International Commission for the Northwest Atlantic Fisheries

Serial No. 3486
(A.c. 4)

ICNAF Comm.Doc. 75/14

ANNUAL MEETING - JUNE 1975

USSR proposal on the methods of determination of net materials used on vessels

Six methods of identification of synthetic net materials are given in the document N 55 E of the International Organization for Standartization (JOS) "Identification of net twines made of synthetic fibres" by Dr. G. Klust, October I972.

They are as follows

- identification on trade mark;
- identification on the form of fibres;
- identification on the combustion and on the products of burning;
- identification on the buoyancy in water (specific weight);
- identification on the dissolution in chemical reagents;
- identification on the point of melting;

Identification on trade mark may be trustworthy at some extent only in the case, when the factory labels of net materials trawl is made can be given for their inspection, but, it is insufficient to possess the information given exclusively by the crew. Besides that, there is every necessity in the both cases, and especially in the first one that data obtained be verified by other methods of identification.

In case of the second method the twine thickness is of the greatest value for identification. As is known, there are very thin twines - fibres (previously named as fibre - silk) with thickness not more than 0.05 mm and fibres - veines with thickness within ranges from 0.I mm and more. The fibres - veines are often called as mono-filament. Complex threads made of thin fibres can be designated as mono-fibrous or filamentary threads.

Synthetic fibres relating to each chemical group may be manufactured both as filament threads and as monofilament. In reality, only one synthetic filament namely – polyethylen, was widely used as a monofilament. The last one taken as thin filamentary threads is not completely used in the fishery. All other species of synthetic fibres are applicated in the fishery as filament threads and very seldom as monofilament mainly for cables manufacturing, and those ones are much more hard than the cables made of polyethylene.

A split-fibre of a special form or a film – fibre made of polypropylene is used mainly for the production of cables and ropes.

Thus, the polyethelene fibres may be quite clearly distinguished from the other ones by their shape or, more precisely, by their thickness.

The third method of fibres identification by their combustion and the products of burning needs a rich skill. This method allows to distinguish quite exactly the fibres of cellulose origine from those of synthetic ones. But, it is hardly possible to distinguish fibres made of polyamide from those of polyester.

The fourth method, i.e. identification of threads on their buoyancy in water is often used to distinguish fibres made both of polypropylene and polyethylene from all other synthetic fibres possessing the specific weight higher than a unit. But, it is difficult to distinguish different synthetic fibres between them by the method.

The last two methods, i.e. identification on the dissolution in chemical reagents and on the point of melting give the most accurate results, but they are difficult to be accomplished. Those methods need to have a special apparatus, then, enough rich set of reagents and the person performing such kind of the identification must know to act with those reagents. That all makes great difficulties to use these methods on the vessels.

Besides that, it is to be added that the identification of net materials with help of chemical or organic methods is especially difficult to be realised in case, when the net materials are saturated by matters preserwing the fibres or covering them, and those matters may be resins, latexes or other ones.

The chemical group of synthetic fibres is identified for the need of selectivity in order to precise the coefficient of the fishing gear selectivity, that depends firstly on the elongation of net materials and, consequently, on the kind of twine it is manufactured of.

Data on elongation of different cod - end materials tested by Dr. von Brandt A. in 1969 and which were mentioned in the report of Dr. G. Klust were analysed by our specialists.

The scientific workers of our Institute tested 78 poliamide, 28 polyethylene, I0 polypropylene, 4 terylene and 3 manila samples got from seventeen member - countries of ICES and ICNAF. Netting sheet knots made of threads and ropes were stretched out on breaking machines in a wet condition.

The elongation (given in per cent) got at the knot stretching with the effort equal to a half of the breaking load per knot was taken as the main factor. The results obtained are given in the Table attached.

Chemical group of fibres	Number of samples possessing the elongation (in %)								Total number of samples
	less than I0	I0,I-I5,0	I5,I-20,0	20,I-25,0	25,I-30,0	30,I-35,0	35,I-40,0	more than 40	
Polyamide	-	-	I5	I9	I6	I2	II	5	78
Polyethylene	2	I9	6	I	-	-	-	-	28
Polypropylene	-	6	2	2	-	-	-	-	I0
Polyester	3	I	-	-	-	-	-	-	4
Manila	3	-	-	-	-	-	-	-	3
T O T A L	8	26	23	22	I6	I2	II	5	I23

As it is seen, the less elongation is proper to the samples made of manila and polyester, more precisely - I0 per cent and less.

The elongation of polyethyleme and polypropylene samples fluctuated from IO up to 20 per cent.

The elongation of polyamide threads and ropes ranged widely, i.e. from I5 up to 40 per cent. The elongation of polyamide fibres changed greatly due to the differences in the tension of the fibres themselves and at the following manufacture of objects. Therefore, even if the polyamide fibre is determined precisely, there is no possibility to know the rate of the fibre elongation, if it is 20 or 40 percent?

Taking into account the fact that presently the trawls are manufactured of polyamide fibres in the most of countries and that those fibres possess different elongation, there is necessity to verify it directly using for these purposes the portable dynamometer, which is to be elaborated.

A usual dynamometer with a cylindrical spring in combination with a driving screw serving for creation of the tension to the control thread is taken as base for the construction of the instrument.

