

s.s. "EUCLID", No. 69360 in Register Book.

Rule dimensions : 410 x 52'ft. x 30'6". *h uphush*
39 ft. *h Shells etc*
4/10 : 10.5

This vessel, which was built by the Northumberland S.B.Co. in 1911, and is owned by Messrs. Lamport & Holt is of the shelter deck type with tonnage opening.

The vessel left Liverpool on the 22nd January last, being loaded, in addition to the water ballast, with 2971 tons of coal which was concentrated in the midship part of the vessel.

Very severe weather was encountered, and on the following day a transverse fracture was observed in the steel weather deck amidships, the deck being also badly buckled. As it was found that the transverse fracture was getting worse it was decided to put the vessel about and return to the Clyde, which was reached safely.

On examination, on the starboard side amidships abreast of the funnel, the shelter deck sheerstrake and strake below were found bulged outward and the plating fractured, the fracture extending the full depth of the sheerstrake and half the depth of the strake below. The plating of the deck below the shelter deck in the same line was severely buckled. On the port side, the shelter deck sheerstrake was opened up at a joint abreast of the boiler casing and the plating was buckled. The shelter deck plating on the port and starboard sides abreast of, and immediately forward, of the machinery casing was found much buckled and in some places fractured, on the starboard side there being a fracture extending over a distance of about 6' across two strakes, and, on the port side, a fracture about 4' in length across one strake. In the line of the fractured sheerstrake plating on the starboard side, the shelter deck stringer and stringer angle were found fractured. The flanged plate girders under the shelter deck were found

torn, from the deck to the lower part of the girder, on the port and starboard sides between the end of No.3 hatch and the aft end of boiler casing. Aft the machinery casing the shelter deck plating was found fractured at the forward corners of No.4 hatch. On the deck below the shelter deck, the plating was found considerably buckled and strained.

An investigation into the strength conditions with the loading at the time of the mishap has been made in the Glasgow Office ^{by Messrs. Hical & Clark} and it has been found that there was a compressive stress on the deck of 10.2 tons per sq. inch which is much more severe than would be experienced in the normal fully loaded condition.

The question of the failure of the deck plating and topsides of cargo vessels under compressive stresses due to concentration of cargo amidships has engaged the Committee's attention from time to time, and so long ago as 1906 a memorandum was prepared setting forth various cases in which failure had occurred.

In his letter Dr. Montgomerie refers to one of the vessels mentioned in 1906, the s.s. "KNIGHT OF THE GARTER", where the bridge deck plating buckled under a compressive stress of 11.15 tons per square inch, this stress being due to the filling of two deep water ballast tanks at the same time as 1300 tons of coal were loaded amidships.

Towards the end of 1923 a special memorandum was placed before the Committee dealing with the cases of the steamers "PORT BOWEN" and "PORT AUCKLAND", each of which vessels was loaded with a sufficient supply of coal for a round voyage amounting to 3100 and 4600 tons respectively, and in both vessels the shelter deck plating buckled. In the "PORT AUCKLAND" the compressive stress on the deck plating was 8.9 tons per square inch and in the "PORT BOWEN" 8.7 tons per square inch.

A somewhat later case was that of the "GRETASTON"

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in which the bridge deck plating buckled under very similar conditions to those in the present case. As a result of the damage to the "GRETASTON", the Committee amended the Society's Rules to require an increase in the minimum thickness of unsheathed steel strength decks, and also inserted a provision in the Rules, Section 13 clause 1 (h), as follows :-

"Where there is indication of particular concentration
"of loading the Committee may require additional
"strengthening to be fitted to the decks".

The thickness of the deck plating in the "EUCLID" is .02" less than would be required by the Committee's latest Rules.

The plans of this vessel if built today would not indicate the likelihood of any particular concentration of loading.

The cause of the damage in the present instance is undoubtedly the undue concentration of the coal amidships causing excessive compressive stress on the deck plating.

The coal, water ballast and stores aboard the vessel amounted to 4225 tons, and in order to complete the total deadweight a further 5,300 tons of cargo could have been taken on board.

Investigation showed that when the vessel was fully loaded by the addition of 5300 tons weight, the extra cargo being stowed forward and aft of the coal, the compressive stress on the deck plating was only 4.8 tons per square inch as compared with 10.2 tons per square inch in the partly loaded condition with the cargo concentrated amidships.

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