



THE MERCHANT SHIPPING ACT, 1894

REPORT OF COURT

(No. 7964)

s.s. "Hopestar" O.N. 161592

In the matter of a Formal Investigation held in London on the 4th, 5th, 6th, 9th, 10th, 11th, 12th, 13th, 16th, 17th, 26th, 27th and 28th days of January, 1950, before K. S. Carpmael, Esq., K.C., assisted by Professor L. C. Burrill, Ph.D., M.Sc., M.I.N.A., E. F. Spanner, Esq., M.I.N.A., and Captain C. V. Groves into the circumstances attending the loss of the steamship "Hopestar" of the port of Newcastle-on-Tyne, Official Number 161592, in the North Atlantic on or about 14th November, 1948.

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 was that the "Hopestar" broke in two in bad weather owing to insufficient strength, but there is an outside chance that striking a mine caused or contributed thereto.

Dated this 9th day of March, 1950.

KENNETH CARPMAEL, *Judge.*

We concur in the above Report,

CHARLES V. GROVES }
E. F. SPANNER } *Assessors*
L. C. BURRILL }

QUESTIONS AND ANSWERS

The Court's answers to the questions submitted by the Ministry of Transport are as follows:—

- Q. 1. By whom was the "Hopestar" owned at the time of her loss?
 - A. The Wallsend Shipping Company, Limited, of 4, Mosley Street, Newcastle-on-Tyne.
- Q. 2. By whom was the "Hopestar" managed at the time of her loss?
 - A. Messrs. Stott Mann & Fleming, Limited, of the above address. Registered Manager was Mr. Leslie Mann, of Feniton, Graham Park Road, Gosforth, Northumberland.
- Q. 3. When and by whom was the "Hopestar" built?
 - A. In 1936, by Messrs. Swan Hunter & Wigham Richardson, Limited, at Wallsend-on-Tyne.
- Q. 4. Was the "Hopestar" built in accordance with the plans submitted to and approved by Lloyd's Register of Shipping, or was there any departure from the approved plans in any and, if so, what material particular?

- A. The "Hopestar" was built in accordance with the plans submitted to and approved by Lloyd's Register of Shipping except that two small bunker hatches were fitted in the shelter deck, one on each side immediately forward of the accommodation between frames 89 and 92. This is dealt with fully in the Annex.
- Q. 5. If there was any such departure from the approved plans, who authorised it? Was the departure known to and approved by Lloyd's Register of Shipping?
 - A. Such departure appears to have been authorised by the owners and builders between them. This is dealt with more fully in the Annex. The existence of the hatches was known to the local Lloyd's Surveyor, but he did not appreciate that they were a departure from the approved plans.
- Q. 6. Did such departure reduce the strength of the hull of the vessel?
 - A. Yes.
- Q. 7. (a) In the early part of 1947, was a third main boiler fitted into the machinery space of the "Hopestar" in place of a donkey boiler, and did this entail alterations in the openings in the ship's deck structure?
 - (b) What were these alterations?
 - (c) Were the fitting of the boiler and the consequent alterations carried out under the inspection and to the satisfaction of Lloyd's Surveyor.
- A. (a) Yes.
 - (b) The second deck was cut back on each side for approximately 6 feet 6 inches over a length of about 9 feet between approximately frames 87 and 90½.
 - (c) Yes. This matter is discussed fully in the Annex.
- Q. 8. Did the fitting of the boiler in 1947 and the alterations in the openings reduce the strength of the hull of the vessel?
 - A. Yes.
- Q. 9. When the "Hopestar" was built in 1936,
 - (a) What classification, and
 - (b) what freeboard were assigned to her by Lloyd's Register of Shipping?
- A. (a) +100 A1 with freeboard.
 - (b) 3 feet 7½ inches.

Q. 10. Were this classification and freeboard justified by the strength of the hull structure as disclosed by the original plans submitted to Lloyd's Register of Shipping?

A. Yes.

Q. 11. Were this classification and freeboard justified by the actual strength of the hull structure as built?

A. No.

Q. 12. After the installation of the third main boiler and the alteration in the openings in 1947, was Lloyd's Register of Shipping justified in continuing the Class of the "Hopecstar" and the freeboard assigned to her?

A. No.

Q. 13. Does the reference from time to time in Lloyd's survey reports to damage in way of the deep tank and the fact that the "Hopecstar's" message sent on the 14th November referred to heavy weather damage in way of the deep tank, indicate an inherent weakness in this compartment of the ship? Was there an inherent weakness in the ship in the way of the deep tank?

A. There was no serious inherent weakness.

Q. 14. (a) Did the "Hopecstar" sail from the Tyne on Tuesday, 2nd November, 1948, for Philadelphia, U.S.A., via the North of Scotland route in ballast condition?

(b) What amount of coal bunkers, ballast and fresh water was the "Hopecstar" then carrying, and where were such weights disposed?

A. (a) Yes.

(b) Ballast		Coal	
210 tons D.B.	1,366 D.T.	31	Side bunkers.
97 tons F.P.	98	1	765 Tween decks
103 tons A.P.	494	2	and saddleback.
30 tons Domestic	339	4	379 2A hold.
	68	5	
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440	2,365	1,175	
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Q. 15. What were the sailing drafts of the "Hopecstar"?

A. Actual sailing drafts are not known, but with deep tank full the drafts should have been 12 feet 11½ inches forward, 18 feet 3½ inches aft.

