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No. 7924

S.S. "ANGLO AUSTRALIAN"

THE MERCHANT SHIPPING ACT, 1894

REPORT OF COURT

In the matter of a Formal Investigation held in London on the 14th June and the 3rd, 4th, 10th and 24th days of October, 1938, before Mr. Kenneth Carpmael, K.C., assisted by Captain W. J. Elford, Captain T. W. Hanney, Mr. T. A. Pearson, M.I.N.A., F.C.M.S., and Mr. A. M. Robb, D.Sc., M.I.N.A., into the circumstances attending the loss of the steamship "Anglo Australian" on or about the 14th March, 1938.

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 most probable cause of the loss of the "Anglo Australian" was the buckling of the shelter deck with subsequent complete fracture from deck to keel.

Dated this 24th day of October, 1938.

KENNETH CARPMAEL, *Judge.*

We concur in the above Report.

W. J. ELFORD,
T. W. HANNEY,
T. A. PEARSON,
A. M. ROBB,
} *Assessors.*

Annex to the Report.

This Inquiry was held at the Institution of Civil Engineers, Westminster, S.W.1, on the 14th June and the 3rd, 4th, 10th and 24th October, 1938. Mr. G. St. Clair Pilcher, K.C., and Mr. O. L. Bateson (instructed by the Solicitor, Board of Trade) appeared for the Board of Trade. Mr. A. B. Carpenter of Messrs. Holman, Fenwick and Willan, Solicitors, appeared for the Nitrate Producers' Steamship Co., Ltd., the owners of the vessel. Mr. Clifford Bennison of Messrs. Bennison, Garrett & Co., Solicitors, appeared for the Navigators' and Engineer Officers' Union and the relatives of the chief and third officers.

The "Anglo Australian", official number 149817, was a single screw steamship built of steel by Messrs. Short Brothers at Sunderland in 1927. Her owners were the Nitrate Producers' Steamship Co., Ltd., of 20, Billiter Buildings, London; she was managed by Messrs. Lawther, Latta & Co., Ltd., and the registered manager was Sir John Latta, Bart.

She had two complete decks, an upper and a shelter deck, and was built under Lloyd's Register Survey to Class ✠ 100 A1 with freeboard corresponding to a draught not exceeding that contemplated by Lloyd's Rules for a complete superstructure vessel having a tonnage opening. She was transversely framed.

Her dimensions were 426 feet in length, 58 feet in breadth, 28 feet 6 inches in moulded depth to upper deck and 36 feet 6 inches in moulded depth to shelter deck. Her tonnages were, under deck 5012·85, gross 5455·19, and net 3331·76.

Her engines were of the direct acting quadruple expansion type giving a speed of about 10½ knots.

She had three cylindrical multitubular steel boilers 14 feet diameter by 12 feet long fitted abreast and having three furnaces each. The loaded pressure was 225 lb. per square inch. Superheating and forced draught arrangements were provided. The boilers were coal fired. The feed water consumption was about seven tons per day and the coal consumption about 26 to 27 tons per day.

The donkey boiler with a loaded pressure of 120 lb. per square inch was fitted in a house over the main boilers.

There were seven steel main transverse watertight bulkheads. The collision bulkhead was carried up to the shelter deck and the other six to the upper deck.

These bulkheads separated the following compartments:—

1. Fore peak tank and storeroom.
2. Fore hold.
3. Fore main hold and cross bunker.
   (A steel transverse non-watertight bulkhead separated the fore main hold and cross bunker.)
4. Engine and boiler room and coal bunkers.
5. Deep tank.
6. After main hold.
7. After hold.
8. After peak tank.

A cellular double bottom was fitted for the length between the two peaks. This comprised Nos. 1, 2, 4 and 5 tanks for the carriage of water ballast. No. 2 tank had a practically watertight longitudinal sub-division and No. 3 tank for feed water in way of engines had a watertight longitudinal subdivision.

