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Port LONDON

6th July, 1962.

E.I.D. Report No. 2151.

M.V. "ATLANTIC SEAL" 8

ATLANTIC DOLPHIN

Class: 4100A1.
Built: J.S. Doig (Grimsby) Ltd., Grimsby, 1961.
Dimensions: 120' 9" x 26' 10" x 11' 4".
Engine: 3 oil engines 48A each 60y. 9 1/2" x 12" through electric drive and 3R gearing to sc. shaft. Davey Paxman and Co. Ltd., Colchester.

9 At the request of Messrs. Stogram Trawlers Ltd., the undersigned attended on board the above vessel on the 20th June, 1962 in order to investigate:-

- (1) The torsional vibration characteristics of the main diesel generating sets.
- (2) The cause of brush gear failure in the aft main propulsion motor.

(1) Torsional Vibration Measurements.

Calculations made from mass elastic data supplied by the engine builders indicated that the flank of the one node 3rd order torsional resonance was superimposed on the one node 3 1/2 order resonance and could give rise to appreciable stresses in the diesel generator crankshafts at revolutions close to the service speed of 625 R.P.M.

In order to verify this, torsiograph records were taken from the port diesel generator engine using a Geiger torsiograph belt drive from a 148 mm diameter pulley which was attached to the for'd end of the engine crankshaft. Half second time intervals and shaft revolutions were simultaneously recorded.

RESULTS.

The results indicate that the measured stress associated with the one node 3 1/2 order and the flank of the 3rd order is within acceptable limits, (FIG. 1). The

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maximum stress present in the crankshaft at the service speed of 825 R.P.M. under full load is $\pm 2,040$ lbs/sq.in.

The governing of the engine was found to be satisfactory under varying load conditions.

(2) Main Propulsion Motor - Brush Gear Failure.

The for'd and aft main propulsion D.C. motor commutators and brush gear were examined. The for'd motor was found to be in order, but the commutator of the aft motor was found to be excessively and unevenly worn.

Examination of the brush gear showed that a number of the brushes were extremely slack in their holders due to the absence of dividing spacers which would normally centralise them.

It was considered that slack brushes were probably the cause of the failure. Arrangements were made to have the commutator machined and the brush gear refitted with the correct size of carbon brushes.

CONCLUSIONS.

(1) The torsional vibration characteristics of the main diesel generating sets are suitable for continuous operation at a service speed of 825 R.P.M. provided this speed is not exceeded.

(2) The cause of damage to the aft main motor commutator was probably due to slack carbon brushes. After refit it is recommended that the motor be kept under close observation for a short period in order to ascertain that no further trouble develops.

D.O. Carmichael

ENGINEERING INVESTIGATION DEPARTMENT. *6th*



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