

SIZE, LENGTH AND DEPTH RELATIONSHIPS OF A MESH WHEN HUNG

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SEVEN TEXT FIGURES

The length and depth of a piece of netting after hanging it to a hanging line are determined by the number and size of its mesh. It is, therefore, reasonable to appreciate the value of a correct mesh measurement, the proper understanding of which is essential to the effectiveness of any fishing gear design.

Mesh, to a fisherman, is defined as one of the similar spaces or openings enclosed by weaving the thread into a net. Its size is determined by the length of the thread which encloses that space. This enclosure is made up of four equal legs or bars, each with a knot between them.

Mesh is conventionally measured in a stretched condition from the first to the end knot at their center points known as center measurement and/or inside of the knots called inside measurement. This is called stretched measure (fig. 1).

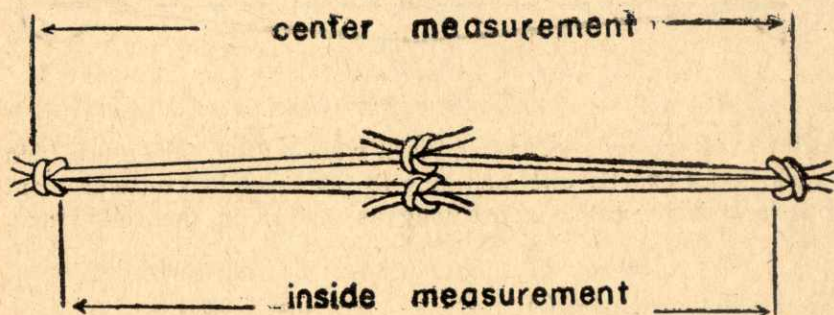


FIG. 1. Stretched measure

The inside measurement is appropriate only in fish conservation work where the inside dimension is considered in relation to the size of the fish for escape purposes, while the center measurement measures only the straight distance between the terminal knots and not the true mesh size.

In both methods, the true size of the mesh is inaccurately measured because of the presence of the center knots B which

makes the bars AB and BC not in one line as shown in fig. 2. This inaccurate measurement of the mesh size certainly would result in a faulty determination of the hanging length and depth of nettings.

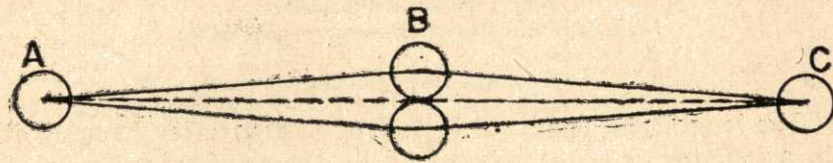


FIG. 2. Bar x 2 measurement,—solid line; stretched length—dotted line.

Usually, a stretched mesh is given a length of 100 per cent and a depth value of zero. Actually, however, depth is more than zero since knots have thickness. Thus, in fig. 3 the true

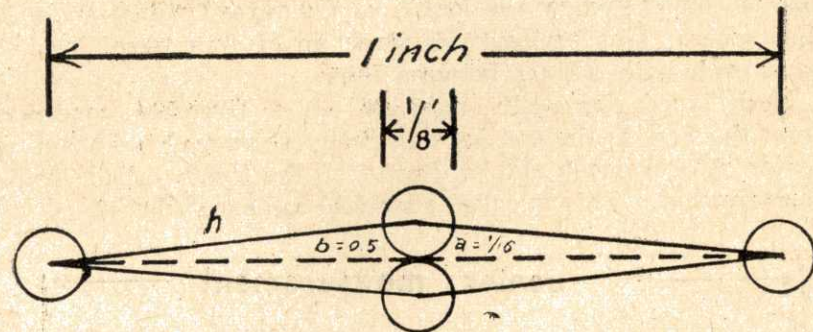


FIG. 3. True Mesh Size

size of the one inch stretched mesh with a knot one-eighth inch thick is not exactly one inch long as per stretched measurement but is actually 1.008 inches long as proven in the following:

$$\begin{aligned} h^2 &= (a)^2 \div (b)^2 & h &= \sqrt{0.253906} \\ h^2 &= (\frac{1}{8})^2 \div (.5)^2 & h &= .504 \\ h &= \sqrt{(\frac{1}{16})^2 \div (.5)^2} & 2h &= 1.008 \text{ inches} \end{aligned}$$

In this particular case, the true length ($2h$) is 1.008 inches or 0.8 per cent longer than the stretched length.