There were no main side to side closed-in erections above the shelter deck.

A large saloon house was fitted on the shelter deck about 60 feet forward of amidships and above this was a smaller house which contained the wireless telegraphy installations. The wireless room was about 30 feet above the water line in the ballast condition.

The wireless installations consisted of a Marconi Company's ½ kilowatt quenched gap transmitter worked directly off the ship's mains and also an emergency set operated from batteries. A Marconi Company's MR4B receiver was fitted with a range of 1,000 to 11·5 kilocycles. The main set had a transmitting range of 250 miles by day and 500 miles by night and the emergency apparatus 50 miles by day and 100 to 200 miles by night. A Marconi 11G type direction finder was fitted in the wireless room. The ship had two steel masts placed 253 feet apart. Telescopic wood topmasts were fitted. The wireless aerial was slung between them at a height of about 70 feet above the shelter deck. There was a spare aerial carried in the wireless house.

The main hatchways in the upper or freeboard deck were as follows:—

1. To fore hold 31′ 6″ × 22′ 0″.
2. To fore main hold 31′ 0″ × 22′ 0″.
3. and 25′ 10″ × 22′ 0″.
4. To deep tank 10′ 4″ × 9′ 0″, two in number fitted with watertight steel covers.
5. To after main hold 31′ 0″ × 22′ 0″.
6. To after hold 28′ 5″ × 22′ 0″.

The coamings were all steel 9 inches by 3½ inches bulb angles. Five steel shifting beams were fitted in Nos. 1, 2 and 5, three in No. 3 and four in No. 6.

There were corresponding hatchways with 2 ft. 6 in. coamings in the shelter deck. These were fitted with wood hatch covers, and battening down arrangements and locking bars were provided.

The hatchway 10 feet 0 inch by 22 feet 0 inch over the cross bunker was trunked up to the shelter deck.

The wood hatch covers were all laid fore and aft. There were also the following bunker hatchways in the upper deck in way of the permanent lower bunker spaces:—

7 feet 3 inches by 3 feet 5 inches four in number and 7 feet 0 inch by 3 feet 5 inches two in number each with 9 inch coamings. These were fitted with wood hatch covers laid athwartships. Battening down arrangements were provided.

Trimmers' escape hatchways 2 feet 0½ inch by 2 feet 0 inch with 9 inches coamings were fitted on the upper deck four each to all cargo holds except the after hold which had two only. These escape hatchways were fitted with watertight steel covers.

The saddle back hatchway, at the level of the casing top, which served the coal bunkers, was 7 feet 0 inch by 190 feet 0 inch with a 12 inch coaming.

The tonnage opening 5 feet 2 inches by 22 feet 0 inch, in the shelter deck aft, was fitted with an 11 inch bulb angle coaming and wood hatch covers, but no means were provided for battening down. The wood hatch covers could be secured by lashings on the underside.

Timber was provided for making spare hatch covers.

A steam steering engine was fitted at the shelter deck level at the after end of the machinery casing. The engine was of the horizontal type with cylinders 10 inches diameter by 10 inches stroke and it was controlled from the navigating bridge by rod and bevel gear led along the starboard side just above the casing top.

Emergency gear in the form of wire rope and tackles was fitted at the quadrant and sufficient spare gear was supplied.

The usual pumping arrangements for a vessel of this type were provided.

The ventilation arrangements were in accordance with common practice. The ship was fitted with the usual fire fighting appliances worked from the two bilge pumps and from the general service pump with the usual lengths of hose for a vessel of this class. Patent fire extinguishers were provided.

The " Anglo Australian " had passed her last Special Survey (No. 2) in 1935 and since that date had not been involved in any casualty. She was last drydocked at Cardiff on the 3rd and 4th March, 1938. Her hull was sighted and she appears to have been in good condition on the completion of the docking. Subject to remarks hereafter with regard to certain signs of weakness amidships, the vessel appears to have been well kept up in every respect. Her three main boilers had been opened out for survey in February, 1938, at Birkenhead, the boiler survey being completed at Cardiff in the beginning of March by survey of the donkey boiler. The Court is satisfied that the boilers were in good condition and that the safety valves were properly adjusted.

