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L'UTILISATION DE NAPPES DE FILET FAITES A LA MACHINE POUR LA FABRICATION DE CHALUTS MEDITERRANEENS

THE USE OF MACHINE-MADE NET WEBBING FOR MEDITERRANEAN TRAWL NETS

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ABSTRACT

Trawl nets made of tailored machine-made netting are seldom used in the Mediterranean. It should be expected that the introduction of synthetics into trawl fisheries will force the Mediterranean trawl-fishermen and netmakers to switch over from hand-braided to machine-made, tailored nets. This paper describes certain methods for simple tailoring of net-sections and of standardization of machine-made netting. A detailed plan of an Italian-type trawl net, made of shape-cut, machine-made netting, is included.

RÉSUMÉ

Les chaluts fabriqués à partir de nappes faites à la machine à la mesure sont rarement utilisés en Méditerranée. L'introduction des fibres synthétiques devrait inciter les pêcheurs et les fabricants à passer des filets faits à la main à ceux faits à la machine et aux filets tous taillés. Ce document décrit certaines méthodes de taille simple de sections de filet et de standardisation de nappes faites à la machine. L'auteur y a joint un plan détaillé d'un chalut du type italien fabriqué à partir d'une nappe coupée en forme, faite à la machine.

Introduction

Shape-cut sections of machine-made net-webbing are, at present, rarely used in most countries of the Mediterranean. With the expected introduction of synthetic twines into trawl fisheries in this sea, methods should be introduced which will enable the Mediterranean fishermen and netmakers to shift from hand-braided and straight-edged net-sections to the tailoring of machine-made netting. Although in some countries of the Mediterranean, trawl nets are constructed from factory-made cotton and hemp netting, sections are rarely cut to shapes, straight edged, rectangular sections being preferred.

Experience gained in Israel, while fishing with Italian-type, (Fig. 1), and hybrid-hemp-trawl nets, (Ben-Yami, 1959), assembled from sections of machine-braided netting cut to shapes, shows that there is no rational reason for preferring straight-edged webbing, from the point of view of the results of fishing (Ben-Yami, 1957). The only difficulties are due to the conservatism of the fishermen who are not accustomed to tailor net-webbing and to repair edges, other than " *all points* ". The methods

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for ordering, calculating the amount, and tailoring of machine-made netting, suggested in the following pages, might perhaps assist the netmakers and fishermen, while introducing synthetic and other factory-braided nets into Mediterranean trawling.

1. *Webbing to be supplied by the manufacturers*

The net-webbing leaves the netting machine in large rectangular sections, called *bales* in this paper. The *depth* of a bale is limited by the size of the netting machine, while its *length* is independent on the machine. Trawlnets are assembled in such a manner that the length of the sections concerned is formed by the depth of a bale (Fig. 2). Thus, when manufacturing bales suitable for different sections of trawl nets, the depth of the bale should be identical with the length of the required section of

