exception of the port boiler-room tank, this being half full, the vessel having a list of about one degree to port. The coaling was now nearly completed, and the coal was being shipped through two of the coal ports, one on either side of the vessel, and which were the two ports from forward, all the other ports being fastened up.

The main boilers, five in number, were empty at about 3.55 p.m., when about 1400 tons of coal had been shipped, the working bunkers being full to within 13 tons. At this time the peak tanks were empty, and the condition of the other tanks was as follows:—The fore-hold port tank full, the starboard tank empty, in main hold port tank full, starboard tank empty, the fore and cross bunker port tank full, the starboard tank, about 52 tons in it, which would be about five-sixths of its capacity, in the boiler room; the port tank had about 15 tons in it, about one-fifth of its total capacity; the starboard boiler room tank was empty; in the after cross bunker the port tank was empty, and also the starboard tank; in the engine-room the port tank was full, the starboard tank empty; the after-hold port and starboard tanks were empty.

There were, therefore, 135 tons of water more on the port side than on the starboard side. Captain Conlan, the marine superintendent, who was her first commander, pointed out in his evidence that he always had to place about 55 to 60 tons of cargo on the port side to make up the extra weight of machinery which was fitted in the engine-room on the starboard side.

This was, according to the whole of the evidence, the correct condition of the ship’s ballast tanks, so far as relates to the quantity of water in them.

Upon the chief officer taking charge at noon the third officer drew his attention to the fact that the ship was very unsteady, and was taking a list to either side, and he also drew his attention to the tank sounding book, upon which the chief officer communicated with the assistant superintendent engineer, and stated that he must knock off coaling until he could run up the port boiler room tank, which was under repairs. The assistant superintendent told him that the repairs would be concluded in about half an hour, and at two o’clock the

tank being ready he ordered the second engineer to run in sufficient water to bring the ship up. This being done, the ship righted, and the coaling was resumed on the starboard side. He then sent the carpenter to sound the tanks and take the draft of water. At three o'clock he gave up charge to the second officer and went ashore, the vessel having a list of about two degrees to port at that time.

At about 3.50 p.m. the second officer being in his berth, felt the ship give a sudden lurch to starboard; he rushed out and immediately gave orders to remove the shoots from the coaling ports on the starboard side. Great difficulty was experienced owing to the starboard shoot being jammed on account of the heavy list the ship had at this time.

The list was now further aggravated in consequence of the shore gang, which numbered from about 250 to 300 men, rushing down the brow ashore on the starboard side, a panic having no doubt seized them. After the coal shoot was removed great difficulty was experienced in closing the port door. This, it appears, could not be done properly owing to some coal or foreign substance preventing its being closed, the lower part being left about 1½ inches open, through which water poured into the coal bunker, which was a watertight compartment.

Water was now freely coming in at the discharge valves and finding its way through the opened condenser, and from there into the starboard engine-room bilges and tank. The second and third engineers were at this time on their way to close the foremost valve down.

The after one was found closed, but by whom it is impossible to say, as both these men stated that it was closed before they got to it. Their efforts to close the forward one proved ineffectual, as it was found that something had found its way between the valve and its seating. This was afterwards found to be a piece of canvas which formed part of a cover or tarpaulin that had been placed over the ballast donkey discharge orifice which was immediately forward of the forward discharge valve. This screen or canvas had been placed over this aperture for the purpose of preventing the discharge water from finding its way into the coal barges alongside, and so prevent them from sinking.

It will be manifest from what has just been stated that had the forward discharge valve been closed no casualty could have occurred. Nor if the bunker coaling port had been open, the discharge valve being shut, could the casualty have occurred, the lower edge of the bunker coaling port being 2 ft. 3 ins. higher than the lower edge of the forward discharge valve. The third engineer finding it was impossible to close the forward discharge valve went on deck and found the second engineer employed in sinking a piece of canvas, which was weighted with fire bars, for the purpose of covering the discharge valve opening on the ship's side, in order to prevent the inflow of water, and which valve was now two feet below water. This was, however, futile, and the vessel gradually sinking, they, together with the rest of the workmen, left the ship.

