

ICES Working Group Meeting on Fishing Technology and Fish Behaviour  
Dublin, 24-26 April 1989

**A METHOD OF RECAPTURING FISH WHICH HAVE ESCAPED FROM DANISH  
SEINE AND TRAWL CODENDS AT THE SURFACE**

by

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**INTRODUCTION**

In nearly all kinds of fisheries some fish will escape after having been in contact with the fishing gear. The fish may have forced their way through meshes in trawl, Danish seine or gillnetts, broken away from hooks in longline, out of a purse seine that bursts due to big catch, or have simply escaped or been thrown overboard because it was too small or the catch was too big. The further fate of the fish after gear contact has up to the past few years been paid very little attention. At the worst, this may give an unaccounted mortality that is given very little attention in the management of the fish resources.

In trawl and seine fisheries, mesh size regulations have been one of the main management tools, as small and undersized fish to a varying extent will escape from codends. It has been assumed that most of the escaped fish will survive and have an additional growth before they

are caught again, thus giving an increased yield per recruit. Recent investigations have, however, shown that the survival of fish after escaping from trawl is reduced (Main & Sangster, 1988).

To recapture fish that escape from codends in the depth they were caught, different methods have been used. While Scottish researchers (Main and Sangster, op.cit.) used divers and caught the escaped fish in black plastic bags and transferred the fish to underwater net cages for further studies, the Russians (PINRO) have used 10 m<sup>3</sup> net cages attached to codend covers to collect escaped fish. The net cages were closed and released from the cover during trawling (Valdemarsen, 1988). Both methods have shown an alarming high mortality, especially for small haddock, after escapement, while the Soviet investigation showed a rather low mortality rate for cod.

In addition to fishing depth escapement, some escapement will occur when the codend is brought to the surface. This is most obvious with trawlers and seiners taking onboard the catch on one side. From the moment hauling of wire and sweeps/ropes commence and until the codend are brought alongside the boat, very little strain are put on meshes, and an active fish will have the best opportunity to force its way through open and slack meshes. Depending on fishing depth, the escaped fish will either swim down or stay at or near the surface for a while, due to an excess of air in the swimbladder, and then often become seabird food.

When fishing for haddock in shallow waters (40-100meter) off the coast of northern Norway, five coils of rope (on each side) give a relative short fishing cycle, and the fish are very much alive when brought to the surface. The escaped haddock are seen swimming down rapidly, but very little is known about the survival rate of this escaped fish.

In order to elucidate this matter, some experiments with releasing the seine codend in the surface were planned, together with a purse seine to collect escaped fish for further observations.

## **MATERIAL AND METHODS**

The boats used during the experiments were the chartered 65 feet sheltered seiner M/S "Heidi-Anita" (550 H.P.), our 48-foot combination vessel F/F "Fjordfangst" (180 H.P.), rigged as a purse seiner, and a 16-foot skiff with a 25 H.P. outboard motor. The experiments were carried out in August 1988 at the West coast of Finnmark.

The rigging of the codend used is shown in Figure 1 (A-E). The aft part of the extension piece and the front part of the codend were supplied with codline meshes (A) of 6 mm polyethylene, through which a joining rope of 8 mm P.E. rope was fitted (B). The joining rope was attached to a combined buoy/towing line (C) and a towing(lifting) strap (D). Both the joining rope and the towing strap were carefully tied up to prevent narrow pass due to the drag from the buoyline during fishing.

As soon as hauling of ropes commenced, and before the seine was put in the power block (Fig. 2 A), the skiff went quickly up to the buoy (Fig. 1 E), the joining rope was cut, and the codend released from the extension piece. The seiner withdrew from the area, and while the skiff was towing the codend in a circle (2-3 knots), F/F "Fjordfangst" put its purse seine around the skiff and codend (Fig. 2 B). The towing did proceed until the seine was pursed, thereafter the codend was closed (in the front) and left behind with slack and open meshes.

The experiments were carried out with two different purse seines, one with a length of 50 fathoms and depth of 14 fathoms, the other one with measures of 120 and 20 fathoms.

## RESULTS AND DISCUSSION

To enable towing the codend in a circle during the whole purse seining periode, it was necessary to use a purse seine of at least 100 fathoms lenght and 20 fathoms depth.

The time used from detaching the codend from the seine net until the purse seining commenced, was shorter than normal hauling time of the seine net itself and bringing the codend alongside for emptying.

Unfortunately, there were very few fish in the area, and the experiments therefore turned out to be just a testing of methods. To simulate catch and drag in the codend, two spare codends were put into the experimental codend. The transfer of escaped fish from the purse seine to pens for long term storage and observations were consequently not tried, but is a very common method in the Norwegian saith fishery.