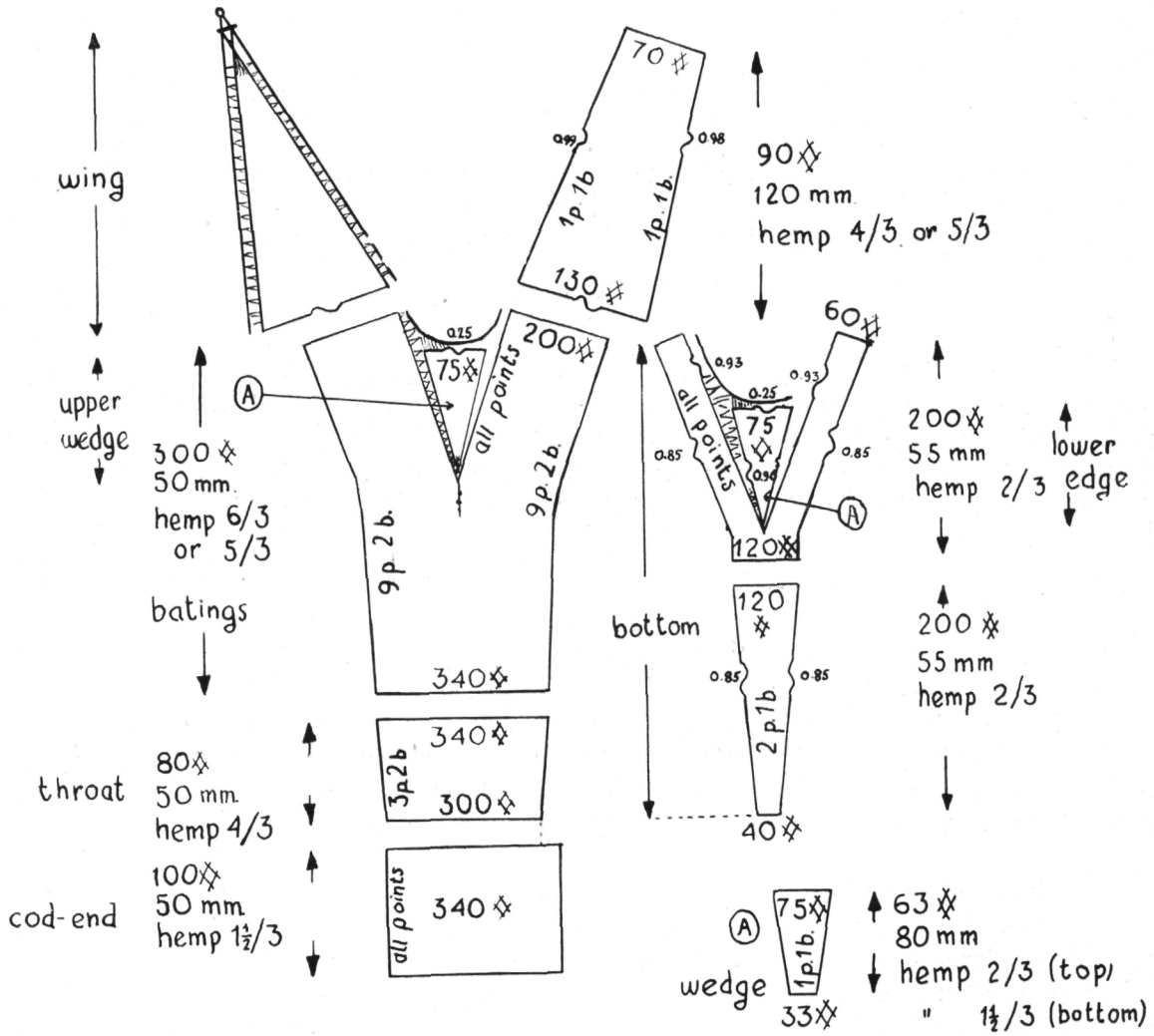

FIGURE 1.

the net, thus enabling the material to be used without remnants. When a short section is required, two or more bales can be braided simultaneously on one machine, using *false seams*, easily removed after leaving the machine.

There are three possibilities for marketing machine-made netting:

1) In completely assembled nets (a method scarcely acceptable by the Mediterranean trawl fishermen, who prefer to assemble their nets themselves);

