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International Council for the
Exploration of the Sea

C.M. 1977/B:18
Gear and Behaviour Committee

Concerning the International Standards Organization
draft proposal for a standard method of test for determining mesh
size using the I.C.E.S. meter

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1. Request for action

The Secretariat of ISO technical Committee 38 on Textiles has requested comment from ICES on the subject draft proposal, and the ICES General Secretary has referred this request to the Gear and Behaviour Committee. Considering the limited time available for discussion, the Committee should concern itself only with principles and policy, leaving comments on detail for individuals to route through their respective national members in ISO. A Recommendation is required from the Committee to assist Council in establishing the official ICES position in this matter.

2. Historical

Ten years ago ICES was very concerned with means for reducing the by-catch of pre-recruits to the commercial fisheries in an effort to maintain stocks with minimum reduction in fishing effort. The means of prime interest was the selectivity of the fishing gear as governed by the size of the mesh in the cod-end.

Selectivity experiments soon revealed that the measured mesh size is a function of the method of measurement. Therefore, by C. Res. 1969/3:7 ICES requested ISO Technical Committee 38 on Textiles to "include on its agenda the subject of mesh measurement". By Resolution No. 26 at its sixth meeting in Hamburg in November 1969, ISO/TC38 Sub-Committee 9 on Textile Products for Fishing Nets referred the question to its Working Group 1 on Test Methods, recognizing that there may not be a single method to satisfy the divergent requirements of the netting manufacturers, fisheries scientists and enforcement of regulations.

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Members of ISO/TC38/SC9/WG1 conducted a series of tests with available methods and, after considering these results at its fourth meeting in Paris in December 1972, concluded by Resolution 11 that "mesh measurement using the principle of ICES-meter is the best available at the present time" and by Resolution 12 that "the force applied to the mesh (during measurement) should be based on proper investigation of different types of netting under both laboratory and fishing conditions".

Soon after this meeting Netherlands transmitted the Secretariat of WG1 to Belgium and Germany relinquished the Secretariat of SC9, and further work to establish better test procedures and optimum mesh loads has not been conducted.

ISO has a policy to review all its standards and program items every five years. Thus, the time has come for this ISO program item on the measurement of mesh size either to be reactivated and brought to a conclusion as an international standard or for it to be abandoned. In the absence of an SC9 Secretariat, the Secretariat of TC38, the parent committee for SC9, has undertaken to draft a proposal based on the material assembled by WG1, for such a standard. Their initial draft was distributed to member countries of ISO and to ICES in January 1977 and was discussed by the ICES Gear and Behaviour Engineering Working Group at its meeting in Hamburg in April 1977. The ISO/TC38 Secretariat has received several comments on this first draft and has undertaken to prepare a second draft which should be available for discussion by the ICES Gear and Behaviour Committee at the 65th Statutory Meeting in Reykjavik in September/October 1977.

3. Suitability of the ICES-meter

In principle, the ICES-meter consists of two "fingers" which are inserted into a single mesh at a time and separated manually into diagonally opposite corners of the mesh to extend it in the N-direction (normal to the course of the twine). An adjustable coil-spring mechanism is preset so that, at a fixed load on the mesh, a pawl engages a ratchet in the meter to arrest separation of the "fingers" in the mesh. The mesh opening is then read directly from a scale on the ICES-meter.

ISO Standards achieve legal status only when adopted and enforced by national standards organizations. It, therefore, behooves ISO to reach as wide a consensus as possible in its standards. Many national standards organizations categorically deny the use of springs to exert a measured force. Thus, the use of the spring in the ICES-meter to exert the "pre-determined" force on the mesh at the time of measurement makes the ICES-meter unacceptable in many national standards. It is, therefore, not suitable as an international standard.

Experience with selectivity trials in ICES countries confirms the conclusion of ISO/TC38/SC9/WG1 that the ICES-meter is the "best available at the present time". Further, fisheries scientists have expressed the desire to continue using the ICES-meter so that new selectivity results will remain comparable with data already obtained. Thus, the ICES-meter appears to be suitable as a research tool, at least for the present.