Q. 16. Did the owners receive reports from the master of the "Hopecstar" on the 3rd, 7th and 10th days of November, 1948, giving the vessel's position and speed at noon on each of these days?

A. Yes.

Q. 17. After the 10th November, 1948, did the "Hopecstar" experience bad weather, high wind and heavy seas?

A. Yes.

Q. 18. Did the owners' agents in Philadelphia receive a message from the "Hopecstar" on the 14th November, 1948, and what was that message?

A. Yes, to the effect that the estimated time of arrival at Cape Henlopen was 10.30 p.m. 17th November, and adding that there was heavy weather damage in the way of the deep tank and requesting that Lloyd's surveyors and repairers should be sent on board on arrival.

Q. 19. Was a weather message sent out by the "Hopecstar" approximately eleven hours after the "Hopecstar" sent the message about her arrival at Henlopen, picked up by a Canadian Signal Station, and did this message disclose the fact that at that time the "Hopecstar" was contending with winds at Force 9?

A. Yes.

Q. 20. What was the total crew all told carried on the "Hopecstar" on her last voyage?

A. 40.

Q. 21. (a) Was anything heard or seen of the "Hopecstar" or any wreckage discovered after the sending of the weather message referred to above, and

(b) was the "Hopecstar" posted as a missing vessel at Lloyd's, London, on 31st December 1948?

A. (a) No.

(b) Yes.

Q. 22. What compasses were carried, and where were they placed on the "Hopecstar", and was compass adjustment carried out at the commencement of the last voyage?

A. The usual magnetic compasses which were properly adjusted before the voyage started.

Q. 23. Was the ship supplied with appropriate charts, sailing directions and necessary publications for the voyage?

A. Yes.

Q. 24. Were lifesaving appliances and fire fighting appliances carried in accordance with the regulations on the last voyage?

A. Yes.

Q. 25. Was the "Hopecstar" seaworthy when she left the Tyne on the 2nd November, 1948, to meet the perils of the voyage she was then undertaking; if not, in what respect was she unseaworthy?

A. If the voyage is considered merely as a ballast voyage to America, the Court is unable to say that it is established that she was unseaworthy according to standards accepted at the time, but the Court is of opinion that she was in fact deficient in strength for such a voyage. If, however, the voyage in question is considered as including the loaded leg to the Mediterranean (as the Court is of opinion it does), then the "Hopecstar" was unseaworthy to meet the perils of that voyage, reasons for which opinion are given in the Annex.

Q. 26. If there was any such state of unseaworthiness did it contribute to the loss and, if so, were the owners, registered manager or any other person or party to blame for such state of unseaworthiness?

A. As stated in the answer to question 25, the Court is of opinion that the "Hopecstar" was unseaworthy for the voyage in contemplation but the Court is unable to come to the definite conclusion that such unseaworthiness contributed to the loss, although in the opinion of the Court it probably did.

For the reasons given in the Annex, all concerned in producing the deficiency of strength referred to, namely, owners, registered manager, superintendent engineer and repairers, are blameworthy in varying degrees. This applies to a minor extent to the local Lloyd's surveyors.

Q. 27. What was the probable cause of the loss of the "Hopecstar"?

A. The most probable cause of the loss was that she broke in two in bad weather owing to insufficient strength, but there is an outside chance that striking a mine caused or contributed thereto.

ANNEX TO THE REPORT

This Inquiry was held in London on the 4th, 5th, 6th, 9th, 10th, 11th, 12th, 13th, 16th, 17th, 26th, 27th and 28th January, 1950.

Mr. J. B. Hewson and Mr. L. W. Murray (instructed by the Treasury Solicitor, Ministry of Transport Branch) appeared for the Minister of Transport. Mr. J. V. Naisby, K.C. and Mr. G. N. Boyes (instructed by Messrs. Middleton, Lewis & Company, 53, Leadenhall Street, E.C.3, agents for Messrs. Middleton & Company, 52, John Street, Sunderland) appeared for the Wallsend Shipping Company, Limited; Stott, Mann & Fleming, Limited, and Mr. Leslie Mann. Mr. Roland Adams, K.C., and Mr. Waldo Porges (instructed by Messrs. Parker, Garrett & Company, St. Michael's Rectory, Cornhill, E.C.3) appeared for Lloyd's Register of Shipping. Mr. R. F. Hayward, K.C. and Mr. Vere J. U. Hunt (instructed by Messrs. Bentleys, Stokes & Lowless, 32, Bishopsgate, E.C.2, agents for Messrs. Mark Pybus & Sons, Milburn House, Dean Street, Newcastle-on-Tyne) appeared for Swan Hunter and Wigham Richardson, Limited, and the Wallsend Slipway & Engineering Company, Limited. Mr. P. F. Broadhead (of Messrs. Ingledew, Brown, Bennison & Garrett and Company, 136-138, The Minorities, E.C.3) appeared for the Mercantile Marine Service Association and the Navigators' and Engineer Officers' Union. Mr. Neil MacLean (of Messrs. Neil Maclean & Company, 10, John Street, W.C.1) appeared for the National Union of Seamen. Mr. H. V. Brandon (instructed by Messrs. William A. Crump & Son, 10-11, Lime Street, E.C.3) attended holding a watching brief for one of Lloyd's Surveyors.

The "Hopestar" was a steel, single screw, shelter deck cargo steamer with machinery amidships. She had two decks including the shelter deck and a double bottom extending from the fore peak bulkhead to 11 feet 6 inches forward of the after peak bulkhead. There was one tonnage opening in the shelter deck—at the after end—and the space between the second deck and the shelter deck, with the exception of stores and the crew space aft, was exempt from inclusion in the gross tonnage.

