

(No. 7906.)

"JOSEPH MEDILL" (M.V.)

THE MERCHANT SHIPPING ACT, 1894

REPORT OF COURT

In the matter of a Formal Investigation held at the Moot Hall, Newcastle-upon-Tyne, on the 21st, 22nd and 29th days of July, before His Honour Judge Richardson, O.B.E., assisted by Commodore H. Stockwell, C.B., D.S.O., R.D., Captain Piers de Legh, and Mr. J. L. Scott, M.Sc., M.I.N.A., into the circumstances attending the loss at sea of the m.v. "Joseph Medill" on or after the 17th day of August, 1935.

The Court having before it the Questions submitted by the Board of Trade, finds, upon the evidence given at the Investigation and for the reasons stated in the Annex hereto, that the said Questions ought to be answered as follows:—

Questions and Answers.

1. Q. Who were the owners of the m.v. "Joseph Medill"?

A. The owners were the Quebec and Ontario Transportation Company, Limited, of Montreal.

2. Q. When and by whom was the vessel built?

A. The keel was laid on the 16th February, 1935. The ship was launched on the 4th July, 1935. She was built by Messrs. Swan, Hunter, and Wigham Richardson, Limited, of Wallsend-on-Tyne.

3. Q. Who prepared the design and specifications for the construction of the vessel? Did the design and specifications indicate the method to be followed in constructing her?

A. The design and specifications for the construction of the vessel were prepared by Walter Lambert, M.I.N.A., senior partner in the firm of Lambert and German, Naval Architects and Marine Surveyors, Montreal, Canada, in co-operation with his partner and staff. The design and specifications did indicate the method to be followed in her construction.

4. Q. Was the vessel constructed in accordance with the method indicated in the design and specifications? Was the method of her construction by welding prudent, and should it have resulted in producing a seaworthy ship?

A. The vessel was constructed in accordance with the method indicated in the design and specifications. The method of her construction by welding was prudent and should have resulted in producing a seaworthy ship. Our reasons for coming to this conclusion are elaborated in the Annex.

5. Q. Was the vessel built to a class of Lloyd's Register of Shipping? What class did Lloyd's Register assign to her?

A. Yes. The class assigned by Lloyd's Register was $\frac{1}{2}$ A.1. for service in the Great Lakes and the Gulf of St. Lawrence (from April to October) and at an extreme draught of 14 feet; also $\frac{1}{2}$ L.M.C.

6. Q. Were the scantlings of the vessel considered by Lloyd's Register of Shipping? Were the scantlings considered by Lloyd's sufficient for any, and if so what, draught?

A. The scantlings of the vessel were considered by Lloyd's Register of Shipping and were considered sufficient for service on the Great Lakes at a draught of 14 feet in fresh water, corresponding to 13 feet 8 inches in salt water.

7. Q. What freeboard was assigned to the vessel for her voyage across the Atlantic? By whom and at whose request was that freeboard assigned? Were the scantlings considered by the assigning authority before the freeboard was assigned?

A. The freeboard assigned to the vessel for her voyage across the Atlantic was 9 feet. It was assigned by the Board of Trade at the request of the Government of Canada. The scantlings were considered by the assigning authority before this freeboard was assigned.

8. Q. Was the vessel registered in the United Kingdom? If not, on what certificate did she obtain her clearance? At whose request was this arrangement carried out?

A. The vessel was not registered in the United Kingdom, but was granted a temporary certificate authorising her to proceed to Montreal for registration, under the command of Captain James Mackintosh. This arrangement was carried out at the owners' request.

9. Q. By whom and at what date was an International Load Line Certificate issued to the vessel? When did that Certificate expire?

A. The International Load Line Certificate was issued by the Board of Trade on the 25th July, 1935, and expired on the 16th January, 1936.

10. Q. What were the conditions in the building contract as to the speed to be attained on the vessel's loaded trial? At what draught was the trial to be run?

A. The conditions in the building contract as to the speed to be attained on the vessel's loaded trial were that the speed should be $9\frac{1}{2}$ statute miles per hour, with the engines working at normal specified power and revolutions, without overload; as determined by exhaust temperatures and fuel consumptions. The trial was to be run on a 14-foot draught on even keel.