The second officer was in charge at this time, and finding the vessel was settling down, he procured the Tilbury Dock fire engine, but it was of no avail.

At 6 o'clock the vessel was lying at an angle of 18 degrees. She so remained until she was raised. At about 7 o'clock the chief officer returned and took charge.

Immediately before the list, at about 3.50 p.m., there were six men and a boy at work in the starboard engine-room ballast tank. One of the men, Stephen Read, whose deposition before the Essex coroner was produced, states that he heard water coming into the tank from the condenser, and went to one of the manholes, but on account of the rush of water he had some difficulty in getting through. A boy also escaped by the same manhole, being allowed to pass by Read who helped him through. The other men were seen by Read trying to get through the other manhole, but all were drowned, one of them being found after the vessel was raised jammed in the manhole, the others being in the tank.

The vessel when raised was put into dry dock.

The names of the drowned men were:—

Henry Hellmund,  
George Prewer,  
Charles Fairey,  
George Read, and  
William Ringrose.

The Court is of opinion that the engineer in charge

should be always made responsible for all seacocks and valves, no matter in what part of the vessel's side they are situated, and that he should see they are all shut when not in use, and that in ships of the class of the "Orotava," carrying passengers and much valuable property on board, the ballast tank valves should be secured by lock and key, the keys being kept by the commander or officer in charge of the ship. This would ensure the tanks not being interfered with without his knowledge.

The Court was surprised to find that so little organisation existed when this vessel was in Tilbury Dock, that no one appears to have been responsible for the general superintendence of the operations taking place.

Evidence was given by Mr. Rowe and Mr. Sowter, of the Board of Trade, and by Dr. Elgar, F.R.S., and Mr. West, naval architect, of Liverpool, on behalf of the owners. All these gentlemen agreed that when laden and fully equipped for her customary voyage the "Orotava" was in every way a stable and seaworthy ship; but that with her tanks as already described she was not stable at the time of the casualty. Had her four forward ballast tanks been filled, however, she would have been perfectly stable. They also agreed that if the valves had been closed she would not have sunk.

The nominal list of the "Orotava" would, according to the evidence of these four witnesses, be about four degrees, while the vessel on righting would fall to starboard at an angle of about two degrees more than she was at port. Moreover, the presence of free water would be a great disadvantage under her then conditions.

The officers do not appear to have been alive to the vessel's unstable condition at the time, and the Court regrets that they had not studied and made themselves acquainted with curves of stability, which should, in its opinion, form part of the Board of Trade examination.

These were the facts of the case, and on the conclusion of the evidence Mr. Mansel Jones on behalf of the Board of Trade put to the Court the following questions:—

1. What was the cause of the casualty to the "Orotava" on the 14th December last, and what were the circumstances in which five persons lost their lives?
2. Was there a table of curves of stability on board the "Orotava"?
3. Was it possible for the officers in charge of the vessel to readily ascertain either by or without reference to the curve of stability when the circumstances of loading and ballasting rendered the vessel unstable?
4. Was it in the opinion of the Court necessary to furnish a statement showing the stability of the vessel in numerous and varying conditions of coaling and ballasting before an officer could ascertain at any moment whether the vessel had sufficient stability?
5. Whether the course referred to in Question 4 is usually adopted by ship owners, and if not were there any special circumstances in the design and construction of the "Orotava" which rendered this course necessary?
6. Whether as a sea-going vessel the "Orotava" when laden and equipped for sea has sufficient stability?
7. Whether in the opinion of the Court the fact of opening valves and condenser doors for examination, and of keeping them open whilst a vessel is coaling, is attendant with danger?
8. Whether there were any circumstances in connection with the coaling of the "Orotava" on the 14th December from which the engineers should have gathered that the opening of the valves and doors was likely to endanger the vessel?
9. Whether during coaling operations on the 14th December the ballast tanks, or some of them, were only partially filled, and, if so, was this likely to endanger the safety of the vessel?
10. Did the owners of the "Orotava" take reasonable and proper measures to ensure the safety of the vessel and the lives of those on board her whilst she was coaling on the 14th December last?
11. Whether, in the opinion of the Court, blame attaches either to the owners of the "Orotava" or to the chief and second officers or to the second engineer of the vessel?