On the 5th March the wireless installation was tested to some extent and passed by Board of Trade Surveyors.

The vessel commenced taking in bunkers after undocking on the 4th March and completed bunkering in the early morning of the 8th March having taken in 1,869 tons 17 cwt. which with the bunkers remaining on board gave a total quantity on sailing of 1,920 tons. The disposition of the coal is given in the Answer to Question 6.

The " Anglo Australian " left Cardiff in ballast soon after noon on the 8th March, 1938. She had on board a full complement of 38 hands all told. Her draught in salt water appears to have been 12 feet 4 inches forward and 17 feet 6 inches aft. There was no definite information as to which ballast tanks were in fact full but the very careful calculations made on behalf of the Board of Trade indicate that all the tanks must have been full, including the feed water tank No. 3 and the fresh water tanks in the 'tween decks but excluding No. 4 double bottom tank. It was unusual for the No. 4 double bottom tank to have been empty, but assuming it to have been full it would have falsified altogether the draught figures given above. It is possible of course that after sailing the master may have, for example, filled No. 4 tank and also pumped out the after peak which latter, according to some of the evidence, was usually empty.

It was estimated on behalf of the Board of Trade that her displacement on sailing was 7,856 tons, representing a total deadweight on board the vessel of 4,215 tons. Of that amount the figures given above indicate that there was a very considerable concentration of weight amidships which amounted in all to about 2,800 tons out of the total deadweight of 4,215 tons spread over 23 per cent. of the length of the ship, which was already carrying the concentrated weight of engines, boilers, etc.

The stability of the vessel on sailing was generous.

After leaving this country on the 8th March nothing further was heard of her by her owners until they received a wireless message as follows:—

" Passed Fayal this afternoon 9 knots 26 tons bunker consumption. Rough weather all well." This message was despatched from the vessel at 6 to 6.30 p.m. ship's time on the 14th March. The message was sent as a matter of routine and in the ordinary course no further message would be sent until the ship was in the region of the Panama Canal.

Taking into account this message and the fact that she had been in wireless communication on the previous day with another vessel whose position is known, it appears to be probable that the " Anglo Australian " passed the Azores in the channel to the southward of Flores. Evidence and wireless messages have established that on the 14th March there were several other vessels within distances of about 100 to 200 miles or so from the position of the " Anglo Australian " as given above. The weather was, according to evidence from the other vessels, of a severe Atlantic type with a force of wind of 8 to 9 Beaufort scale. A careful examination, moreover, of the available evidence made by experts on behalf of the Board of Trade established that the trough of the storm must have passed nearer to the " Anglo Australian " than any of the other vessels and that this probably occurred during the night of the 14th March. Further, the ship would have been in the right-hand semicircle in the rear of the trough in which position the sea conditions would be worst.

As stated above, the wireless message of the 14th March was the last that was heard of the " Anglo Australian " and no wreckage of the vessel was ever seen. In this connection it is to be noted that certain hatch covers which were sighted about 25 miles off Colon on the 14th May, 1938, some 3,000 miles from the Azores, were not of the same pattern as those fitted in the " Anglo Australian ".

In these circumstances the actual cause of the loss of the " Anglo Australian " must remain a matter of speculation. Various alternative possibilities were outlined on behalf of the Board of Trade as follows:—

(1) a loss possibly due to a failure in the structure or equipment of the vessel;

(2) a loss due to some internal damage such as a boiler explosion or gas explosion in the bunkers; and

(3) a loss due to contact with some external object such as a mine or another ship or wreckage, or by being overwhelmed by phenomenal seas in bad weather.