The inner bottom plating, second deck plating and shelter deck plating was edge to edge welded; the watertight bulkheads and fore and aft bulkheads were of welded construction. Otherwise the main hull of the "Hopestar" was of rivetted construction. Deck houses, masts, derrick posts, pillars and a number of other items were welded.

"Hopestar" was built in 1936 by Messrs. Swan Hunter & Wigham Richardson, Limited, at Wallsend-on-Tyne, and was owned by the Wallsend Shipping Company, Limited, of 4, Mosley Street, Newcastle-on-Tyne. She was managed by Messrs. Stott, Mann & Fleming, Limited, of 4, Mosley Street, Newcastle-on-Tyne, and her registered manager was Mr. Leslie Mann, a director of that firm.

The registered dimensions of the "Hopestar" were:—

416.8 feet/57.45 feet/27.0 feet.

The builders' dimensions were:—

Length between perpendiculars	410 feet 0 inches.
Breadth moulded	57 feet 3 inches.
Depth moulded to shelter deck	38 feet 0 inches.
Depth moulded to second deck	29 feet 6 inches.

The tonnages were:—

Under deck	4885.28
Gross	5267.28
Register	3191.92.

The "Hopestar" had 7 watertight steel bulkheads separating the following compartments:—

Fore peak tank, chain locker, and stores.

No. 1 cargo hold.

No. 2 and No. 2A cargo holds.

Machinery space and side bunkers.

Deep tank for cargo or water ballast.

No. 3 cargo hold.

No. 4 cargo hold.

Aft peak tank and store.

The fore peak bulkhead extended to the shelter deck; the other watertight bulkheads stopped at the second deck.

There was a non-watertight steel bulkhead between Nos. 2 and 2A holds.

In the holds clear of the hatchways there were steel non-watertight fore and aft bulkheads on the middle line of the ship. In the forward holds these extended from the double bottom tank top to the second deck; in the after holds they extended from the top of the shaft tunnel to the second deck.

In the deep tank there was a non-watertight steel fore and aft bulkhead on the middle line of the ship extending from the top of the shaft tunnel to the second deck.

There was a steel screen bulkhead between the boiler room and the engine room.

In the 'tween decks, in addition to the fore peak bulkhead, there were the following steel transverse bulkheads:—

On frame 74, at the after end of the engine casing.

On frame 15, at the fore end of the tonnage well.

On frame 13, at the after end of the tonnage well.

The two first had tonnage openings port and starboard closed by boards.

The "Hopestar" had two vertical sliding watertight doors in the bulkhead between the stokehold and No. 2A hold, and one vertical sliding watertight door in the engine room giving access to the shaft tunnel. All three doors could be worked from the shelter deck level.

The "Hopestar" had a short forecastle and three steel deck houses—two amidships and one aft—on the shelter deck. One of the midship deck houses accommodated the officers, and above it was the captain's bridge, on which there was a steel deck house for the master, wireless operator, and wireless room, and over this was the navigating bridge and a wood deck house for the chart room and wheel house. The other midship deck house accommodated the engineers on the port side and petty officers on the starboard side, and over it was the boat deck. This deck house surrounded the machinery casings except the fore end of the boiler casing which projected forward of this house. The galley was at the forward end of the boiler casing. On the boat deck there were steel covers over the fiddley openings and a skylight over the engine casing, and there were six ventilators with steel coamings, 4 to the engine room and 2 to the boiler room. On the after end of the boat deck was a steel house for crew. The deck house at the after end of the shelter deck accommodated crew and steering gear.

The opening to the forecastle was closed by tonnage boards.

Coal was carried in small side bunkers in the boiler room, in the 'tween decks amidships, in a small bunker in the engineers' deck house, and in the coaling hatch trunks. Coal could also be carried in No. 2A hold; this was loaded through a trunked portion of

No. 2A hatch and was accessible to the stokehold, through two watertight doors in the transverse watertight bulkhead.

The 'tween deck coal bunker was bounded at the after end by the steel bulkhead on frame 74 (in line with the after end of the engine casing); the forward end was bounded by a portable wood bulkhead which had alternative positions. When the "Hopestar" sailed on her last voyage this wood bulkhead was on frame 117, that was one frame space aft of the after end of No. 2 hatch.

The approximate capacity of the spaces used for coal on the last voyage were, at 49 cubic feet per ton:

Sides of boiler room P. and S.	31 tons
Shelter 'tween decks between frames 74 and 117	763 tons
Saddleback coal chute above shelter deck	26 tons
Bunker in deck house	42 tons
No. 2A hold	1,429 tons

On the shelter deck there were 6 main cargo hatchways 22 feet wide (one over each hold and one over the deep tank). Nos. 1, 2, 3 and 4 hatchways were about 30 feet long, No. 2A hatch was 22 feet 6 inches long and the hatchway over the deep tank was 15 feet long. The hatchway coamings were steel, 2 feet 6 inches high, and were fitted with horizontal stiffeners and vertical brackets as required by the Classification Society.

On the second deck were 6 main cargo hatchways of the same size as those on the shelter deck, except that to the deep tank there were two hatchways, one port and one starboard, 12 feet 6 inches long and 9 feet 6 inches wide, and a portion of No 2A hatchway, 7 feet 6 inches long, was trunked from the shelter deck to the second deck; the trunk was steel. The hatchway coamings, with the exception of those to the deep tank, were 9 inches bulb angles. The hatchways to the deep tank had 12 inches channel bar coamings and were closed by steel bolted covers.