Mr. Scrutton and Mr. Nelson then addressed the Court on behalf of their respective clients, and the second officer and second engineer having also made

some remarks on behalf of the vessel, given as follows:

1. The cause of a sudden list, water ballast tank partly filled, main circulation which water found tank. This list door not being flowed into the shore hands at 300 men) rushed in a panic. A starboard side

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some remarks to the Court, Mr. Mansel Jones replied on behalf of the Board of Trade, and judgment was given as follows:—

1. The cause of the casualty was that the vessel took a sudden list, falling over to starboard, some of the water ballast tanks being at the time empty and some partly filled, the doors of the condenser off, and the main circulating pump discharge valves open, through which water found its way into the engine-room ballast tank. This list was aggravated by the coaling bunker door not being properly closed, through which water flowed into the starboard side of the vessel; and by the shore hands at work on the vessel (numbering 250 to 300 men) rushing to the quay from the starboard side in a panic. All these openings to the sea were on the starboard side.

Six men and a boy were at work in the starboard engine-room ballast tank; of these one man and a boy succeeded in getting out through one of the manholes. One of the five other men appears to have become jammed in the manhole in endeavouring to get out; and he and the four others in the tank were unfortunately drowned.

2. There was a table of curves of stability on board the "Orotava."

3. The officers in charge of the vessel could not readily ascertain by reference to the curve of stability when the circumstances of loading and ballasting rendered the vessel unstable, as they did not understand the subject.

The only other means of ascertaining when the circumstances of loading and ballasting rendered the vessel unstable would be their previous knowledge of the vessel, which could not be thoroughly relied upon, and from noticing her to be lolling about during the day while coaling.

4. In the opinion of the Court the statement showing the stability of the vessel furnished by the owners was ample.

5. This course appears to be sometimes adopted by ship-owners, but the statement is not usually so full as that supplied on this occasion.

There were no special circumstances in the design and construction of the "Orotava" rendering this course necessary.

6. As a sea-going vessel, the "Orotava," when laden and equipped for sea, was perfectly stable and was a first-class vessel and thoroughly well equipped in every respect.

7. The Court is strongly of opinion that the discharge valves should always be kept shut when the vessel is in port, and when neither the main engines nor the auxiliary circulating pump is at work; and they should be shut down immediately on either of these operations being concluded.

Keeping them open is attended with danger.

8. The Court is of opinion that the engineer in charge should have gathered that there was an element of danger, especially during coaling, by having the valves open when the doors of the condenser were off.

9. During coaling operations on the 14th of December some of the ballast tanks were only partially filled, and this did endanger the safety of the vessel.

10. The owners of the "Orotava" took all reasonable and proper measures to ensure the safety of the vessel and the lives of those on board her whilst she was coaling on the 14th December last.

11. No blame attaches to the owners or to the chief and second officers of the "Orotava."

The Court regrets that it cannot entirely absolve the second engineer from blame, he being in charge of the engine-room at the time.

The Court wishes to recommend that officers of vessels of this description should make themselves thoroughly acquainted with curves of stability, and that this subject should form part of the Board of Trade examinations.

(Signed) R. H. B. MARSHAM, Judge.

We concur.

(Signed) HENRY KNOX, Captain  
R.N.,  
A. RONALDSON,  
J. H. HALLETT, C.E.,  
Engineer, } Assessors.

(Issued in London by the Board of Trade on the 11th day of February 1897.)