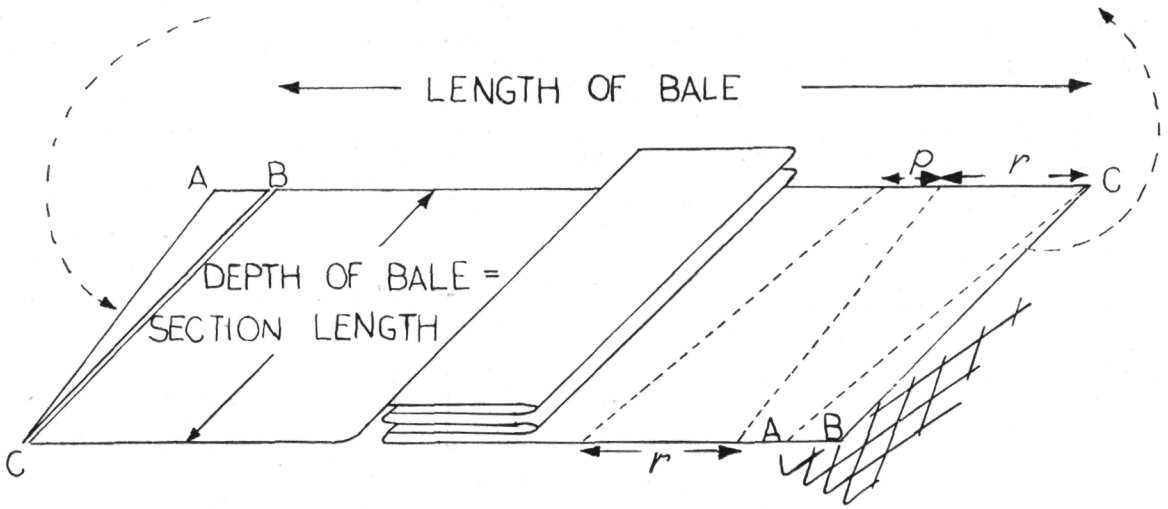

FIGURE 2.

2) In rectangular pieces, cut out from bales with a standardized length;
3) In standardized sections, cut to shapes, cut out from bales with standardized length.

In the second case, the buyer cuts out a rectangular piece from the bale of webbing. He is free to chose the width of the section, as well as the shape-ratio (degree of tapering). He obtains the required, tapered section, after performing three operations:

a) straight cutting the necessary amount of netting off the bale,
b) cutting the calculated shape-ratio,
c) sewing (as described in Section 3).

According to the third method, the buyer is able to obtain the required tapered section by a single cutting, under the condition, however, that uniform shape-ratios will be used for all sections which are cut from one bale (Fig. 2).

2. *Calculating the shape-ratio for cutting tapered net-sections*

A simple and quick method of planning the shape-cutting of net-sections was described by Baranov (1948), and is reproduced below in a slightly modified form.

Example: From a bale of netting 60 meshes deep we want to cut out a triangular section with

a base 10 meshes long (Fig. 3). Let us denote the edge BC (depth) by the letter m, and the edge AB (length) by the letter n. The equation for the shape-ratios is:

I $$\frac{\text{points}}{\text{bars}} = \frac{m - n}{2n}$$

the numerator of the fraction indicates the number of meshes to be cut along a vertical line (*points*), and the denominator indicates the number of half-meshes to be cut diagonally (*bars*). In this example:

$$\frac{m - n}{2n} = \frac{60 - 10}{20} = \frac{5 \text{ points}}{2 \text{ bars}}$$

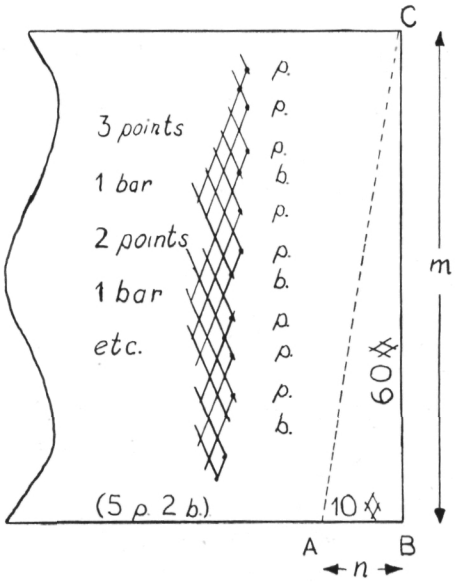

FIGURE 3.

the result indicates that for every 5 meshes cut straight, one full mesh, or 2 bars, has to be cut diagonally. To avoid " steps " along the tailored edge of the netting, the cutting should be carried out in the following manner: 1 bar after 2 points and the second bar after three points, repeating this pattern till the end of the tailored section (Fig. 3).