With the exception of the deep tank hatchways on the second deck, all the main hatchways on the shelter deck and second deck had steel hatch beams about 5 feet apart; wood covers 2½ inches thick were laid fore and aft, and battening down was by the usual arrangement of tarpaulins, battens and wedges. There were two tarpaulins to each hatch.

The tonnage opening on the shelter deck was 4 feet 10 inches long and 22 feet wide. It had a 12 inches channel bar coaming and was closed by wood covers laid fore and aft.

On the boat deck were two coaling hatchways. One, 6 feet long and 16 feet 6 inches wide with steel coaming 2 feet 6 inches high, was trunked to the shelter deck and was fitted with a saddleback to deliver the coal to the sides of the 'tween decks. The other, 7 feet 6 inches long and 16 feet 6 inches wide with 9 inches steel coaming, served the 'tween deck space and the small bunker in the engineers' deck house.

On the shelter deck amidships abreast the boiler casing were two coaling hatches 6 feet 6 inches long, 3 feet 7 inches wide with steel coamings 2 feet 6 inches high, and on the second deck below these were two small coaling hatchways with 9 inches bulb angle coamings to the side bunker in the boiler room.

In the forecastle was a small hatch to the fore peak stores with 9 inches bulb angle coaming, and on the shelter deck aft was a small hatch to the aft peak stores with 2 feet 6 inches steel coaming.

There were 20 small trimmers' escape hatches on the second deck with 9 inches bulb angle coamings.

The hatches on the boat deck and the small hatchways were closed by wood covers 2½ inches thick, and battening down was by the usual arrangement of tarpaulins, battens and wedges. There were two tarpaulins to each hatch.

Hatch lashings were supplied as required by the Classification Society.

On the second deck, over the deep tank, were two manholes closed by hinged steel watertight covers.

The double bottom tanks under the holds and deep tank were used for water ballast. Those under the machinery space were used for boiler feed water. The peak tanks were used for fresh water or water ballast. The deep tank was used for cargo or water ballast.

The capacities of the tanks were:—

	Water Ballast Tons	Fresh Water Tons
No. 1 double bottom (under No. 1 hold)	98	—
No. 2 double bottom (under Nos. 2 and 2A holds)	494	—
No. 3 double bottom (under boiler room)	—	100
No. 3A double bottom (under engine room)	—	110
No. 4 double bottom (under deep tank and No. 3 hold)	339	—
No. 5 double bottom (under No. 4 hold)	68	—
Fore peak tank	100	97
Aft peak tank	106	103
Deep tank	1,366	—
Total	2,571	410

The double bottom tanks, except Nos. 1 and 5, were divided into port and starboard tanks by a watertight centre line girder.

There were two domestic fresh water tanks in the 'tween decks, each with a capacity of about 13½ tons.

The deep tank extended from the inner bottom to the second deck. It extended from side to side of the ship and had a non-watertight bulkhead on the middle line extending from the top of the shaft tunnel to the second deck.

The "Hopestar" had steel bulwarks on the shelter deck abreast the midship deck houses and abreast No. 1 hatch; elsewhere round the shelter deck and erection decks were rails and stanchions.

There was one freeing port each side of the tonnage well. These were 12 inches above the second deck and were fitted with hinged steel covers.

Side scuttles to the crew spaces in the 'tween deck aft were fitted with hinged deadlights.

Scuppers and discharges from the after crew spaces in deck house and in 'tween decks, and scuppers from the stores in the 'tween decks amidships, from the tonnage well and from the after 'tween deck cargo space, were led overboard below the second deck. Scuppers and discharges from the midship deck houses were led overboard above the second deck. With the exception of those from the tonnage well, scuppers and discharges were fitted with storm valves at the ship's side.

An ash shoot from a hopper on the shelter deck forward of the boiler casing was led overboard on the port side about 4 feet below the second deck.

On the forecastle deck and shelter deck there were ventilators to the stores, cargo 'tween decks, cargo holds, deep tank and shaft tunnel. The coamings were steel, 3 feet 0 inches high, within ¼ length of the ship from the stern and 2 feet 6 inches high elsewhere. Wood plugs and canvas covers were provided for closing these ventilators. Two derrick

posts at the forward end of the midship deckhouse ventilated the 'tween decks, and the two derrick posts at No. 3 hatch ventilated the forward end of No. 3 hold.

Ventilators to the machinery spaces are given under machinery casings.

On the forecastle deck and shelter deck there were air pipes to the peak tanks, double bottom tanks and rudder trunk. They were all 18 inches high and wood plugs were provided for closing.

There were two 6 inches diameter overflows (one port, one starboard) to the deep tank. Each of these consisted of a vertical pipe rising from the deep tank top near the ship's side and discharging overboard through a spring loaded non-return valve on the ship's side about 4 feet 6 inches above the tank top.

The propelling machinery of the "Hopestar" comprised H.P. and L.P. ahead, and H.P. and L.P. astern turbines driving a single shaft through double reduction gearing made in 1934 by Parsons Marine Steam Turbine Company, Limited, Wallsend-upon-Tyne, and three steel cylindrical, single-ended, multi-tubular coal-fired boilers made by the Wallsend Slipway & Engineering Company, Limited, Wallsend-upon-Tyne, two in 1936, and the third in 1947. The "Hopestar", when built, had two boilers and a donkey boiler. In 1947, the two main boilers were moved outboard, the donkey boiler was removed, and a third main boiler was added between the other two. The boilers were fitted with forced draught and smoke tube superheaters, and their normal working pressure was 285 lbs. per square inch.