To recapture fish that once have escaped, this method, as well as others, clearly shows the necessity of using one or another kind of "fishing gear". This will once again stress the fish and most likely give it some kind of "gear contact". Even if this contact is very gentle, it may give rise to a bias in survival rate relative to escaped, but free-swimming fish. Methods used

for recapture of escaped fish should therefor be carefully evaluated, and experimental survival rates obtained so far regarded as absolut minimum rates.

#### REFERENCES

Main, J. and Sangster, G.I., 1988: A progress report on an investigation to assess the scale damage and survival of young gadoid fish escaping from cod-end of a demersal trawl. Scottish Fisheries Working Paper no. 3/88, 12pp.

Valdemarsen, J.W. 1988: Report from a meeting in Murmansk about selection in trawls. FTFI Working note, march 1988, (in Norwegian).

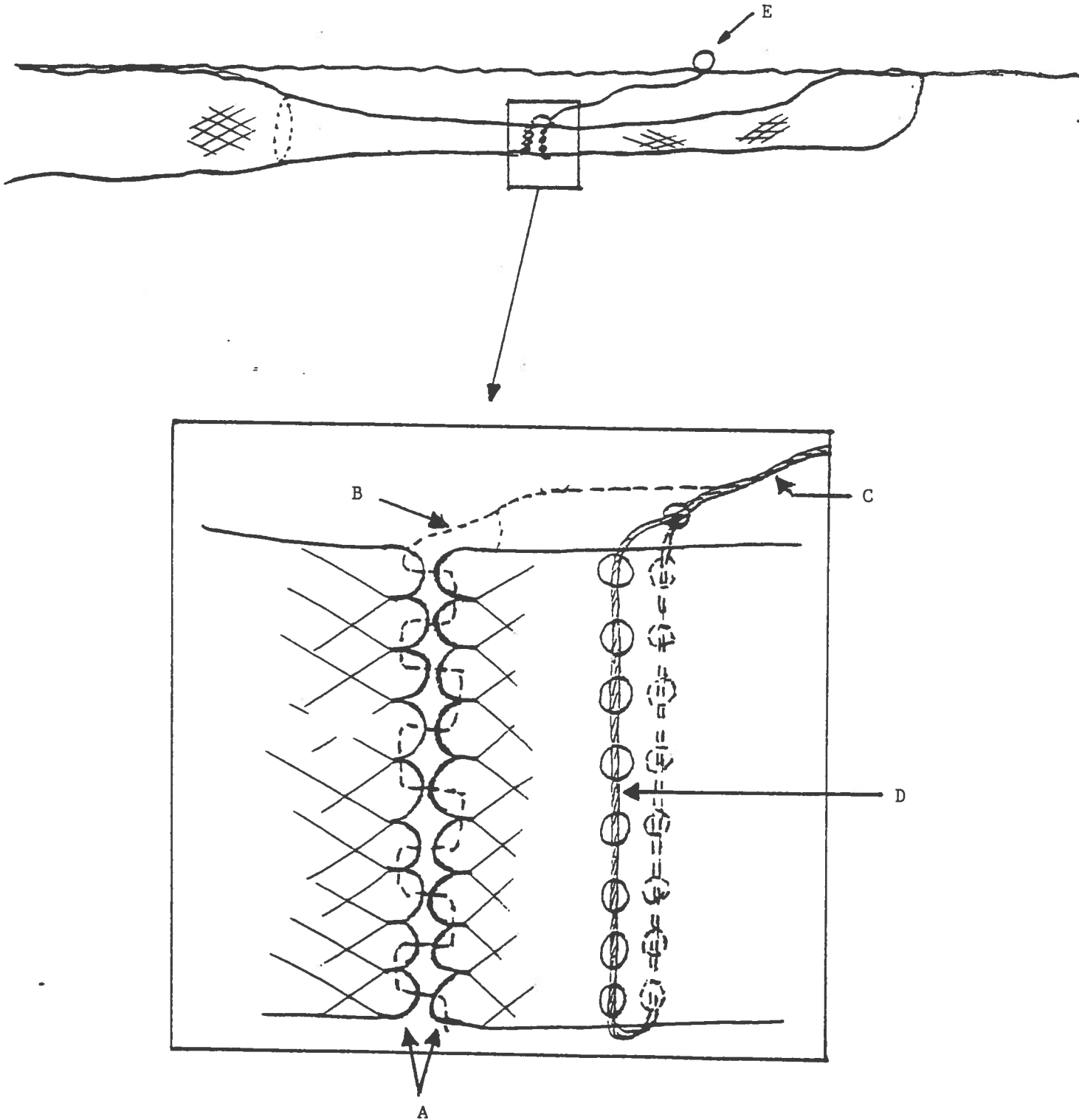
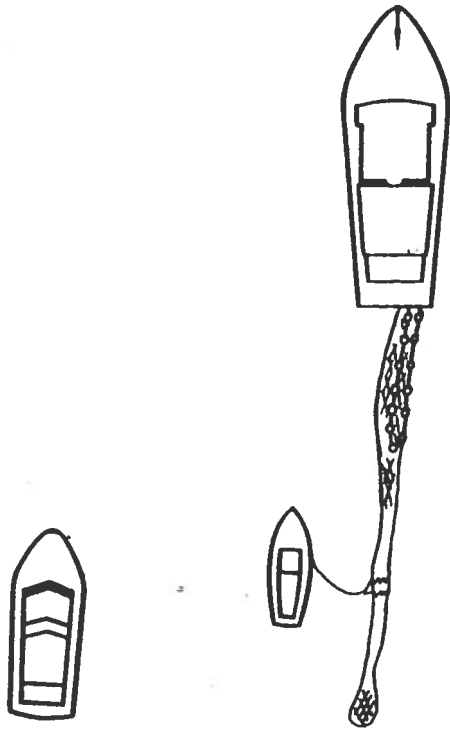