The ICES-meter is a fairly complex mechanism which requires careful maintenance and fairly frequent recalibration (incidentally against a spring, which is not acceptable in many national standards). Therefore, the ICES-meter is probably not suitable for enforcement of fishery regulations at sea or in the courts of law.

Netting manufacturers will probably continue to check mesh size in the factory by measuring the distance spanned by a known number of rows of knots. Thus, the ICES-meter would be useful only if it becomes the official tool for legal measurement of mesh size.

The question then remains whether or not ISO should be requested to develop a new method for measuring mesh size, which will overcome the deficiencies of the ICES-meter. This would require considerable imaginative work by people knowledgable both in textiles and in fisheries research and management.

4. Load on mesh during measurement of size

ISO/TC38/SC9/WG1 was very correct in identifying the need for much more research on the effect of mesh loading on mesh-size measurement (and on fishing gear selectivity). In the draft proposal for a method for measuring mesh size, the TC38 Secretariat quite arbitrarily bases the load table on 0.5 gf tension on each yarn (twine) per resultant tex (g/km) yarn weight. This is consistent with existing international standard ISO2062-1972, "Breaking load and elongation at breaking load of single strands", but it is twice that called for in ISO3790-1972, "Elongation of netting yarns". According to this criterion the mesh-size meter should be capable of exerting mesh loads as low as 20 gf for fine gill-nets and as high as 26 kgf for trawl cod-ends made of double twine running 75 m/kg. Obviously the ICES-meter cannot exert this range of mesh loads and cannot be used universally as required of an international standard.

However, there is evidence that this criterion for establishing mesh loads is not appropriate. The most common need for measuring mesh size in the fisheries relates to formation and enforcement of regulations for selective fishing gear as a means for reducing by-catch of pre-recruits and non-commercial

species and to selectivity experiments in support of fishery resource management. For this application, the measured mesh size should relate consistently to the sizes of fish retained and released. However, with the mesh-loads currently in common use during mesh-size measurement, these fish sizes vary also with the type of fibre and size of netting yarn. It is conceivable that mesh loads exist which will yield measured mesh-sizes which relate to fish sizes retained and released in a fairly consistent way regardless of material, but it will take appreciable work to find the criteria for selecting such loads.

There is considerable information available on the load-elongation characteristics of various fibres used in fishing nets. There is even appreciable information on braided and twisted netting yarns and the effects of hardness and certain treatments. However, there is very little information on the load-elongation characteristics of meshes in netting. In new netting, these mesh characteristics are considerably affected by the type and setting of the knots, but changes in these characteristics with various treatments and with experience in fishing significantly affect the selectivity characteristics of the fishing gear. Much additional, factual information is required on these changing load-elongation characteristics of the meshes before the mesh-loads for mesh-size measurement can be selected with any degree of intelligence, particularly as it relates to fishing gear selectivity.

The question remains whether it is worth the time and effort to obtain this information at the present time and, if so, who should be asked to do it.

There is very little to be gained by a program to measure mesh sizes in netting of various fibre types and yarn sizes with the ICES-meter, considering that the mesh loads selected probably will eventually prove to be inappropriate.

5. Fate of the ISO draft proposal

Obviously the draft proposal prepared by the TC38 Secretariat is fundamentally unsuitable as an international standard. However, with a little more input from the fisheries side it probably could be developed into the recognized method for purposes of trawl-selectivity research, at least until more information, as identified in sections 3 and 4 above, becomes available.

The question remains, what is the appropriate response from ICES to ISO? Should the ISO mesh-measurement project be abandoned or should we ask them to pursue the question further along different lines? If the work should continue, how can we assure input from fisheries to complement the ISO capability in textiles?

6. Terms of reference for discussion by the Gear and Behaviour
Committee

Time for discussing this problem at the 65th Statutory meeting will be very limited. Therefore, discussion should be limited to policy and basic principles such as those outlined above.

Further contributions of this nature would be most welcome, but comments of details should be submitted through the national ISO/TC38 members.