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Cruise Report

FRV 'Clupea'

24-28 October 1977 (Part 1)

Objectives

To develop handling procedures for operating an array of up to four 4ft scallop dredges and to obtain preliminary data on warp loads arising during dredging.

Narrative

The scientific staff joined 'Clupea' at Aberdeen on the morning of 24 October when dredging and scientific equipment was loaded. 'Clupea' sailed that day at 1330 hours and proceeded to Spey Bay where she went to anchor for the night. Scallop dredging trials commenced the next morning, 25th, in Spey Bay, working in water depths of 10-12 fathoms. Four hauls were made using two dredges followed by two hauls using three dredges. Whilst at anchor that evening a four dredge array was assembled ready to use the next day.

On 26th after five hauls with four dredges, still in Spey Bay, 'Clupea' proceeded to Buckie to land the fishing mate by rubber boat at the prior request of the Marine Superintendent. When the rubber boat rejoined the ship, 'Clupea' returned to Spey Bay to make another four dredge haul. Whilst at anchor that evening all dredge items were weighed and measured and a three dredge array was prepared for the following day.

On the 27th, two hauls were made in sea state 6-7. With weather conditions worsening 'Clupea' then proceeded to Buckie harbour and tied up at 1200 hours. In the afternoon all dredging equipment was off-loaded on to the quay in preparation for loading gear the next morning for the second part of the cruise. Scientific staff with scientific equipment departed from 'Clupea' at 1600 hours and returned to Aberdeen by mini-bus. Dredging equipment was brought back to Aberdeen on the 28th by the returning lorry.

Trials Procedures

For the first hauls using two and three dredges, the arrays were towed on the fore warp from the aft gallows, the gear being shot from the side between the fore gallows and forward trawl winch and using the ship's hydraulic crane to lift the gear. To facilitate lifting the gear and slipping it when the weight of the gear was taken by the warp, a short rope strop was made fast to the centre of the tow bar. The first time a three dredge array was hauled an imbalance of catch (large stones in the bag of the port side dredge) caused the array to tilt when its weight was taken by the crane and the strop slipped off centre and tilt increased. This gave rise to handling difficulties due to being unable to raise the array high enough to clear the ship's rail. Before shooting again the crane jib was manually extended and the rope strop transferred to the towing ring at the fore-end of the towing chains. After the next haul the gear was brought in-board between the aft trawl winch and the aft gallows. All subsequent shooting and hauling was conducted from this station. For the last four hauls the gear was towed on the aft warp.

The normal commercial practice when hauling the dredge array is to lift the gear high enough to allow the teeth of the dredges to hook on to the top of the ship's rail leaving the bags hanging outboard and then the tow bar is swung in-board and lowered on to the deck. On 'Clupea' the dredges, when the array was lowered, tended to slip back outside the rail and it was necessary to strop each dredge to the taut wire below the top of the ship's rail before swinging the tow bar in-board and lowering it. The

lifting strop was then unhooked from the crane jib and the crane used to lift the aft end of each bag in turn to empty the catch on board. For this latter cooperation a strop was attached to the aft end of each bag for hooking onto the jib hook.

Warp tensions were measured by chaining a C.E.L. deck tension meter to the aft gallows and connecting the other end of it to the warp just aft of the gallows by means of a carpenter's stop. The warp was then slowly let out until the load came on to the tension meter.

The ship's speed through the water was measured by a towed speed log.

During all hauls ship's speed was varied 1-4 $\frac{1}{2}$ knots and warp tension and ship's speed were continuously recorded on chart paper. Decca positions, sea depth and ground conditions as indicated by the ship echo-sounder were noted.

Results

A total of 14 hauls, paired with and against the tide, were made on grounds varying from smooth sand to fairly hard stony ground and apart from a short temporary failure of the speed log, continuous records of warp tension and speed were obtained for all hauls. All catches consisted mainly of varying amounts of stones with a few benthic animals and included, in some catches, up to four mature scallops and two or three small flat fish.

A preliminary examination of the warp load records showed that the average loads for the different arrays at approximately 2 $\frac{1}{2}$ -3 knots were:-

2 dredge array	-	0.5 tons
3 " "	-	0.65 tons
4 " "	-	0.85 tons

There were frequent snatch loads of up to 2.0 tons and several in excess of 2 tons. During the last two-dredge haul a snatch load of 5.5 tons was recorded. When the gear was hauled the tow bar was quite badly bent and one of the dredges was damaged. The latter was subsequently repaired by the crew. Detailed analysis of the performance results will appear in a later report.

The total weight of a four dredge array without catch was found to be 698 kg (1540 lb) and a sample basket of stones weighed 77 kg (170 lb). The safe working load for 'Clupea's' crane when the jib is fully extended, as it was at certain stages of shooting and hauling the gear, is 1361 kg (3 000 lb). On the basis of these figures the combined weight of a four dredge array and a total catch in excess of eight baskets of stones would be in excess of the safe working load for the crane when the jib is fully extended. During this cruise the largest total catch was estimated to be four baskets of stones and the largest catch in one dredge was 2 $\frac{1}{2}$ baskets of stones. No experience was gained in dealing with an excessively heavy catch. However, the gear can be lifted high enough to see the catch and judge its quantity before the jib is hydraulically fully extended to lift the gear over the rail and, if necessary, the catch in one or more of the dredges could be emptied into the sea at this stage to reduce weight. A gilson was rigged to hand in case it was needed to assist with a heavy catch.

The crew quickly familiarised themselves with handling procedures and when these became more routine, shooting and hauling generally proceeded smoothly. Early in the cruise a lifting strop parted and a dredge fell a few feet on to the deck and highlighted the need to ensure that all lifting gear is strong enough for the job and that care is needed when handling the gear.

Conclusion

A satisfactory procedure was developed for the handling of dredge gears and while care must be exercised to avoid hazards when hauling the gear it is concluded 'Clupea' is suitable for further investigations into this fishing method.