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CRUISE REPORT

FRS CLUPEA

21 June - 10 July 1971

Staff: D N MacLennan (21.6-27.6, 5.7-10.7)
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Objectives

- (a) To survey selected areas in the Moray Firth (40-50 fm depth) and determine their suitability for acoustic range work.
- (b) To continue the 1971 programme for testing and evaluating noise recording equipment (ref. 4CP71).
- (c) To investigate the suitability of alternative techniques for laying and recovering long hydrophone cables in over 40 fm of water.
- (d) To study the problems associated with using a pelagic trawl gear close to the sea bed.

Narrative

Scientific personnel and equipment joined the ship in Buckie on the morning of 21 June. The Aberdeen based boss boat, which was to be used for range laying, was launched in Buckie harbour. The next 24 hours were spent setting up equipment and holding training exercises using the boss boat. "Clupea" sailed from Buckie at 1230 hours on 22 June and, returning to Buckie each weekend, worked at several stations in the Moray Firth until 6 July. At each station hydrophones were laid, bottom grab samples taken and current measurements made. Due to the excellent progress made in this work, it was possible to lay a fully operational range, and an arrangement was made for FRS "Explorer", returning from a gear testing cruise in the Shetlands, to tow her gear over this range on 2 July. On 6 July, "Clupea" returned to Buckie to collect environmental sampling equipment as a "fish kill" incident on Smith Bank had been reported. A hydrographic station was worked on Smith Bank that evening, and samples of sandeels obtained. The following day, "Clupea" continued north and the pelagic trawl gear was tested on Fair Isle Bank. This work continued until the evening of 8 July, when "Clupea" returned to Buckie, arriving there at 2400 hours.

Acoustic range work

An acoustic range is laid by first anchoring two dahns which are tied together by 100 metres or so of rope buoyed up by additional floats. The hydrophones are then individually laid and their cables brought back to the rope. "Clupea" was anchored fore and aft near the dahns, but some difficulty was experienced in keeping her steady relative to the dahns, particularly in adverse conditions of tide and current. Heavier anchors should be obtained for future range work. Some ship drift was accommodated, however, by using a long length (500 metres) of slack cable between "Clupea" and the dahns, buoyed up by floats.

The use of a winch for laying and lifting cables from the boss boat was a great improvement over the previous method (hand hauling). A new winch incorporating reduction gear and other additional facilities is to be provided for the next cruise, which should further ease the difficult process of range laying.

Several recordings were made of ship, gear, and background noise received at the hydrophones, and these are now being analysed. As a result of the excellent progress made during the earlier part of the cruise, it was possible to arrange for FRS "Explorer" to tow her gear over a fully operational range, and this provided invaluable experience towards the planning of the joint cruise involving the two vessels later this year. It is clear that an improved means of communication between the ships must be provided to more efficiently control critical parts of a haul, and to allow the towing vessel to come right above the range. Nevertheless, the tapes recorded during the two hauls made by "Explorer" past the range will yield quantitative data on the acoustic disturbance produced by her gear. When the gear is close to the hydrophone array, the noise level is of course substantial but it has been found that pulses from an acoustic pinger attached to the gear can easily be detected using a filter and so the track of the gear relative to the hydrophone array can be computed.

Pelagic trawling

During the final two days of the cruise, a 1040 mesh, 4 panel pelagic net was used on the Fair Isle Bank and stations to the south of there. The gear was rigged with a 500 lb weight suspended from a 2 in strap on each lower bridle to control the operation of the gear close to the sea bed. This arrangement worked well, and the gear could be confidently fished for long periods very close to the bottom. Apart from a netzonde no instruments were used on the gear as the prime objective was to try out the handling capability of the gear, it not being possible in the time available to carry out a detailed performance assessment. The gear was quite a large one for "Clupea", and her maximum towing speed was 3 knots. As this figure is lower than expected, it is hoped that it will be possible in the near future to instrument this gear and provide data on towing loads and net drag.

In view of the limited speed range over which "Clupea" could tow the gear, it was often necessary to adjust warp length for the control of net depth. Using this method, however, a problem arises in that it is necessary to slow the ship down in order to engage the netzonde winch clutch prior to hauling in warp. When the ship slows, the gear will obviously tend to fall and may well be damaged if the ground is rough. This problem may be overcome by the use of a cable-less (acoustic link) netzonde.

The few fish traces seen on the echosounder correlated well with the moderate catches, mainly haddock which were obtained. A few flatfish were caught on occasions, demonstrating that the gear was operating correctly close to the bottom. Occasional dense traces were seen on the ship's sounder, and the gear was used to sample these. The traces appeared to consist exclusively of small sprats, which could not be caught in quantity as they easily escaped through the meshes in the after part of the net. However, there was no indication from the echosounder or netzonde recordings of any escape mechanism operating in the forward part of the net, and so a gear using a similar rig but with a net designed specifically for industrial fishing applications may well have been more successful in these circumstances.

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30 August 1971