To deal first with No. 2:—The Court is of opinion that the possibility of a boiler explosion is very unlikely in view of the fact that the boilers had so recently been surveyed and safety valves adjusted. Each boiler had two safety valves and a third in the steam pipe from the superheater, and the failure of all the safety valves is highly improbable. The Court is also of opinion that the likelihood of a

gas explosion in the bunkers can be ruled out as unlikely as the coal supplied was of a nature not prone to spontaneous combustion. Next with regard to the third alternative group, evidence called by the Board of Trade showed that there was an outside possibility of a mine from the coast of Spain having drifted to the presumed vicinity of the disaster. The Court considers it is unlikely in the extreme that the " Anglo Australian " could have hit a mine. There was no evidence of another vessel having been sunk or damaged in the vicinity at this time, and the Court accordingly rules out the possibility of collision with another vessel. Collision with submerged or other floating wreckage cannot of course be ruled out but there was no evidence of any such wreckage having been seen and had such a collision occurred it renders the absence of wireless messages of distress somewhat inexplicable.

With regard to the possibility of the vessel being overwhelmed by phenomenal seas, in the opinion of the Court the weather experienced by the " Anglo Australian " was not likely to have been such as to have involved any such casualty. The " Anglo Australian " was in ballast with a freeboard of about 21 feet and, according to the evidence, it is unlikely in the extreme that a vessel in such a condition can have been so damaged as to have sunk very quickly.

There remains the first group of alternatives and it is in this group that the Court is of opinion that the most probable cause for the sinking of the " Anglo Australian " lies. By a curious coincidence, in the following month a Greek vessel, the " Mount Kyllene ", in ballast condition with a great deal of weight concentrated amidships, in fact buckled her deck and broke in half amidships in a very short time, approximately a quarter of an hour after the first signs of breaking were observed. The weather on that occasion was not nearly so severe as in the previous month, but what happened to the " Mount Kyllene " was apparently that her bow and stern got suspended on the crests of two waves and the concentration of weight amidships caused her to buckle and break.

The concentration of weight in the " Mount Kyllene ' was more severe than in the " Anglo Australian " but the weather conditions including the height of the waves were very much more severe for the " Anglo Australian " than for the " Mount Kyllene ".

In the absence of direct evidence it is impossible to say with certainty that the " Anglo Australian " must have suffered a fate similar to that of the " Mount Kyllene ". On the other hand it is difficult to imagine what else could have caused her disappearance. The catastrophe whatever it was must, in the opinion of the Court, have been rapid but the fact that no message was received does not necessarily involve the assumption that the two parts sank immediately. The important consideration here is that with the main aerial and the main source of power to the wireless transmitter out of action because of the disaster, there would remain only the battery-fed auxiliary transmitter with its range much reduced because of an inefficient aerial. The nearest ship was probably about 90 miles away, see Answer to Question 14, and so may well have been beyond the range of signals.

There is a further consideration of some importance. Within about a year of the " Anglo Australian " being put into commission a crack developed in the structure of the shelter deck. The crack was repaired by welding. Thereafter there was a fairly regular succession of cracks, and of repairs by welding, the last repair being effected shortly before the ship sailed on her last voyage. The frequent recurrence, in the one localised region, rather suggests some deficiency in structural strength. It is true that the cracks would be developed by excessive tensile stress, whereas the sort of disaster which has been envisaged is a consequence, primarily, of excessive compressive stress. Nevertheless the presence of a crack developed under tensile stress, and possibly inadequately repaired, might impair the capacity of the plating to withstand compressive stress.

Moreover there was some evidence to the effect that the shelter deck of the " Anglo Australian " was subject to visible buckling amidships when the ship encountered heavy weather whilst in ballast trim.

Thus there is direct evidence which to some extent supports the possibility that the disaster was a consequence of inability of the structure to withstand the forces imposed on it in heavy weather by concentration of loading. Although there is such evidence the Court does not attach any blame to the owners or other persons concerned for not having recognized at the time that the recurrence of minor cracks indicated weakness of the structure. Such a history of minor damage naturally appears in a different perspective when considered as a whole in the light of after events.