The B.H.P. of the turbines was 2,000.

The service speed of the loaded ship was about 10 knots.

The bilges in the holds, boiler room, engine room and shaft tunnel could be pumped out by the following pumps :—

Bilge pump driven by the main engine.

Ballast pump and general service pumps driven by independent steam engines.

The engine room bilge could also be pumped out by the bilge injection connected to the main circulating pump driven by the main engine.

For electric lighting and wireless telegraphy apparatus, the "Hopestar" had two main and one auxiliary steam driven generators, and distribution was double wire 110 volts direct current.

The "Hopestar" had steam steering gear; the steam engine was situated in the after deck house on the shelter deck and was controlled by telemotor from the bridge.

The "Hopestar" had the following anchors and cables :—

2 Bower Stockless anchors 68 cwts. each.

1 Spare Bower Stockless anchor 58½ cwts.

1 Stream anchor 24 cwts. including stock.

270 fathoms 2 inch diameter "Tayco" type cable weight 577 cwts. 2 qrs. 21 lbs.

90 fathoms 5 inch circumference steel wire.

The fire extinguishing appliances comprised :—

A fire and wash deck main along the shelter deck, fitted with hose connections.

A lead from the main deck steam line to the lower part of each cargo hold, including the deep tank, also a lead to the forward 'tween decks and a lead to the after 'tween decks.

Two gallon chemical fire extinguishers. The owners' superintendent has stated that there were ten of these extinguishers and that these were overhauled and refilled shortly before the ship sailed on her last voyage.

The "Hopestar" had one Class 1A wood lifeboat under radial davits on each side of the boat deck. The dimensions of the boats were :—

Port side—27.85 feet/8.5 feet/ 3.5 feet certified for 49 persons.

Starboard side—27.0 feet/8.25 feet/3.4 feet certified for 41 persons.

The starboard boat had a motor.

Other lifesaving appliances included :—

42 lifejackets.

8 lifebuoys.

A line-throwing appliance.

The lifesaving appliances were inspected by a Ministry of Transport Surveyor in October, 1948, and were certified as being in a satisfactory condition.

There was also one 14 foot dinghy under radial davits on the captain's bridge.

The navigation lights and sound signals were inspected by a Ministry of Transport Surveyor in October, 1948, and were certified as being in a satisfactory condition.

The "Hopestar" had the following Marconi wireless telegraphy apparatus :—

Transmitter ¼ k.w. Type 533.

Receiver Type 730.

Second Channel Receiver Type 784.

Direction finder Type 579.

There were two alternators, one dynamo driven and one operated by a battery installation.

The wireless telegraphy apparatus was inspected by a Government Surveyor on the 26th May, 1948, and a safety radiotelegraphy certificate was issued at that time. An interim inspection of the wireless telegraphy apparatus was carried out by Government Surveyor in November, 1948. The apparatus was inspected by a Marconi Inspector in November, 1948. The direction finder was calibrated and a Marconi Seavisa echometer was fitted and tested when the vessel was last in port.

The "Hopestar" was built under Lloyd's survey. She was classed Lloyd's +100 A1 "With Freeboard". The last special survey was commenced in 1946, and completed in 1947.

A load line certificate was issued by Lloyd's Register of Shipping on the 1st April, 1946, to remain in force until 28th February, 1949.

The assigned freeboards were :—

Tropical 3 feet 1 inch.

Summer 3 feet 7¼ inches.

Winter 4 feet 2 inches.

The fresh water allowance for all freeboards was 6¾ inches.

The freeboards were measured from the top of the second deck stringer plate at side. The draft corresponding to the summer freeboard was 26 feet 0½ inches.

The last examination in drydock and the last annual freeboard survey were held in October, 1948.

The "Hopestar" carried the following portable lifeboat wireless apparatus :—

Receiver—Rees Mace. Type W. Serial Number 5692.

A Transmitter I.M.R. Type T.G. 5 B. Serial Number 267.

Ordinary magnetic compasses were fitted.

The "Hopestar" sailed from the Tyne at about 8 p.m. on Tuesday, the 2nd November, 1948, bound for Philadelphia, U.S.A., in ballast. Captain F. H. Duffton had been master since August, 1947, having previously been the chief officer, and the crew consisted of 40 persons all told.

No solid ballast was carried, but 1,200 tons of bunkers had been taken. The probable disposition of coal, ballast, etc., on sailing is given in the answer to question 14.

The "Hopestar" proceeded by the North of Scotland, and the normal bi-weekly messages were received by the owners from her.

It is clear from these messages that from 10th November the "Hopestar" encountered rough weather which, however, does not appear to have exceeded the normal for a winter North Atlantic voyage. At 1.0 a.m., G.M.T., on the 14th November, the master sent a message to the owners' agents at Philadelphia, giving the estimated time of arrival at Cape Henlopen as 10.30 p.m. on the 17th November, adding that there was heavy weather damage in the way of the deep tank and requesting that Lloyd's surveyors and repairers should be sent on board on arrival. There was nothing in the message to indicate any special urgency. At noon, G.M.T., on the same day, the "Hopestar" (which was a weather reporting ship) sent out a weather message reporting wind W.S.W. force 9, in position latitude 43° N., longitude 56.8° W., i.e., about 150 miles South-East of Sable Island. This was the last news to be received from or relating to the "Hopestar" from any source. No wreckage was found, and on the 31st December, 1948, the "Hopestar" was posted as a missing vessel at Lloyd's, London.