11. Q. Did the Board of Trade take any, and if so what, steps to permit the loaded trial of the vessel to be run on that draught?

A. Yes. The Board of Trade decided in the special circumstances of the case that they would agree to this vessel being loaded to a draught of 13 feet 8 inches in salt water for the purpose of the loaded trial.

12. Q. Where was the trial run? Were the modifications allowed in the draught safe and satisfactory in the circumstances?

A. The trial was run on the Burntisland Mile on the 3rd August, 1935. The modifications allowed in the draught were safe and satisfactory in the circumstances.

13. Q. When the trial run had been completed, was the vessel lightened to bring her up to the freeboard assigned for the trans-Atlantic voyage?

A. Yes.

14. Q. Was the loaded trial run satisfactorily (a) as to speed, (b) as to the steering qualities of the vessel?

A. According to evidence given in Court, the loaded trial run on the 3rd August, 1935, was unsatisfactory in respect of the steering qualities of the vessel and, in consequence, her speed was affected adversely.

15. Q. Were any, and if so what, alterations made in (a) the rudders; (b) the skegs on the hull of the vessel, after the trial run?

A. In consequence of this trial the following alterations were made:—(a) About 6 inches was cut off the fore end of both rudders. (b) The centre skeg was extended aft so as to come within a few inches forward of No. 1 frame. Extra skegs were put under the propeller bossings.

16. Q. Was a further loaded trial carried out after the alterations had been made? Was the trial satisfactory?

A. Yes, a further loaded trial was carried out on the Hartley Mile off the Northumberland Coast on the 19th August, 1935. This trial was carried out after the alterations had been made, and was satisfactory.

17. Q. At what draught was the vessel when this trial run was made? When the trial run had been completed was the vessel lightened to bring her up to the freeboard assigned to her for her trans-Atlantic voyage?

A. When this trial run was made her draught was 13 feet 7½ inches. Prior to the vessel sailing on the trans-Atlantic voyage she was lightened to bring her up to the freeboard assigned for that passage.

18. Q. Were her (a) main and (b) auxiliary steering gear in good and seaworthy condition when she sailed, having regard to the voyage on which she was proceeding?

A. Yes.

19. Q. Was any application made to the Board of Trade to grant exemptions from the requirements of the Merchant Shipping (Wireless Telegraphy) Act, 1919, for the trans-Atlantic voyage?

A. Yes.

20. Q. If so, by whom and when was it made? Was it granted? If granted, was the Board of Trade, having regard to all the circumstances, justified in granting the exemption?

A. The application was made by Mr. Boeler on behalf of Messrs. Swan, Hunter, and Wigham Richardson, Limited, on the 29th March, 1935. It was granted. Having regard to all the circumstances, the Board of Trade were justified in granting the exemption. See Annex.

21. Q. Had the vessel a receiving set on board her when she sailed? If so, what was its range?

A. The vessel had a receiving set on board when she sailed. Providing the atmospheric conditions were good and the voltage supply to the receiver was 220 volts or higher, the manufacturers are of opinion that the set should receive the medium and long wave B.B.C. transmitters over the sea to approximately 1,000 miles, and 5XX Droitwich long wave transmitter about double this distance; and similarly the higher powered American stations about 1,000 miles.

22. Q. When did the vessel sail on her trans-Atlantic voyage? From what port did she sail?

A. On the 10th August, 1935, from Wallsend-on-Tyne.

23. Q. What were (a) the mean draught; (b) the freeboard of the vessel, when she sailed on her trans-Atlantic voyage? Were they safe and proper for the voyage?

A. Her mean draught was 13 feet and her freeboard 9 feet. These were both safe and proper for the voyage.

24. Q. Was the vessel in a safe and seaworthy condition when she sailed from the United Kingdom on her trans-Atlantic voyage?

A. Yes.

25. Q. When the vessel sailed on her trans-Atlantic voyage was she so loaded as to be in a safe and seaworthy condition from the point of view of stability?