The stretched length of a mesh is, therefore, not the same as the true length. The former is shorter than the latter depending on the size of twine and type of knot used. The effect of the thickness of the knots is evident when two pieces of one-inch nettings are compared, one constructed from fine threads and the other from heavy twines. Both have one inch

mesh but the latter appears smaller than the former. This is because the stretched length of a mesh is shorter than the true mesh size.

It is, therefore, more accurate to measure mesh size by the bar length method where the true length is equal to twice the bar length. Hanging length of the mesh should also be measured accordingly.

It should not be measured in stretched condition as its true length is really equal to the length of the two bars measured from center to center of the knots. When stretched, the straight distance from the first to the end knot is shorter than the true length of the mesh. One hundred per cent hung, therefore, should be taken to mean as 100 per cent of the true length and not 100 per cent of its stretched length.

When hung at a slack, the mesh becomes diamond-shaped depending on the degree of shrinkage, or per cent of hanging. Thickness of the knot affects the depth of the mesh only when it is hung at 100 per cent in stretched condition or when hung at a shrinkage of not more than the thickness of the knot.

Nettings are usually hung with a certain degree or percentage of slack depending on the type of gear and individual taste of the fisherman. They are never hung at 100 per cent of their length or zero per cent slack; nor zero per cent hung or 100 per cent slack.

Percentage of slack means the amount of shrinkage the hung length is shorter than the mesh length. Thus, in the 60 per cent hung (fig. 4) the mesh is hung 60 per cent of its true length, leaving 40 per cent as slack or shrinkage. The hanging length can be expressed either in percentage of slack or percentage of hung, each obtained by subtracting the other from 100 per cent, since they are complementary.

Depth of the mesh varies inversely to the hanging percentage. It increases when the hanging length is decreased and decreases when the hanging length is increased. At 100 per cent hung, the depth is equal to the thickness of the knot. At 60 per cent hung, the mesh is diamond-shaped with a depth of 80 per cent of the mesh length.

This is better understood by considering the two-inch mesh illustrated in fig. 5. At zero slack, the length is 100 per cent while the depth is theoretically zero. At full slack, the hung length is theoretically zero, while the hung depth is theoretical