There was no suggestion that the general upkeep of the vessel was otherwise than satisfactory, and the Court so finds.

The "Hopestar" had been built under supervision of Lloyd's Register of Shipping Surveyors, being classed +100 A1 with freeboard, which class was thereafter maintained, Lloyd's Register of Shipping under an assigning authority for freeboard purposes under the provisions of the Merchant Shipping (Safety and Load Line Conventions) Act, 1932.

Her disappearance without trace, therefore, was a matter of grave concern and called for the closest possible investigation into all the possible causes.

Four causes were suggested as possible, namely :

- (1) Breaking in half due to insufficient strength.
- (2) Striking a mine.
- (3) Being overwhelmed by heavy seas.
- (4) Bursting of boilers.

With regard to (3) the Court is of opinion that, having regard to the fact that the vessel was in ballast with a high side out of water, this cause is unlikely in the extreme and can be ruled out of account.

With regard to (4) there was evidence, which the Court accepts, that the boilers were in good condition with a number of adequate and proper safety valves. The Court regards this suggestion as not feasible.

The possibility of striking a mine cannot be altogether dismissed, but the Court is of opinion that the possibility is a remote one. There was evidence that floating mines had been reported in various parts of the North Atlantic during 1947 and 1948. Some of these reports, however, were doubtful, and the only casualty since the war that has been established as being due to a floating mine was that of the "Cydonia" in the Irish Sea on 21st October, 1949. It has to be remembered in this connection that by international convention a moored mine is supposed to become harmless when it breaks adrift and, according to the expert evidence called in connection with this matter, such mines become harmless in 90 per cent. of the cases. According to the same expert evidence, the chance of a vessel striking a floating mine is very remote.

Having carefully considered the possibilities, the Court has come to the conclusion that it is unlikely in the extreme that the "Hopestar" struck a floating mine, though it feels that the possibility of this happening cannot be altogether ignored.

There remains to be examined the first suggested cause, namely, breaking in half due to insufficient strength. The case presented on behalf of the Minister was that there had been considerable reduction in longitudinal strength resulting from two sets of alterations in the structure and that the loss was due to fracture of plating under compressive stresses in the way of those alterations. It is therefore necessary to examine in some detail what these alterations were, how they came to be made, and what was the theoretical loss in strength thereby.

Although, as stated above, the vessel had been given the highest class and the minimum freeboard by Lloyd's Register of Shipping, the Assigning Authority, there is no doubt that had all the facts been known this would not have been done because of two matters which came to light during the preliminary investigation made on behalf of the Minister. These caused a reduction in strength in the way of frame 90 to 84.3 per cent. of that required by the Rules.

In the first place, before the vessel was built, her plans were placed before Lloyd's Register of Shipping in London for approval. The plans so submitted on which the strength was determined and freeboard allotted contained no side bunker hatches in the shelter deck. When this fact was appreciated during building, two small bunker hatches, one on each side, were fitted in the shelter deck immediately forward of the accommodation between frames 89 and 92, that is, a little forward of amidships. No application was made, however, at the time to Lloyd's Register of Shipping in London for approval, and it is left in doubt whether there was any consultation between the builders and the local Lloyd's Surveyor.

In considering this matter and another alteration which was made subsequently, it is necessary to have in mind Rule XXXVII of the 2nd Schedule of the 1932 Act referred to above, which is as follows :—

Strength.

The Assigning Authority is to be satisfied with the structural strength of ships to which freeboards are assigned.

Ships which comply with the highest standard of the rules of a Classification Society recognised by the Administration, shall be regarded as having sufficient strength for the minimum freeboards allowed under the Rules.

Ships which do not comply with the highest standards of the Rules of a Classification Society recognised by the Administration, shall be assigned such increased freeboards as shall be determined by the Assigning Authority

The Rule goes on to formulate for guidance certain strength moduli, and was reproduced in essence in Statutory Rules and Orders made under the 1932 Act, the copy used at the Inquiry being 1941 No. 1464. It was under these Rules that the minimum freeboard was given to the "Hopestar" on being built, as according to the approved plans the strength would have been up to 100 per cent. required by the Classification Society Rules.

The fitting of the two bunker hatches however reduced the strength of the vessel to 91.6 per cent. of that required by those Rules, and it is clear therefore that the minimum freeboard was in fact wrongly assigned.

The Court is satisfied that at the time the vessel was built the hatches were fitted without any calculations being made by anyone as to what, if any,

reduction in strength according to the Rules would result. Nor was any compensation made, for example, by doubling plates.

Speaking after the event, some of the witnesses claimed that the loss of strength against sagging stresses occasioned by the fitting of the hatches was compensated for by the coamings fitted thereto which were 2 feet 6 inches high, but it was agreed that the figure 91.6 per cent. which was put forward by the expert on behalf of the Minister was arithmetically correct, it being the accepted practice to leave all coamings out of account in arriving at these strength criteria.

Having carefully considered the whole matter, the Court sees no reason not to accept 91.6 per cent. as indicating the reduction in longitudinal strength both under the Rules and in fact.

Again speaking after the event, the surveyor who was supervising the building on behalf of Lloyd's Register of Shipping expressed the opinion that the fitting of these hatches was a marginal matter which he might have approved himself or might have referred to London. He would, however, have required compensating strengthening in the way of the hatches and in either case the specific attention of Lloyd's Register of Shipping in London would have been drawn to the matter. As it was there was no compensating strengthening, and although the two hatches were actually shown on the as-built plans and other information sent to the London Office, the fact that there had been any departure from the approved plans was not appreciated there, and freeboard was assigned on a 100 per cent. strength basis.

