REPORT ON THE ACOUSTICS WORKSHOP

held at the Soviet/Norwegian symposium on the Barents Sea capelin,
Bergen, Norway 14-19 August 1984

Reported by Odd Nakken (IMR)

The workshop was held Wednesday 15. between 1330 and 1500 hours.

Participants: Z.M. Berdichevskiy (PINRO)
                 L.I. Serebrov (PINRO)
                 J. Dalen (IMR)
                 O. Nakken (IMR)
                 I. Røttingen (IMR)
                 T. Jensen (IMR) -interpreter

1. Nakken gave a brief introduction to the echosounder simulator and its use. He also described the education system in fisheries acoustics in Bergen, which includes regular courses for university students in fisheries biology and special cources and job training for electronic engineers and instrument operators.

2. The following points were discussed:

   a) Calibration of acoustic integration systems.

   b) Back scattering cross section and the conversion factor for integration systems.

   c) Data sampling and processing at sea.

The main points in the discussions are given in this report.

A) Calibration

Acoustic calibration is carried out on standard targets according to standard procedures. An ICES manual for calibration is now in preparation at IMR, Bergen and at the Marine Laboratory, Aberdeen and will be approved by the working group on Fisheries Acoustic Science and Technology (ICES) in May 1985.

The acoustic calibration results in a system instrumentation constant. When this constant is applied in the integration, the outputs (integrator values) are in absolute values and directly comparable from vessel to vessel (system to system).

The units of these absolute values of back scattering is in m^2 per unit area. It was agreed that all the acoustic survey data to be exchanged in future should be in absolute values having the dimension:

m^2 per (nautical mile)^2.

The importance of knowing the exact values of the transducer directivity function was discussed. Observations indicate that the directivity function may change when a transducer is fitted to the hull of the vessel. Directivity measurements of transducers should therefore be undertaken preferably after installation. Both PINRO and IMR will consider this problem.

B. The back scattering cross section and the conversion factor.

The relationship between the back scattering cross section, σ_{bs}, the system instrumentation constant, C_I and the conversions factor C is:

$$C = \frac{C_I}{\sigma_{bs}}$$

Adopting the values of the conversion factor, C, used for capelin, a target strength to length relationship of

$$TS = 19.1 \log L - 74.5$$

is arrived at.

This relationship gives values of TS which are higher than those arrived at in experimental situations (see paper by Dommasnes and Røttingen at this meeting).

In order to arrive at a more reliable TS - length relationship usable in the abundance estimation, TS - measurements in situ should be carried out by both institutes. Such experiments should include several species: capelin, cod and haddock, blue whiting, herring and polar cod. The work should continue over the next 3-5 years and results should be exchanged and discussed during the yearly March meetings. It is essential that this work is carried out in single species concentrations with narrow length distributions, and that corresponding distributions of target strength, length and weight are obtained. Instrumentation for such work is (or will soon be) available.

C. Data sampling and processing.

This point was only discussed in brief due to lack of time.