ICES FISH CAPTURE COMMITTEE

Working Group on Fishing Technology and Fish Behaviour (FTFB)
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by

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This report include contributions from the following institutions:

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2) Institute of Fishery Technology Research (FTFI)/Vessel and Marine Engineerin Division, Trondheim
3) Institute of Marine Research, Bergen
4) The Norwegian College of Fisheries Science/University of Tromsø
5) The Norwegian Institute of Technology, Trondheim

(Numbers in parentheses indicate institution(s) involved in different activitie .

Fish behaviour and reactions to fishing gear

- The behaviour of fish towards different trap-designs has been studied in the field by UTV (1).
- Studies of schooling behaviour of herring, including measurements of school dimension and -density have been conducted (1).
- Further trials have confirmed the possible manipulation of herring behaviour (vertical migration) by underwater light and sound stimuli (1).
- A stationary telemetry fish tracking system has been tested with promising results. The system give the position and swimming speed and -direction of the fish with updating every 5 seconds (1).

Selective fishing (including sampling gear)

- Shrimp trawls

The work on selective shrimp trawls has been continued:

- Fishing trials with a new types of (solid) sorting device (5)
- Fishing trials with separator panels (70 mm HH-net) (4,5)
- UTV-observations of square mesh cod end in shrimp trawls (4,5)
- Studies on the effect of ground gear (rock hopper, bobbins) on shrimp trawl catch composition (size and maturity) (1,3)

- **Fish trawls**
- Joint investigations with USSR have been conducted to evaluate the effect on cod end selectivity of two different cod end methods (1).
- Selectivity of cod ends with 10-20% shorter lace ropes has been compared with traditional cod end design, using the modified trouser cod end method. Improved escapement of small cod and haddock was found (1).
- A combined square-diamond mesh cod end gave improved size selectivity compared with standard cod ends (4).
- Trials have been conducted to investigate the effect of towing time on species and size selectivity of bottom trawls (1,3).
- Experiments with a (600 m circumference) pelagic trawl have been done to clarify if this could be a useful gear for representative sampling of cod and haddock (1,3).

- **Longline**
- Further trials confirm earlier findings on the improved size selective properties of artificial bait (Probait) for cod (1).

Improvements of fishing gear and methods

- **Fish traps**
- Several coastal vessels are now successfully using fish traps for catching tusk. The traps are operated in fleets of 50, with trap spacing of 40-50 m (1).

- **Longline**
- The work on artificial bait (Probait) has been continued (1). More effective longline gear (swivel, EZ-hook and monofilament gangion) has now been adopted by several autoline vessels. Compared with traditional gear, the long term improvement in catch rate is at least 30% (1).

- **Gill nets**
- Experiments with different twine materials in gill nets have been continued (5).

- **Purse seine**
- Based on promising results with large meshes in the last part of purse seines, several purse seiners have lengthened their nets with large mesh panels (1).

- **Trawl**
- Development of a new multipanel fish trawl design (1,4).
- A fish trawl designed for 3 warp drag has been tested in the flume tank. Vertical opening could be increased by 50-70% by pulling the 3rd warp, attached to a tounge of the central head line (1,4)
- An investigation on otterboards has been started (5).
- Successfull results are obtained with a 4 winch/2 (standard) trawl system on a factory trawler.

Vessel technology and marine engineering (2)

Within the program **Information technology in the fishing fleet** main topics have been:
- Future functional requirements for instrumentation system and bridge desing on fishing vessels.
- Decision Support System on fishing vessels.
- Systems for ship to shore data communication in the fishing fleet.

The project **Robotization of catch handling** has focused on the need and requirements for an automated system for loading and unloading of frozen fish in the hold of a freezer trawler.

The program **Intregrated production systems in the fishing industry** has aimed at finding the most efficient division of tasks between the fishing fleet and the shore plants in the fishing industry, and to develop the technology for such production systems.

The objective of the program **Renewal and increased efficiency in the fishing fleet** has been to analyse future requirements to Norwegian fishing vessels, and to study how alternative fisheries management regimes will affect the possibilities of meeting these requirements.

The program **Cost reduction in the fishing fleet** has focused on how to reduce running and maintenance costs, and on improving profits by means of preventive maintenance, thus reducing the probability of non-planned interruptions in fishing operations.

Among the activities outside the main areas mentioned above, the following topics of relevance to the interests of the working group have been treated:

- Predesign studies of the qualities of catamarans as fishing vessels (large deck areas, moderate motions in a seaway, etc.).
- Model tests of antipitching tank for reduction of vessel motions and resistance in a seaway.
- Evaluation of water draining systems for the working deck area of shelter decked longliners and gillnetters.
- Survey of location and maintenance of survival suits onboard Norwegian fishing vessels.
- Development of fishing vessels designed for bringing their catch alive on shore.
- Recording and reduction of vessel noise affecting fish behaviour.

Other relevant activities

- A model has been developed to simulate the sinking of a purse seine (1)
- In a project aimed at catching cod fry as seed fish for farming, about 600,000 0-group cod were caught with a small meshed Danish seine in shallow waters along the outer coastline of Finnmark, during August/September 1988. The fry were easily located with a 38 kHz echosounder. Assessment of the 0-group cod stock in coastal waters of Finnmark was estimated to about 40 mill. individuals (1).
- Trawling across pipelines was observed by underwater TV (Ocean Rover) in the North Sea. At low angles (less than 45°) the trawl door would slide along the pipe, giving reduced door spread and a distorted trawl geometry. When crossing the pipe, minor effect was observed on the trawl (1).
- A data bank on fishing vessel economy and technology is being established (5).