After this lapse of time, recollections as to what actually happened between the builders and the local surveyor have naturally become dim. In addition, some of the working plans have been destroyed. It is also only fair to say that during her whole life no signs of weakness in the way of the hatches became apparent and it would therefore appear possible that *by themselves* these hatches did not constitute any serious source of weakness.

The Court, therefore, is disinclined to attribute any blame to either the builders or the surveyor. It does desire, however, to emphasize the necessity for the utmost co-operation between shipbuilders and representatives of a Classification Society with a view to all significant departures from the approved plans being noted, reported and compensated for as necessary.

With regard to the London Office of Lloyd's Register of Shipping, the Court considers that no blame is attributable for failure to appreciate a difference between approved and as-built plans. The Court is also satisfied that since the "Hopestar" was built further checks have been instituted which should prevent a similar failure.

The second matter in which the strength of the vessel was reduced was in connection with a decision taken in 1946 to instal a third main boiler in place of the donkey boiler which was originally placed amidships between the two main boilers. In order to carry out this work the two original main boilers had to be moved out nearer to the sides of the vessel, necessitating abolishing a large portion of the wing bunkers; cutting away the deck above to the extent of 6 feet 6 inches, on each side over a length of about 9 feet, between approximately frames 87 and 90½; and the fitting of a small bunker hatch on each side of the second deck at the forward end of the bunker space. The work of installing the boiler was entrusted by the owners to the Wallsend Slipway & Engineering Company, Limited, to be carried out while the vessel was undergoing special survey during the first few months of 1947.

The Court is satisfied that the superintendent engineer on behalf of the shipowners instructed the repairers during the course of the work that as there was to be cutting away of the deck this was a strength question and should be carried out to the Classification Surveyor's requirements.

The Court is also satisfied, however, that as this was a strength question it was a matter which should not have been delegated in this way and that it was and remained the duty of the owners, the registered manager and their superintendent engineer to ensure that the approval of the Classification Society was obtained for the proposed alterations and to see that the necessary compensation was provided in substitution for the structure that was being cut away.

In fact no calculations were made at the time by anyone as to what reduction in strength would be involved and, owing to the death of the foreman and the destruction of the working plan, it was impossible to establish at the Inquiry what work was in fact carried out. An approximate plan made up from recollection of other people concerned was, however, used for the purposes of the Inquiry and accepted as more or less accurate. On the basis of this plan the loss of strength in the area affected, coupled with the loss of strength caused by the fitting of the shelter deck hatches, brought the strength under the Rules down to 84.3 per cent.

Owing to the death of the foreman in charge of the work the Court was left in doubt (a) what instructions, if any, he had with regard to his informing the local surveyors with regard to the alterations proposed, and (b) what information, if any, he gave to the surveyor. The fact remains that for one reason or another the local surveyors appear not to have appreciated what was being done, or the deleterious effect this was likely to have on the strength. In the result no communication was made to the London Office.

As stated above, the strength under the Rules was thus reduced to 84.3 per cent. in a part of the ship where both sagging and hogging strains are at their highest.

The Court is well aware that the strength under the Rules is largely to do with the allocation of freeboard, that is to say that if the strength is not up to 100 per cent. of the Rules standard a greater freeboard may be assigned which applies, of course, to a loaded voyage. But it is also quite clear, as pointed out by the Ministry expert, that the strength of a ship cannot be and is not solely determined by her loaded condition. An Assigning Authority, in fixing the freeboard allowable, must always have in mind the strength question and would not be justified in merely increasing the freeboard where there was a significant reduction in strength.

There have been a number of cases of failure of vessels in the ballast condition and the matter was investigated by Mr. James Montgomerie, Chief Surveyor to Lloyd's Register of Shipping, whose paper in 1934 with regard to experiments on the compression of deck plating remains the standard work on this subject.

It was contended by the expert called on behalf of the Minister that the strength requirements under the Rules, in effect, represented a minimum although he conceded that it was a question of degree. He, however, was firmly of the opinion that had he known as an Assigning Authority of the reduction of strength to 84.3 per cent. he would not have been satisfied with her structural strength. In expressing this opinion and in dealing in particular with the virtue or otherwise of hatch coamings, he emphasised the fact that in the part of the ship in question there are so many discontinuities that their effect is to concentrate compressive stresses rather than the reverse. He also stated that had he known that the strength was down

to 84.3 per cent. he would not have allowed the ship to go to sea, because the ballast trip across the Atlantic was only part of the voyage in contemplation, the second leg being to the Mediterranean after loading a full cargo.

The evidence on behalf of Lloyd's Register of Shipping was not very different in effect. The Principal Ship Surveyor (Research) of Lloyd's Register of Shipping in London gave it as his opinion that the strength of the "Hopestar" was adequate. He, however, gave this opinion subject to very important reservations. He confined his opinion to her strength for a ballast voyage, and even in that condition he would have advised certain restrictions in loading, that is to say, keeping the peaks full and possibly in reducing the amount of weight amidships. He would also have insisted that she would have to be strengthened in America before she undertook a loaded voyage. To use his own words, he would have said: "Well, you will have to strengthen her eventually; why not do it now?"