A. Yes.

26. Q. Was the vessel properly and sufficiently manned when she sailed on her trans-Atlantic voyage?

A. Her manning complied with the Board of Trade regulations.

27. Q. By what route and at what speed did she travel after she sailed?

A. It would appear from the fact that the m.v. "Joseph Medill" was sighted by the s.s. "Stavangerfjord" at 11.14 a.m. G.M.T. on the 17th August, 1935, in latitude 57° 19' North, longitude 26° 12' West, that she was proceeding on the northerly passage to Belle Isle and that she was travelling at a speed of just over 6 knots.

28. Q. Did she communicate with any other, and if so what, vessel on her trans-Atlantic voyage? If so, when and where did this communication take place?

A. She did not communicate with any other ship except the s.s. "Stavangerfjord" at the time and place stated in the Answer to the last Question.

29. Q. When would the vessel be likely to have reached the vicinity of Newfoundland, having regard to the speed at which she was travelling?

A. On the 24th August, 1935.

30. Q. What were (a) the weather conditions; (b) the ice conditions, in the vicinity at or about that time?

A. (a) On the 24th August, 1935, when it was anticipated that the vessel would be off the Newfoundland coast, strong to fresh winds from various directions were experienced in the vicinity of Belle Isle, the weather having been very disturbed for some two or three days previously in that vicinity. The R.M.S. "Aquitania" reported a tropical storm to the southward of that vicinity on the 24th August, 1935. (b) According to the ice report there was a considerable amount of ice in the vicinity of Belle Isle.

31. Q. When and where was the vessel lost?

A. This must remain problematical.

32. Q. What in the opinion of the Court was the most probable cause of the loss of the vessel?

A. For reasons given in the Annex, the Court considers the most probable cause for the loss of the vessel was "ice".

33. Q. Did any, and if so what, persons lose their lives as a result of the casualty?

A. Sixteen, being all hands.

Dated this 29th day of July, 1936.

T. RICHARDSON,

Wreck Commissioner.

We concur in the above Report.

HENRY STOCKWELL

PIERS DE LEGH

J. L. SCOTT

} *Assessors.*

Annex to the Report.

Mr. O. L. Bateson (instructed by the Solicitor, Board of Trade) appeared for the Board of Trade. Mr. G. St. Clair Pilcher, K.C. (instructed by William Mark Pybus and Co.), held a watching brief on behalf of Messrs. Swan, Hunter, and Wigham Richardson, Ltd. Mr. Alexander Ross (instructed by Russell Jones and Co.) appeared for the Navigators and Engineer Officers' Union and the National Union of Seamen. Mr. E. W. Brightman (instructed by Messrs. Hill Dickinson and Co.) held a watching brief on behalf of the owners of the "Joseph Medill." The Quebec and Ontario Transportation Company, Limited. Mr. H. Ingledew held a watching brief for Lloyd's Register of Shipping.

The motor vessel "Joseph Medill" was a new ship which had just left the builders' yard. She was of unusual construction, an all-welded ship, owned by the Quebec and Ontario Transportation Company, Limited, and built by Messrs. Swan, Hunter, and Wigham Richardson, Limited, of Wallsend-on-Tyne. She had her machinery aft and was practically flat-bottomed and of unusually full underwater form. Her two rudders were of balanced type. She had two Diesel engines of 500 brake horse power each. Her gross tonnage was 2086.82 and her net tonnage 1606.73.

She was 251.2 feet long, 43.9 feet beam, and had a moulded depth of 22 feet. She had four hatches and three holds. The middle hold was a large one with two hatches. She had six bulkheads and open rails round the upper deck. She was launched on the 5th July, 1935, and ran a light trial on the 31st July, 1935, in ballast. Subsequently she loaded a cargo of coal at Grangemouth and had a further speed trial on the Burntisland Mile on the 3rd August, 1935. On that occasion her steering was unsatisfactory and it was found impossible to keep her on a straight course. She was taken back to the Tyne and put in dry dock with her cargo in her. Various alterations were made and a further trial took place on the 10th August, 1935. On this occasion she handled satisfactorily. She had good weather conditions for this trial.

