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Port LONDON

20th October, 1964.

E.I.D. Report No. 2323/B.

"FRISTON DOWN"

Class: A1 Tug (Class Contemplated).
Built: R. Dunston Ltd., Thorne.
Dimensions: 81' 10" x 20' 8".
Engine: Oil Engine 4SA 4Cy. 340 x 570 mm.
British Polar Engines Ltd., Glasgow.

Lateral Vibration of Main Engine.

REASON FOR INVESTIGATION

At the request of the Builders, Messrs. Richard Dunston (Hessle) Ltd., the undersigned attended on board the above vessel at Hull on 5th October, 1964 and at Tower Pier on 13th October, 1964 in order to record the transverse vibration of the main engine subsequent to stiffening the hull in way of the machinery space. (E.I.D. Reports Nos. 2323 and 2323/A refer).

PROCEDURE AND RESULTS

With the vessel running free the speed of the engine was slowly varied between 185 R.P.M. and approximately 250 R.P.M. (the device limiting the engine to its normal service speed of 220 R.P.M. having been disconnected). Records of lateral vibration were taken with an Askania hand vibrograph from the top of No. 3 cylinder at the front of the engine. The results, together with those taken with the vessel towing six barges each containing a load of 200 tons, are given in FIG. 1.

The instrument incorporated an electrical timing marker from which the vibration frequency and engine speeds were determined.

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The critical speed associated with lateral vibration occurs at 236 and 244 R.P.M. in the free running and towing conditions respectively. The difference, which is less than 3% is due to the difference in draught for each condition. The towing records were taken after bunkering and the vessel was thus deeper in the water. The increased mass in the hull and the secondary effect of stiffening due to increase in hull area subject to water pressure combine to increase the critical speed by the amount shown.

The results of trials made at Hull with cross-beams only and with additional frame stiffening are also given in FIG. 1.

CONCLUSIONS AND RECOMMENDATIONS

The critical speed for lateral vibration of the main engine occurs above the service speed of 220 R.P.M. and the amplitude of vibration at 220 R.P.M. is small, i.e. 0.010" and less. The lateral vibration characteristics of the main engine are therefore considered satisfactory.

It is recommended that the engine controls be adjusted to ensure that the maximum speed is limited to 220 R.P.M.

A. R. Hudson

ENGINEERING INVESTIGATION DEPARTMENT. *id*



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