This method of calculating the shape-ratio of tapered net-sections is suitable for any kind of fishing net, under the condition that the depth of the required section (m) exceeds the length difference (n). This condition appears in almost all cases. If the length difference, however, exceeds the depth of the section, the shape-ratio should be obtained by means of an equation:

Ia $$\frac{\text{points}}{\text{bars}} = \frac{B - M}{2M}$$

where: B indicates the longer edge of the section, in this case, the required difference of length, and M — the shorter edge of the section, namely its depth. The numerator of the thus obtained fraction indicates the number of points to be cut parallel to the edge B, i.e. lengthwise, and the denominator, the number of bars to be cut in a diagonal line (Fig. 4).

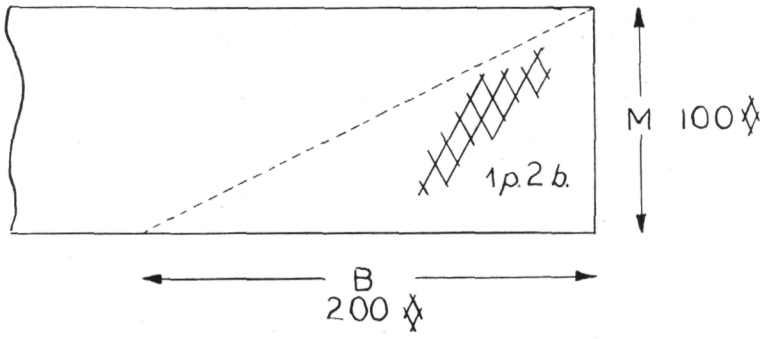

FIGURE 4.

3. *Constructing the required tapered section from a rectangular one*

In order to construct a tapered net section from a rectangular netting, first the depth of the netting should be brought to that of the required section (which is the case if standardized bales are available). The length of the rectangular piece of webbing (L) is easy to find, using one of the following simple equations:

II $$L \text{ (meshes)} = \frac{r - p}{2} + p \quad \text{or} \quad \frac{r}{2} + \frac{p}{2}$$

where: r — the number of meshes at the wider edge of the tapered section and p — the number of meshes at the narrower edge.

If, for example, a section of webbing, tapered from 400 to 340 meshes is required, the calculation is an follows:

$$\frac{400 - 340}{2} + 340 = \frac{400}{2} + \frac{340}{2} = 370; \text{ (Fig. 5a).}$$

After cutting the piece of 370 meshes from the bale, the ratio of shape should be found. Let us say that the depth of the bale, (and the section required), is 300 meshes (Fig. 5). The shape-ratio will be found according to the equation I, where m is the depth (300 meshes) and n is the length difference and will be found using the formula III. We shall find that:

III $$n = \frac{r - p}{2} = \frac{400 - 340}{2} = 30$$

$$\text{consequently the shape-ratio} = \frac{m - n}{2n} = \frac{300 - 30}{60} = \frac{9}{2}$$

The result 9 : 2 indicates the shape-ratio of 9 points and 2 bars, or in practice: 5 points, 1 bar, 4 points, 1 bar and so on. Now the netmaker has to count 170 meshes along the edge of 370, and begin the cutting. The diagonal cut must be directed to the left, if counted from right to left, or to the right, if the counting was carried out from left to right. (Fig. 5a). If the cutting started from the proper point, A (Fig. 5a), and was carried out carefully, the cut diagonal line will reach the opposite edge of the webbing exactly at the point B (Fig. 5a).

After dividing the webbing into 2 sections, each of them with one edge tapered, one of them must be turned over and placed in the manner shown in Fig. 5b. The 2 straight (all points) edges should now be connected, with a knot-to-knot seam. In case, however, that the section will serve as batings in an Italian-type trawl net, the edges will be left unconnected along the front 7 m., in order to form a cleft into which will be inserted the upper wedge (Fig. 1). After doubling the shape cut edges (double or triple selvages), and the edges in the cleft, the batings is completed.