In these circumstances before trying to arrive at any opinion it would obviously be desirable to have precise information as to her exact condition with regard to disposition of weights at the time of her presumed loss.

Unfortunately, the Court is not in possession of such precise information, because although a fairly good approximation can be made as regards most of the weights, it is not known what the actual condition of the peak tanks was at the time of the loss. The condition of the tanks appears to make all the difference to the calculations. If the peak tanks were full at the time of the loss, the calculated stress in the shelter deck plating would have been 7.05 tons per square inch as compared with a safe stress according to Montgomerie's curve of 7.6.

If, however, one or other of the peaks were empty, the calculated stress would have been 7.9, and with both peaks empty, 8.42.

In the estimated sailing condition (see answers to questions 14 and 15) the draft should have been 18 feet 3 inches aft, whereas the tips of the propeller would only be immersed at a draft aft of about 18 feet 8 inches. As the voyage progressed the tips would emerge still further. There was evidence from a previous master that when the engine room tanks were within three or four days of being empty the practice was to refill them from one or other of the peaks.

After the third boiler was installed it is probable that the consumption of fresh water on a ballast voyage was 12 to 15 tons a day. It is therefore clear that by the 14th November, when she was 12 days out, the time had come for a transfer of water to the engine room tanks.

The Court is of opinion that in order to obtain deeper immersion of the propeller, which was obviously desirable with a view to better control, it is likely that the fresh water in the fore peak tank would have been transferred first but that the after peak would probably have been left full. If this were the fact, the calculated stress in the shelter deck plating would, as pointed out above, have been 7.9 tons per square inch, that is to say just, but only just, outside Montgomerie's curve.

It is, however, very important to bear in mind that all the above calculations are based on static conditions in association with standard wave profiles and, in the opinion of the Court, the actual stresses arising from dynamic forces may considerably exceed those of static conditions, particularly in the case of a vessel in ballast. Moreover, where as in this case, the loss of strength is associated with so many uncompensated discontinuities, the Court is of opinion that the theoretical calculations set out above are not necessarily reliable indications of adequate strength.

As pointed out above, there was no history of defects in connection with the two shelter deck bunker hatches, but there was one incident which occurred during the first voyage after the third boiler was fitted which deserves mention.

In May, 1947, the "Hopestar" proceeded in ballast across the Atlantic and encountered very bad weather during which some waviness (which had not been noticed before) was observed in the shelter deck between two frame spaces on each side just forward of the small bunker hatches. Similar waviness was also observed on the shelter and second deck just forward of the deep tank about in the way of frame 70. Some of the waviness appears to have straightened out after loading. It was examined in Halifax and again after return to England, when the defects noted were removed by Lloyd's Surveyors from the Special Reasons list as they were considered to be of negligible importance. Whether or not the decision to remove these defects from the Special Reasons list would have been made if all the facts set out above had been known must remain a matter of speculation, but the Court hazards a guess that they would not have been removed until the vessel had been brought up to strength as required by the Rules.

In all the circumstances the Court has been unable to come to any definite conclusion that the "Hopestar" was deficient in strength for a ballast voyage according to accepted standards at the time. Accordingly, it is unable to say that she was unseaworthy according to those standards when the question of a ballast voyage only is being considered.

The Court desires, however, to point out in the strongest possible way that this would be an utterly artificial way in which to approach this very serious matter. Those in charge of the vessel were completely unaware that owing to the alterations made in the vessel she was only up to 84.3 per cent. of the strength required by the Rules, and for this state of affairs all concerned, namely, owners, registered manager, superintendent engineer and repairers are blameworthy in varying degrees. The local Lloyd's Surveyors are also to some extent to blame, but the Court is satisfied that had their attention been formally drawn to what was being done and had the matter been discussed (as it should have been), additional compensating strength would have been insisted on. Owing to their self imposed ignorance those concerned had no intention of remedying this lack of strength in America before she started a loaded voyage, and for a loaded voyage she was admittedly too weak.

In these circumstances the "Hopestar" when she sailed was undoubtedly unseaworthy for the voyage contemplated, that is to say a voyage consisting of two legs, one in ballast to America, and the second loaded to the Mediterranean.

In the circumstances set out above, however, the Court is unable to come to the definite conclusion that such unseaworthiness was the cause of the loss of the "Hopestar". But the Court does come to the conclusion that the most probable cause of the loss was deficiency in strength caused by the alterations in design which resulted in the vessel breaking in half in bad weather and foundering shortly after.

It follows that although the Court is unable to come to the definite conclusion that the "Hopestar" was deficient in strength for a ballast voyage according to accepted standards, nevertheless the Court is of opinion that the "Hopestar" was *in fact* deficient in strength for a ballast voyage.

It is clear that finality of view has not yet been reached with regard to the minimum strength necessary for such voyages, but it is also clear that uncompensated discontinuities for example at hatch corners must be avoided.

In the opinion of the Court there is still insufficient knowledge of the strains imposed upon a vessel in the ballast condition in bad weather, and the Court considers that there is an urgent need for this matter to be investigated afresh in the light of modern knowledge in order to define the possible stresses occurring in various parts of the structure arising not only from sagging due to concentration of load, but also from the strains caused by violent pitching, heaving and pounding which is experienced in bad weather.

These are, however, matters which would be better considered by a technical committee rather than by a tribunal such as the present one, and the Court recommends that immediate steps should be taken to set up such a committee.

KENNETH CARPMAEL, *Judge*.

We concur.

CHARLES V. GROVES }
E. F. SPANNER } *Assessors.*
L. C. BURRILL }

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