The question whether the structural strength of vessels generally is sufficient under the present rules for cases of concentrated loading is outside the ambit of the present Inquiry. This question is one to which increasing attention has been drawn in recent years. It may be proper to point out that a new rule was approved by the Committee of Lloyd's Register on the 25th June, 1925, and came into force on the 25th December, 1925. The relevant portion of the rule is:—

> Section 13 (1) (*h*) " Where there is indication of particular concentration of loading the Committee may require additional strengthening to be fitted to the decks."

In the light of the two cases of the " Anglo Australian " and the " Mount Kyllene " it may be desirable to examine the whole question more closely.

The Court desires to acknowledge the great assistance given by the experts called by the Board of Trade and the manner in which the case generally was presented to the Court. The Court fully appreciates the careful manner in which the information necessary for the carrying out of these investigations was collected and collated at the Board of Trade, and the assistance of the owners and others concerned.

The Court also desired to extend its deep sympathy with the relatives of the unfortunate men who lost their lives.

KENNETH CARPMAEL, *Judge.*

W. J. ELFORD,
T. W. HANNEY,
T. A. PEARSON,
A. M. ROBB,
} *Assessors.*

The Court's Answers to the Questions submitted by the Board of Trade are as follows:—

Q.1. By whom was the s.s. " Anglo Australian " owned at the time of her loss and for how long had she been in this ownership?

A. Nitrate Producers' Steamship Co., Ltd. Since she was built in 1927.

Q.2. When and by whom was she built? By whom were the engines made?

A. In 1927 by Messrs. Short Brothers, Ltd., at Sunderland. The engines and boilers were made by the North Eastern Marine Engineering Co., Wallsend-on-Tyne, in 1927.

Q.3. What surveys of the vessel were carried out by Lloyd's Register of Shipping?

A. Surveys of hull, machinery and boilers were carried out by Lloyd's Register of Shipping between December, 1935, the date of her last special survey (No. 2), and the time when she sailed, March, 1938, on her last voyage as follows:—

Newcastle Report, No. 94174 Hull, dated 1st September, 1936.

Newcastle Report, No. 94174 Engines and Boilers, dated 31st August, 1936.

Newcastle Report, No. 94750 Hull, dated 19th February, 1937.

Newcastle Report, No. 94750 Engines and Boilers, dated 23rd February, 1937.

Barry Report, No. 23407 Hull, dated 21st June, 1937.

Barry Report, No. 23407 Engines and Boilers, dated 21st June, 1937.

Liverpool Report, No. 110435 Engines and Boilers, dated 28th February, 1938.

Cardiff Report, No. 52332 Hull, dated 7th March, 1938.

Cardiff Report, No. 52332 Engines and Boilers, dated 8th March, 1938.

Barry Report on Annual Load Line Survey, dated 23rd June, 1937.

Q.4. What classification did Lloyd's assign to the vessel? Did the vessel remain in this class up to the time when she sailed on her last voyage?

A. The vessel was classed by Lloyd's as ✠ 100 A1. She remained in this class up to the time when she sailed on her last voyage.

Q.5. From what port and when did the vessel sail on her last voyage? Was she then in good and seaworthy condition?

A. She sailed from Cardiff on the 8th March, 1938. She was then in as good and seaworthy condition as could be reasonably expected in her condition of loading and all the requirements of the Board of Trade and the Classification Society had been complied with.

Q.6. At the time when she sailed on her last voyage, what bunkers had she on board and where were they distributed?

A. She carried 1,920 tons of bunkers distributed as follows:—

601 tons abreast the machinery space in the shelter 'tween deck, in permanent bunkers below the upper deck, and in stokehold pockets.

888 tons in a cross bunker forward of the stokehold and in the shelter 'tween deck over the cross bunker.

431 tons in the shelter 'tween deck forward of the hatch to the cross bunker.

