R1/7 In Confidence: Not to be quoted without reference to the Laboratory. 4 11 MR 65

CRUISE REPORT

F.R.V. "MARA"

(13th-24th December 1965)

Collaboration between the Marine Laboratory and G.P.O. Research Station, Dollis Hill.

Location:

The trials were conducted in Cullen Bay on the Moray Firth. This change from the original intention to work at Burghead was made because the existing cables there were expected to be too buried. In addition, the problems of using Burghead as base, with a lack of water except at high tide, were further accentuated by the intention to use "Mobell" for obtaining underwater observations.

One mile of submarine cable was laid by H.M.T.S. Ariel in Cullen Bay at a position 57°42'12"N, 2°49'12"W on a bearing of approximately 015°. This cable was buoyed up at a distance of $\frac{1}{3}$ mile from the inshore end. The various test runs were made near this position in order to pass one otterboard over the part of the cable suspended above the seabed.

Procedure

"Mara" was based at Buckie throughout the cruise, returning to port from Cullen Bay each evening. At the beginning of the cruise some time was spent in modifying the flat otterboards with the special spars to prevent hooking on cables, and testing variations of the modifications in respect of handling over the ship's side and into the gallows.

Assembly and testing of a special gantry for handling "Mobell" was also tried, but it was decided that the necessary modifications required to suit "Mara" were likely to take up too much time to pursue. On the one occasion when "Mobell" was put into the water the boom was used as in earlier experiments.

Throughout the test programme a small otter trawl was used with a 60 ft groundrope and 47 ft headline.

The submarine cable was raised at the required point by the use of inflatable buoys attached to the end of fixed lengths of mooring rope. Once in position these buoys were filled by using an extension pipe from the vessel. Height of the cable above the sea bed, and total length suspended was checked several times during the course of operations, by the divers.

Results

(a) Thirteen full test runs were completed for the flat otterboards including those without modification. This was not a sufficient number to provide a statistical comparison between the 'catchability' of the standard board and that of the boards modified by a 5 ft strut from the bottom leading edge of the board to the warp.

(b) There was not sufficient time to conduct the test programme for the curved otterboards, but the one shot without the modification showed that these small boards performed as satisfactorily as the theoretical work and tank tests had predicted.

(c) Measurements of spread of the warps at the ship showed that the struts had not reorientated the flat otterboards to an inefficient angle.

(d) Measurement of tensions in the wire rigging of the trawl and in the warps before and during catching of the cable were obtained.

(e) The technique of heaving on the board not caught was successful in some cases.

(f) Direct observations of the hooking-up characteristics were not possible owing to poor visibility.

Conclusions

Otterboards are clearly a possible source of cable damage if the cable is suspended, or if the otterboards are towing with the sole plate and bottom half immersed in the bottom sediments while the cable is lying on the surface of the sea bed.

The modification tested appeared to reduce the danger of hooking of the submarine cable in all cases except where the cable is suspended well above the height of the otterboard.

Further tests are obviously required but a more suitable method of suspending the cable and direct observation of the snarling up or freeing characteristics are needed.

Detailed reports of the separate parts of the experiments will be issued by the G.P.O. Research Station and ourselves at a later date.

J. J. FOSTER

27th January, 1966.