The arrangement scheme of the portable dynamometer constructed according to the principle in question is given in Fig I.

Below one can see the analysis of the method of simultaneous elongation measurement and the given load for the netting twine with help of the portable dynamometer.

A thread section about 200 mm in length is cut of the netting, then it becomes free of knots, put consequently into the clamps of the dynamometer 6 and 7 with the reading base equal to IOO mm.

Thus, the clamp 6 connected to the rod of the dynamometer 4 is set against the scale mark characterising the load equal to five, that all is made in order that the clamp 7 connected to the driven screw 9 be put against the zero scale mark of the lengthening 8.

Now, it is possible to note that the thread tucked into the clamps undergo the initial effort given to it in advance according to the thread thickness.

Then, the control thread is stretched along the scale 5 up to the effort given due to the rotation both of the steering control 7 and the drive screw, and the elongation of the sample corresponding to that effort is counted out on the scale 6.

In case the initial length of the thread tucked into the clamps was equal to I00 mm and the stretching process being over, the spring clamp appeared to be against the mark of 20 mm and the clamp of the drive screw - at the mark of I40 mm, thus the total length of the thread became I40 - 20 = I20 mm, and its elongation as result of the stretching - 20 mm

$$\text{or} \frac{20}{100} \cdot 100 = 20\%.$$

Using the data given in Table I4, page 4I of "Cooperative research report", series A N 25, I97I, one can determine the equivalent of the material, then, with its help - the real mesh size for the fishing gear, the last one is compared to the mesh size established for any area and the object of fishery.

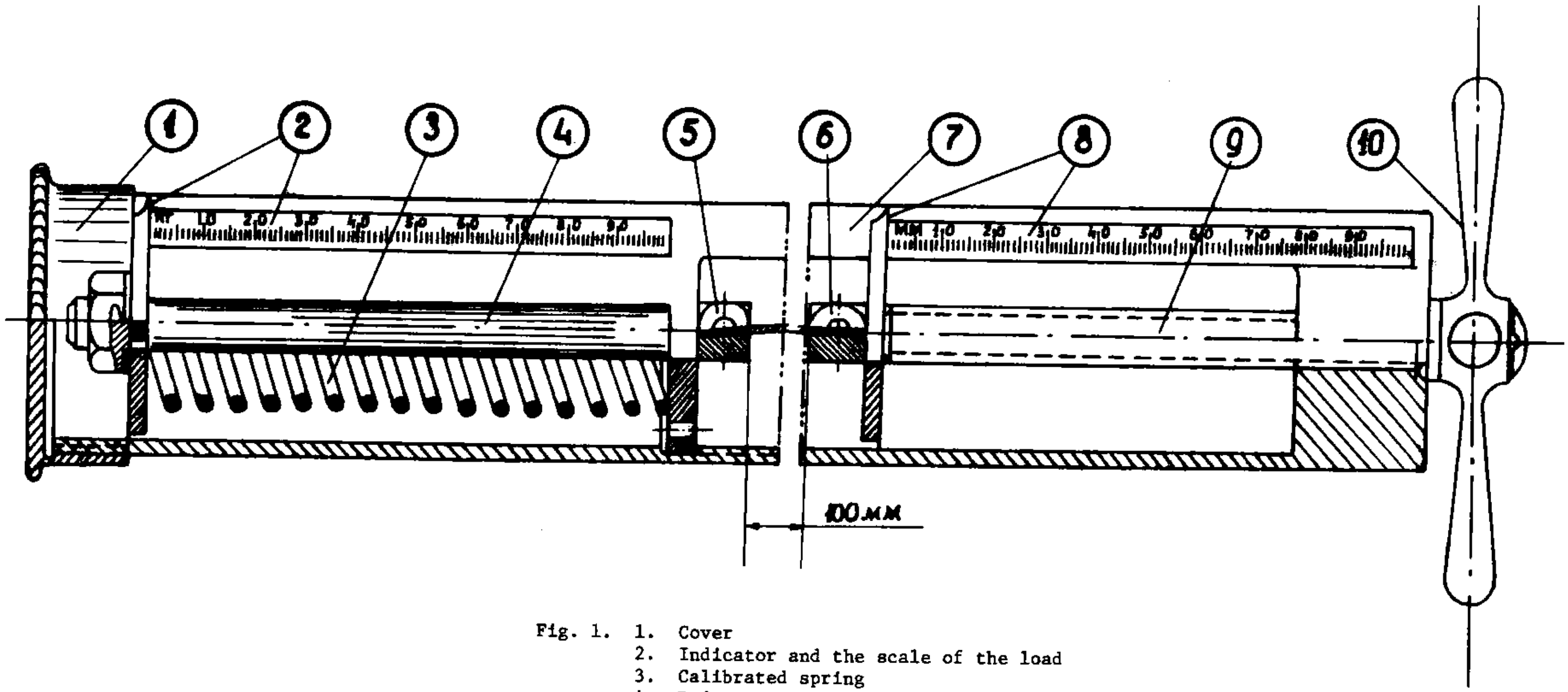

Fig. 1.
1. Cover
2. Indicator and the scale of the load
3. Calibrated spring
4. Rod
5, 6. Clamps
7. Frame
8. Indicator and elongation scale
9. A drive screw
10. Steering control