Figure 1. Arrangement for detaching codend from extention piece in the surface (for explanation, see text).

A.



B.

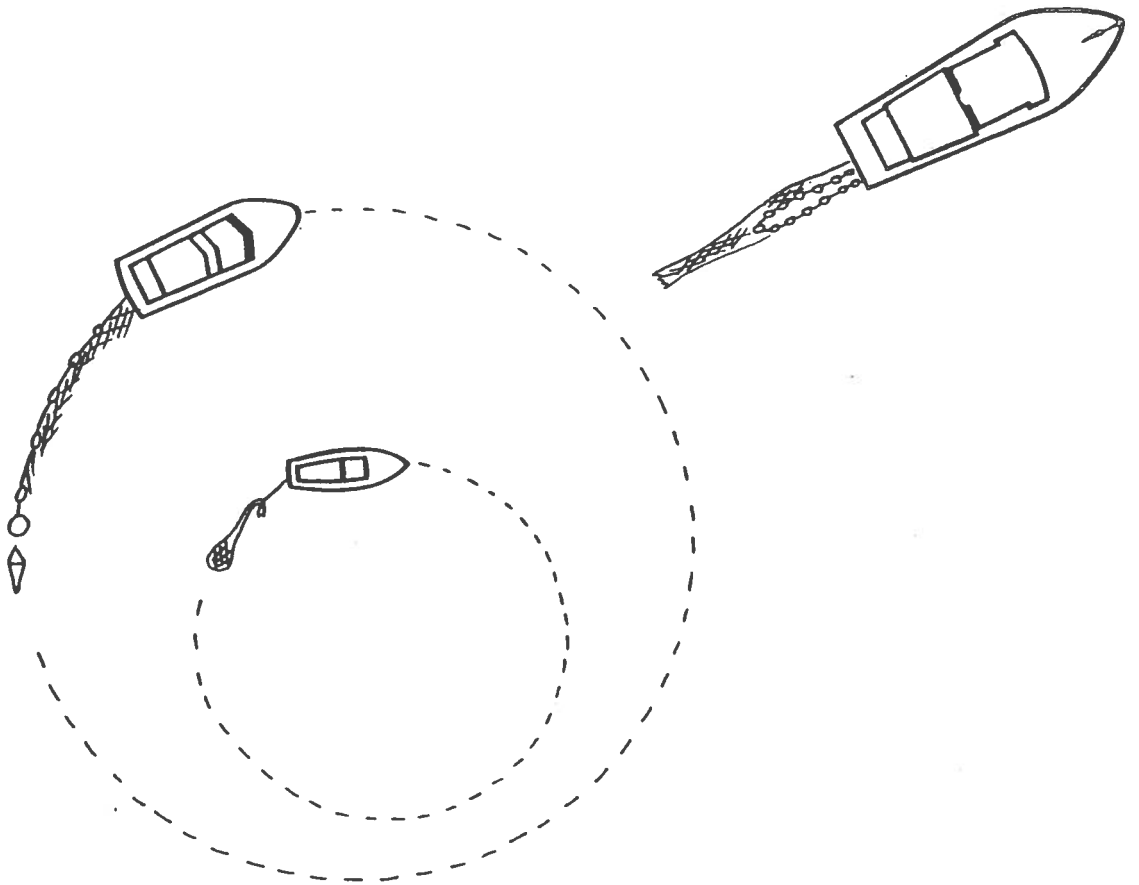


Figure 2. Sketch of operation procedure when A) detaching codend in surface, and B) purse seining the detached codend.