She was loaded with 2,784 tons, 17 cwts. of anthracite coal. This coal was trimmed in all the three holds. She started her voyage on the completion of the trial of the 10th August, 1935. She passed Dunnet Head on the 12th August at 4.45 a.m., and on the 17th August, at 11.14 a.m., in latitude 57° 19' North and longitude 26° 12' West, she spoke to the "Stavangerfjord" by flag signals, asking to be reported to her owners in Canada by radio. She was not fitted with wireless transmitters. This was the last that was heard of her.

She was classed ∇ A.1 at Lloyd's for service on the Great Lakes and the Gulf of St. Lawrence (from April to October) at an extreme draught of 14 feet.

In discussing possible causes of the loss of the "Joseph Medill", which are dealt with in detail later in this Annex, it is necessary to bear in mind that:—

1. She was lost on her maiden voyage, and was a ship of novel construction, in that she was at the time of her loss the largest all-welded ship in the world.

2. She was lost in the North Atlantic Ocean, an environment in which she had not been primarily designed and built to operate.

3. Of the large number of vessels built in this country for service on the Great Lakes, the "Joseph Medill" was the first of such type to be lost in crossing the North Atlantic Ocean.

It is also necessary to bear in mind that since the loss of the "Joseph Medill" an almost precisely similar ship, namely the m.v. "Franquelin", constructed by the same builders and for the same owners and service as the "Joseph Medill", has safely crossed the North Atlantic Ocean.

Structure and strength.

Since ships of all-welded construction of the size of the "Joseph Medill" are an innovation, there is no information available for the purpose of ascertaining how the strength and behaviour of such structures compare with those of the conventional riveted type, when subjected to deep-sea service conditions in all parts of the world, in all conditions of loading, and at all seasons of the year.

The problem of the strength of ships' structures does not admit of proper solution by mathematical treatment alone. The ability of ships' structures to resist the various stresses to which they are likely to be subjected in service is assessed by comparing the results obtained by a standard method of calculation, based on certain definite assumptions, with the corresponding results obtained from ships of similar size and type, the general strength, characteristics and behaviour of which have proved satisfactory throughout long and continuous service conditions at sea.

There are, primarily, two considerations to satisfy in connection with the structural strength of ships, which are, briefly:—

- (a) That the bending stresses in the structure do not exceed a certain figure, depending on dimensions, and equally

- (b) there must also be a certain stiffness of structure, measured by a standard of deflection, requiring certain proportions of length to depth in addition to other properties.

It is necessary to satisfy both of these standards of permissible stress and of deflection in relation to length, because, if (a) be satisfied and (b) be deficient, there will be an increase of flexibility above the standard, which will cause extra working at parts of the structure, mainly the joint connections, depending on the variation of elasticity, which will be greatest at the connections. In a riveted ship, this appears as working of rivets, arising probably from "slip of joints." In a welded ship, it may arise at or, more probably, in the vicinity of a welded joint, as it is uncertain as to whether the deposited metal itself, the parent metal, and the combination resulting from the fusion of the deposited and parent metals, all have substantially the same physical qualities.

With the enormous experience of the strength and behaviour of riveted ships it has been established that they are well adapted for, and in every way capable of, withstanding without damage the various stresses to which they are subjected in service; and by means of the previously mentioned method of comparative strength analysis the general strength characteristics of riveted ships as outlined by considerations (a) and (b) can be confidently predicted.

With the limited experience of welded ships, and the lack of any experience of all-welded ships of the size and type of the "Joseph Medill", the problem is more complicated, and while the structural arrangements and scantlings of an all-welded ship may satisfy consideration (a), the effect of adopting welded connections in a flexible structure of the size of the "Joseph Medill" is not known, and cannot as yet be confidently predicted. One of the features accompanying the adoption of welding, and whereby weight is saved, is the elimination of connecting flanges to the plating, together with the overlaps of the plating in the type of welding adopted in the "Joseph Medill." It may happen that the omission of these parts may reduce the moment of inertia of the vessel's section below that usually adopted for a riveted vessel of the same dimensions and draught, with a resulting increase in the magnitude of the stresses as well as increased deflection and more working of joints. Since the "Joseph Medill" was constructed on the transverse system of framing, any loss of moment of inertia due to the aforementioned causes would be small, and evidence was given to the effect that her moment of inertia was practically identical with what would have been provided had she been of riveted construction.

