

REPORT OF THE JOINT SESSION OF FTFB/FAST WORKING GROUP, HULL,  
MAY 1986; SAMPLING GEAR AND BEHAVIOUR PROBLEMS IN ACOUSTIC  
ABUNDANCE ESTIMATIONChairman: P A M Stewart  
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Marine Laboratory, Aberdeen, Scotland

Meeting place: Hull, England

Date: 15 May 1986

A joint session of the FTFB and FAST Working Groups was held on the morning of 15 May chaired by Dr P A M Stewart. The session heard nine contributions dealing with fishing gear design, fish behavioural observations related to acoustics and studies of avoidance of fish both of survey vessels and fishing gear. The participants were the combined members of both working groups and are listed in the reports to the statutory meeting B46 (FTFB) B44 (FAST).

The first contribution was by D Wileman from Hirtshals, Denmark, on model testing of three bridle trawls for sampling fish stocks. A full description of a Danish trawl was given along with video tape of the model's performance. The history of the design was discussed and some of the pitfalls of incomplete specification stressed. The resulting trawl can be used in mid-water but suffers some change in performance with very short warp lengths.

There were three contributions dealing specifically with fish behaviour.

He Pingyou of the Republic of China presented a contribution describing the swimming behaviour of mackerel. Swimming behaviour as observed under various stimuli. He highlighted the changes in swimming attack angle and the effects of light level, fish density, feeding behaviour and condition factor on swimming speed and the implications for target strength.

P Freon of OSTOM, France presented a paper on the structure of multispecies schools and variations of school size. Observations of caged and netted schools of mixed species were reported. Particularly rapid changes in shape and structure were observed. Species composition appeared to be size dependent rather than related to species group. Species were observed in mixed schools with non-random mixing with Sardinella sp at the centre of the school and other species around the periphery. Catch data from Senegal were analysed to determine school size in a declining stock and were shown to decrease with stock size. It was noted that no clear relationship could be defined, but that shoal size and behaviour would be important both to Acoustic Surveys and Catch per Unit Effort assessment methods.

C Wardle of Marine Laboratory, Aberdeen gave an oral presentation summarising behavioural problems with particular reference to light level. He stressed the importance of the light level threshold effect at around  $10^{-6}$  lux, below which fish can no longer see. The behaviour of fish towards other fish and fishing gear at light levels below this threshold is very different to that at higher levels.

There were five contributions concerning fish avoidance of fishing gear and survey vessels.

E Ona and K Eger of Institute of Marine Research, Bergen presented preliminary results of tests using a high frequency sonar on a trawl. A 675 kHz mechanical scanner with  $1.7^\circ$  by  $30^\circ$  beam was used to build up a  $1.7^\circ$  by  $1.7^\circ$  definition picture with a maximum range of 100 m. The cable length was 4000 m. Results presented suggested suitability for slowly changing situations.

N Diner of Brest, France presented two contributions dealing with avoidance by fish shoals of survey vessels and trawls. Observations were made using an omnidirectional sonar and a towed transducer at up to 200 m from the vessel track. Evidence of avoidance was found in the late afternoon with the vessel at survey speed of 10 knots, but no evidence was found of avoidance in the morning even by schools in shallow water. No clear trends were observed during trawling. The towed transducer was used under similar conditions and no clear avoidance was registered however, there may be some doubts about whether the towed body itself causes avoidance similar to the vessel.

E Ona and O Chruickshank of Institute of Marine Research, Bergen, Norway presented a paper on haddock avoidance reactions during trawling. Fish reaction to the whole trawling operation was studied using a stationary echo sounder system observing the fish in front of the vessel and during trawl passage. Strong avoidance reactions were observed on pelagic haddock, with both horizontal and vertical movement of the fish. The observations indicate that the fish density available for the bottom trawl at shallow depths may be significantly higher than estimated by the echo integration system on board the trawling vessel. At 3 knots with no trawl, there was no avoidance; at 9 knots with no trawl slight evidence of avoidance; at 3 knots with a trawl clear evidence of avoidance.

A Engas and O R Crodø of Institute of Marine Research, Bergen used additional bags between the fishing line and bobbins to determine avoidance under a sampling trawl. A strong length dependent escapement was found and no difference was found between bags placed on the wings or on the bosom. A large increase in the catch of small fish was found in the additional bags.

The Joint Session ended with no special recommendations for the next meeting because of the uncertainty of the locations of the two working group meetings in 1987.