Q.7. At the time when she sailed on her last voyage, how much water ballast did she carry and in which of her tanks was it contained? How much feed and drinking water did she carry and in what compartment was it? What approximate weight of crew and stores had she on board?

A. At the time she sailed on her last voyage it is probable that all her tanks including No. 3 tank and the fresh water tanks in the shelter 'tween deck were full but that No. 4 was empty, the total amount being 2,075 tons. Of this amount there were 964 tons in the deep tank and 274 tons in the peaks. The amount of feed water carried was 136 tons in No. 3 double bottom tank under the engine-room, and 31 tons of drinking water in the tanks in the shelter 'tween deck. The approximate weight of crew and stores on board was 50 tons.

Q.8. What were the vessel's draughts fore and aft at the time when she sailed and how much freeboard had she?

A. The vessel's draughts at the time of sailing were approximately 12 feet 4 inches forward and 17 feet 6 inches aft and her freeboard to the shelter deck was about 21 feet 6 inches amidships.

Q.9. What was the vessel's average consumption of (*a*) bunkers; (*b*) drinking water; (*c*) boiler feed water; and (*d*) stores?

A. The average daily consumption was (*a*) bunkers 26/27 tons; (*b*) drinking water 1 ton; (*c*) boiler feed water 7 tons; and (*d*) stores 2 to 3 cwt.

Q.10. For where was the vessel bound?

A. The vessel was bound for British Columbia ports via the Panama Canal to load a cargo of lumber.

Q.11. What wireless message was received from her on the 14th March, 1938? Was any, and if so what, wireless message received from her subsequent to this date?

A. The following wireless message was received by her owners from the master of the "Anglo Australian" on the 14th March, 1938:—"Passed Fayal this afternoon 9 knots 26 tons bunker consumption. Rough weather all well." No further message was received from her subsequent thereto.

Q.12. Where approximately was the vessel at the time when the wireless message referred to in Question 11 above was despatched?

A. There was no precise information as to where the "Anglo Australian" was when the wireless message referred to in Question 11 was despatched, but she was probably to the northward and westward of Fayal, distant 60 to 70 miles.

Q.13. What was the state of (*a*) the weather; (*b*) the wind; (*c*) the sea; (*d*) the visibility in the approximate vicinity of the vessel on the 14th and 15th March, 1938?

A. There were gale conditions with wind force of nine Beaufort scale with a very high sea, the visibility being moderate. The trough of the storm probably passed the "Anglo Australian" at about 9 p.m. on the 14th March, and the weather continued bad until the forenoon on the 15th March.

Q.14. Were any other, and if so what, vessels in the approximate neighbourhood of the vessel on the 14th March, 1938?

A. The following vessels were in the neighbourhood of the "Anglo Australian" on the 14th March, the approximate distances being as follows:—

At about 6 p.m. "Athelfoam"—90 miles "Scottish Heather"—170 miles "Cerinthus"—160 miles "San Amado"—170 miles.

At midnight. "Athelfoam"—90 miles "Scottish Heather"—180 miles "Cerinthus"—150 miles "San Amado"—270 miles.

Q.15. Did they, or any of them, suffer serious damage as the result of the prevailing weather conditions?

A. Not so far as is known.

Q.16. Has the s.s. "Anglo Australian" been heard of or seen at any time since the 14th March, 1938?

A. No.

Q.17. Has any, and if so what, wreckage from the vessel been recovered?

A. No.

Q.18. What was the probable cause of the loss of the vessel?

A. The most probable cause of the loss of the "Anglo Australian" was the buckling of the shelter deck with subsequent complete fracture from deck to keel.

Q.19. How many members of the crew lost their lives as the result of the casualty?

A. 38.

KENNETH CARPMAEL, *Judge*.

W. J. ELFORD,
T. W. HANNEY,
T. A. PEARSON,
A. M. ROBB,
} *Assessors*.

(Issued by the Board of Trade in London on Saturday, the 12th day of November, 1938.)

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