Another effect of the elimination of connecting flanges to the plating is that the virtual lengths of the unsupported spans of plating are increased, and the general stiffening effect of these flanges on the whole structure is also lost. Unless effective compensation be made for these omissions there will be a greater liability of buckling and possible collapse of structure, particularly under the action of compressive stresses in those portions where there are unsupported flat panels of plating.

Considerations in this connection, however, are that the side water-ballast tanks assist in affording stiffness to the structure in general, and while the fitting of these tanks results in the neutral axis being rather low with consequent higher stresses at the deck than at the keel, it is to be observed that the deck plating is thicker than any other plating in the ship and would not be so liable to buckle as the thinner plating.

Further considerations are that the comparatively modest dimensions and small frame spacing of the vessel, together with her favourable proportions of length to depth, would also tend to minimise any adverse effects occasioned by the elimination of connecting flanges to the plating.

The foregoing observations on structure have been considered necessary in view of the nature of the second portion of Question No. 4, and the Court is

of opinion that the method of construction by welding was prudent and should have resulted in producing a seaworthy ship.

The Court is also of opinion that every precaution it was possible to foresee was taken in determining the scantlings and structural arrangements of the "Joseph Medill" for the particular service for which she was intended, and that the freeboard assigned to the vessel for her voyage across the Atlantic was of proper amount for this purpose. There is no doubt that the butt-welding of ships requires specially careful and skilful workmanship and strict supervision. Any defective work would almost certainly lead to very serious consequences. But it was proved at the hearing beyond doubt not only that the workmanship put into the welding of the "Joseph Medill" was of excellent standard and the supervision ample, but that all new problems were carefully tested and worked out in a school of welders, conducted on the premises of Messrs. Swan, Hunter, and Wigham Richardson, Limited. The actual welding would thus appear to have been in every way satisfactorily completed. The construction of this ship was the subject of very special attention by the builders, Board of Trade Surveyors, Lloyd's Surveyors, and the owners' representative, and it is inconceivable that faulty workmanship of any sort would not have been detected.

No doubt owing to the peculiar box-like shape of the vessel, she was more difficult to manage in a head wind and sea than a ship built for ocean purposes. The captain of the sister ship, the m.v. "Franquelin," found it necessary to go 150 miles out of his course for this reason. Neither of these ships was designed for service in the Atlantic Ocean. The "Joseph Medill" would be under control "hove to" in such conditions of wind and weather or running before the wind; but it might conceivably make manoeuvring in ice more difficult and precarious.

Wireless.

In view of the proviso to section 1 (1) of the Merchant Shipping (Wireless Telegraphy) Act of 1919, and of section 7 (3) of the Merchant Shipping (Safety and Load Line Conventions) Act of 1932, which gives effect to Article 28 II. 2. III. of the International Safety Convention, it is clear that the Board of Trade had no option but to grant an exemption to the "Joseph Medill" from the obligation to carry a wireless installation.

She was a ship "not normally engaged on international voyages, but which in exceptional circumstances" was "required to undertake a single voyage of that kind." No application of this character was made on behalf of the m.v. "Franquelin." If it had been, the Court does not see how the Board of Trade could have refused the application.

It may be a matter for serious consideration whether ships of novel or unusual type or construction, not intended for ocean service, should not be required to carry temporary wireless apparatus for such single international voyages as a precaution against the unexpected or the unforeseen.

Possible causes of the loss.

The Court has considered the possible causes of the loss of the "Joseph Medill" and makes the following observations thereon:—

1. *Collision*.—It would appear impossible for a collision to have taken place without the other ship being aware of the fact. There is no evidence of collision. No other ship disappeared. It is possible that she struck submerged wreckage; but if so, it is unlikely that she would be unable to launch her boats. This possibility can be almost disregarded.

