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MEMORANDUM

H.M. RESCUE TUGS "BUSTLER", "MEDIATOR" and "REWARD".

The machinery of these sister vessels consists of twin heavy oil engines single reduction geared to one screwshaft.

In the case of the first of these vessels, H.M.R.T. "BUSTLER" a special investigation was carried out by this Society in May 1942, as a result of the gearing being found excessively noisy on trials, and the cause of the trouble was traced to the worm periodic error in the gear cutters' (Messrs Barclay Curle's) pinion machine, which was of the "solid table" type. On the Society's recommendation the pinions were re-cut on a "creep" machine, which had the effect of almost completely eliminating the excessive resonant vibration and noise previously experienced. In view of the danger of the rapid deterioration in service of gears subjected to resonant vibration, it was laid down that the acceptance of the gearing would be a matter for consideration during the guarantee period of one year. The gearing was tested by the Glasgow Surveyors under working conditions after six months service and opened up and examined at the end of 12 months, and as a result of its satisfactory condition, the requirement for the gearing to be specially examined was removed from the Special Reasons List.

In the case of the sister vessels "MEDIATOR" and "REWARD" it has now been ascertained that the pinions were cut by Messrs. Barclay Curle on the same machine used to cut the original pinions of H.M.R.T. "BUSTLER", but with a master wheel of larger diameter. The worm gearing employed in the cutting of the "BUSTLER" pinions was therefore not in use for those of the two later vessels. This would have a two-fold effect on the periodic errors reproduced on the pinions, viz:-

- (1) The amplitude of undulations resulting from a worm cyclic error in the machine of the same amount would be inversely proportional to the diameters of master wheel used in the two cases.
- (2) The frequency of meshing of the worm error in the pinions would be directly proportional to the numbers of teeth in the master wheel in the two cases. This would have the effect of lowering the critical speed corresponding to axial resonance in the case of the two later vessels.

In the case of the second vessel, H.M.R.T. "MEDIATOR", after six months satisfactory service, involving a total mileage of 14,000 of which 6,000 miles were under towing conditions, the gearing was examined as far as practicable, by the Glasgow Surveyors, also under working conditions, and found in good order.

It should further be noted that in the 1st Entry Report of the Glasgow Surveyors (Gls. Rpt No.21376) on the third vessel, H.M.R.T. "REWARD", it is stated the machinery was tried under full load conditions at sea and found satisfactory.

After the cutting of the pinions for the "MEDIATOR" and "REWARD", the Glasgow Surveyors state that Messrs. Barclay Curle's pinion machine was overhauled and fitted with creep gear.

In the circumstances, IT IS SUBMITTED the requirements for special examination of the gearing, applied in the case of H.M.R.T. "BUSTLER", might now be waived in the case of the later vessels.