4. *Standardized cutting of net sections*

The third method of marketing netting (see Section 1), enables the fisherman (or the netmaker) to obtain the required, tapered section in a single cutting, on condition, however, that uniform shape-ratio will be used for all sections which are cut from one bale. In each bale one preliminary

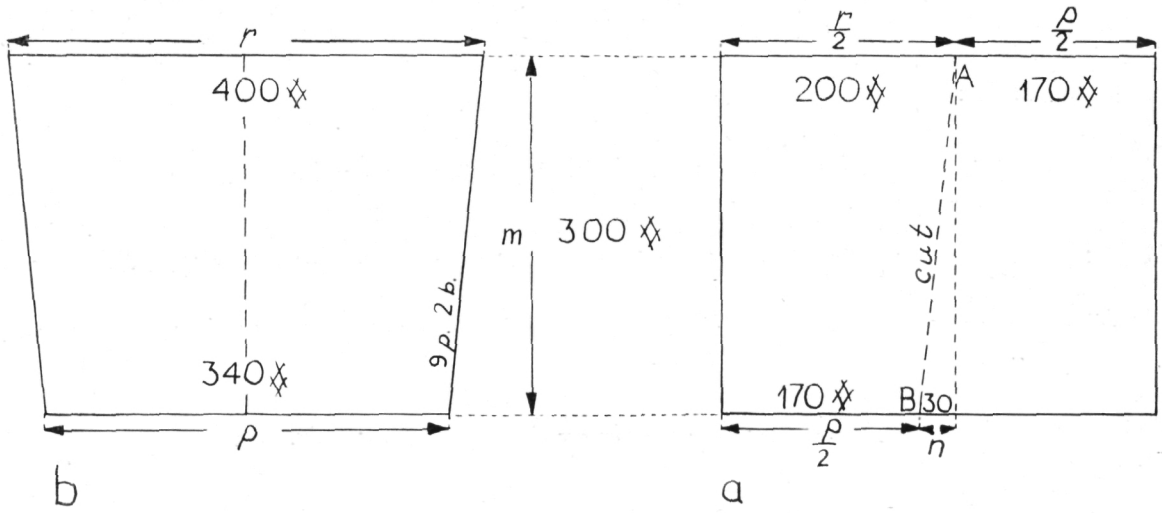

FIGURE 5.

step must be carried out, that is bringing its front edge (depth of the bale), to the chosen shape. This is shown in Fig. 2, where a bale of net-webbing is prepared for cutting sections, by cutting off a wedge ABC according to a standardized shape-ratio. The remaining wedge ABC, thus produced (Fig. 2), should be sewn to the rear edge of the bale, with its "all points" edge, in order to avoid waste of material.

The wedge ABC having been removed from the front edge of the bale, trapezium-shaped sections of any depth can be cut out, each with a single cutting only (Fig. 2). Care should be taken that the wider edge of each section (r) be cut alternately from each side of the bale in the manner shown.

When cutting a section for an Italian-type batings, a cleft must be made, in order to open a space for the upper wedge (Fig. 1). This will be done by cutting straight inwards for the required length of the cleft (generally about 7 m.), at the centre of the wider, front edge of the batings, and by a subsequent doubling of the thus formed edges.

When the wedge ABC (Fig. 2), cut out from the front edge, together with the material which rema ined in the last part of the bale, are not sufficient to form a full sized section, a rectangular strip of webbing can be cut off a new bale, and sewn between the wedge and the remainder, thus forming a complete section and enabling a 100 % usage of the material.

This standard cutting of net-sections is suitable for any type of net used in fishing, for which relatively small, shaped sections have to be cut from machine-made netting, produced in rectangular bales (different types of drag-nets, seines, traps, etc.). This method demands that standardization of depths of the bales and of the shape-ratios be introduced into commercial practice.

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