2. *Fire*.—Fire is always a possibility, due to spontaneous combustion of a coal cargo, but in the view of the Court is extremely improbable in this case. She had ventilators specially fitted for the trans-Atlantic crossing in accordance with the Board of Trade regulations. Fire from other causes is unlikely. She was fitted with the necessary fire-fighting appliances. If a fire had taken place it is improbable that the ship's boats could not have been launched. The weather was not apparently such as to render such launching difficult. A fire at sea would be visible from a great distance and likely to be seen by other ships.

3. *Wreck*.—No doubt there are lonely spots on the coast of Labrador, but it is unlikely that if the "Joseph Medill" was wrecked on this coast or the coast of Newfoundland, no wreckage should be found during the period which has elapsed since August, 1935. The time of year is important, as the coast would not be so lonely then as in the winter. Mr. Buckie, Chief Ships Draughtsman in charge of the ship, has examined wreckage found off the Newfoundland Coast. None of it came from the "Joseph Medill." The Court thinks this possibility can be discounted.

4. *Faulty Construction*.—For reasons already given at length, the Court is of opinion that this possibility may be eliminated.

5. *Bad Weather combined with Shifting of Cargo*.—No adverse criticism can be directed against the trimming or stowage of the coal. So far as we can ascertain from the available evidence, the weather was not of a character likely to shift a coal cargo. The possibility would seem quite improbable.

6. *Ice*.—The Court considers that impact with ice is the most likely cause of this disaster. In view of the fact that no wreckage or boats were found, it would appear that this disaster must have been a very sudden one. Assuming this ship was suddenly confronted with collision with an iceberg or growler, and used her helm to obviate such collision, it is quite feasible that the side of the ship could be cut open by contact with the ice, causing her to founder in a matter of minutes only. She would go down like a stone. This theory does not involve the obvious difficulties presented by the other possibilities.

7. The Court has also considered the possibility that the vessel might be unmanageable if severe weather were encountered and might be thrown bodily by the sea and overwhelmed; but they do not consider this is likely.

The following is a list of the crew lost with the ship:—

Name.	Rank.	Birthplace or Nationality.	Last place of Abode.
J. Mackintosh... ..	Master	Alloa	101, Vale Ave., St. Catherine's, Ontario.
F. O. Rangdale	1st Mate	Leeds	Church Pt., Digby Co., N.S.
C. J. Lieuwijn	Bosun	Holland (Naturalised Canadian)	31, Seaton St., Halifax, N.S.
Jos. Harrison	A.B.	Rochdale	St. John Evangelist, P.Q.
Jas. Halliday	A.B.	Glasgow	3216, 34th Ave., Kerrisdale, Vancouver.
W. Thomson	A.B.	Castle Douglas	16, New Mills, Newcastle-on-Tyne.
C. McLeod	A.B.	Newcastle	3, Tynedale Terrace, Gateshead.
Sinclair Robertson	O.S.	Grimsby, Ont.	Box 504, Grimsby, Ontario.

Name.	Rank.	Birthplace or Nationality.	Last place of Abode.
J. McKenzie	1st Engineer	Dumbarton	29, Whinneyfield, Walkergate, Newcastle-on-Tyne.
S. Lawson	2nd Engineer	Falgay	21, Arcos Drive, Mossbank, Glasgow.
L. Vipond	Asst. Engineer	Summertown, Ontario	St. Catherine's, Ontario.
Josf L. Heumüller	Asst. Engineer	Germany	96½ Pettenkofferstrasse, Augsburg.
J. McCoy	Oiler	Gateshead	131, New Bridge Street, Newcastle-on-Tyne.
L. Gillies	Steward	Gateshead	16, Pt. Pleasant Terrace, Wallsend-on-Tyne.
A. J. Robson	Ship's Cook	Durham C.	16, Trafalgar St., Newcastle-on-Tyne.
Gavin Angus	O.S.	Bo'ness	6, George St., Grangemouth.

T. RICHARDSON, *Wreck Commissioner.*

We concur

HENRY STOCKWELL	} <i>Assessors.</i>
PIERS DE LEGH	
J. L. SCOTT	

(Issued by the Board of Trade in London
on Tuesday, the 1st day of September, 1936)

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