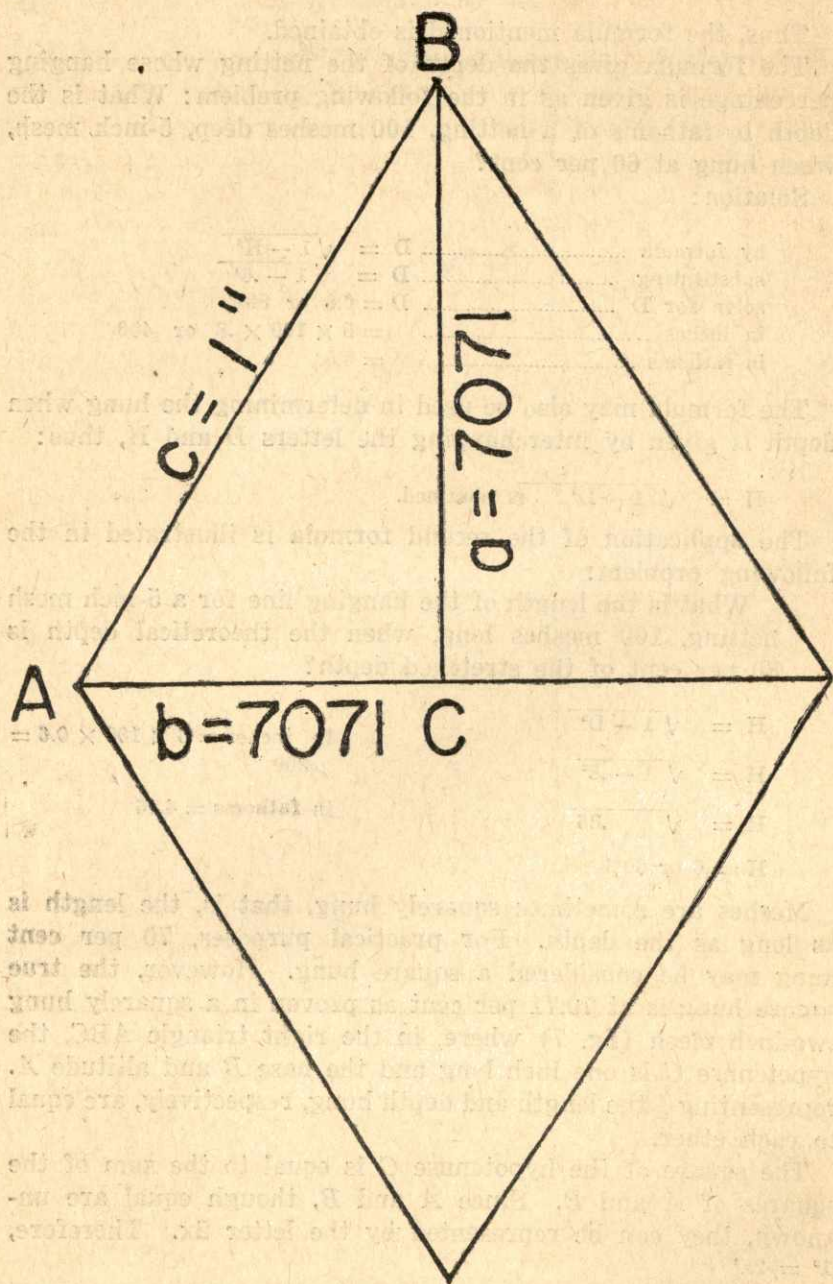


FIG. 7. Square hung

This proves that the mesh is squarely hung at 70.71 per cent. It has been shown in the foregoing discussion that it is wrong to measure the size of a mesh in stretched condition. The true size is equal to twice the length of any one of its bars or legs measured from the center of the knots. This correction in the manner of measuring mesh size eliminates the error of the conventional stretched measurement in determining the corresponding depth and length of the net after hanging it at any given percentage.

It is common knowledge that when the hanging line is as long as the size of the mesh, the depth becomes zero or the "eye is closed." However, when the hanging line is increasingly decreased, the depth also increases or the "eye opens" up to the degree when the square hung condition is attained, after which, the "eye closes" again. This relationship is shown in the accompanying Table 1, a guide table for length and depth relationship in per cent of a mesh after hanging, based on the true mesh size measurement discussed above. The table has three columns, namely:

1. Per cent hung—gives the hanging length in per cent of the mesh size.
2. Per cent slack—gives the amount of slack or shrinkage in per cent of any given percentage hung from 100 per cent.
3. Per cent depth—shows the depth in per cent when hung at any given degree of per cent slack.

The table is useful in determining the length of the hanging line for a given netting. It determines the depth of the netting after hanging and also the exact amount of netting necessary to construct a fishing gear when the hanging line and depth after hanging are given. Thus, at 60 per cent hung, the hanging percentage most commonly used, the depth of one-inch mesh by 100 meshes deep netting is equal to $1 \times 100 \times 0.8$ or 80 inches, while the length is equal to $1 \times 100 \times 0.6$ or 60 inches.

Fishermen never hang their net at zero nor 100 per cent. Hence, zero and 100 per cent hung are not included in the table. The hanging per cent usually used is from 35-70, 50-65 per cent being more common.