

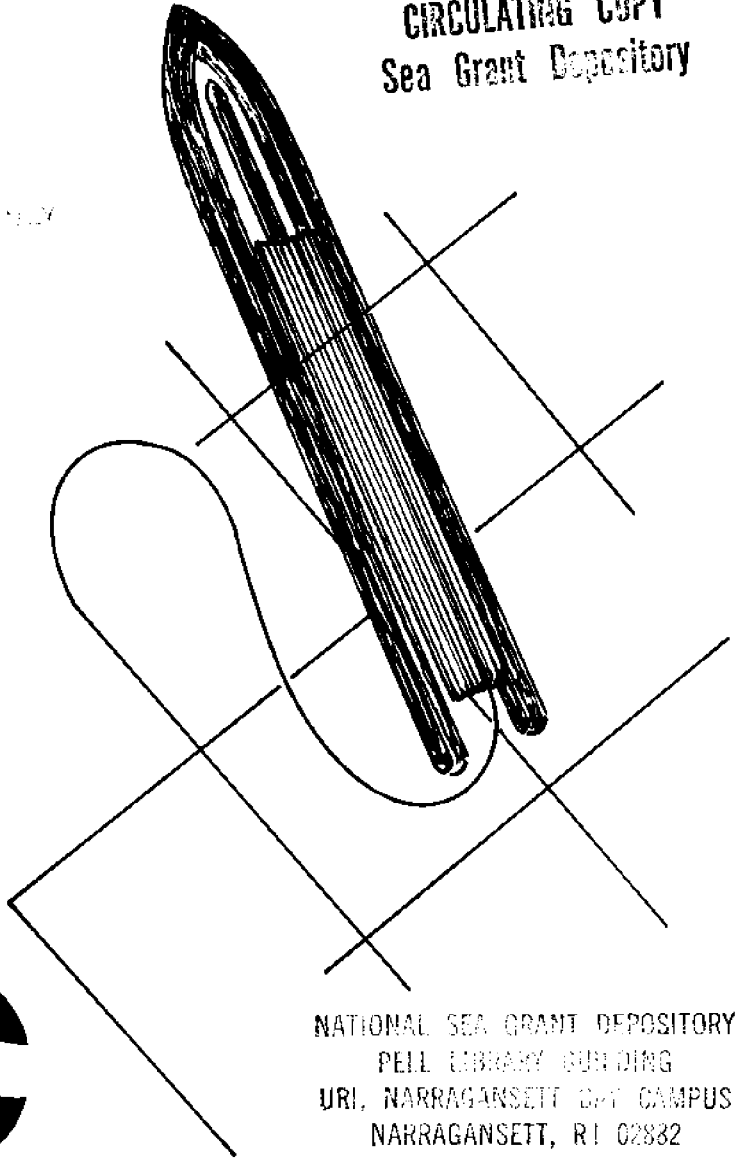
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CUTTING WEB TAPERS

by Geoffrey A. Motte

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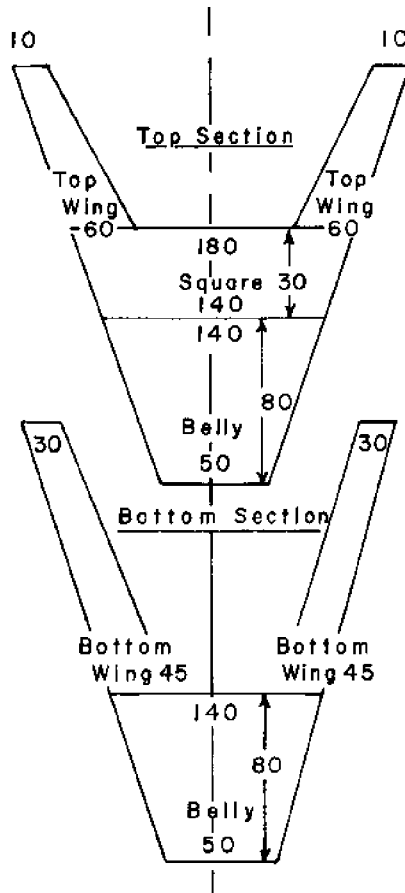
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UNIVERSITY OF RHODE ISLAND
Marine Leaflet Series
Number 1

YANKEE 35 TRAWL



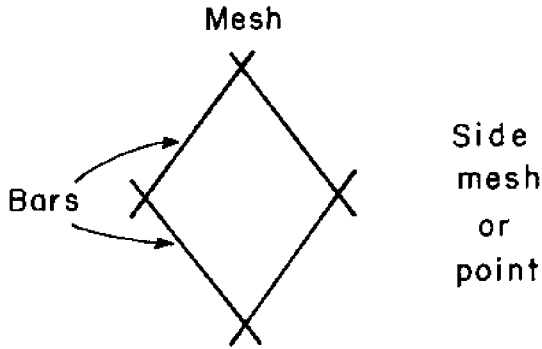
INTRODUCTION

For many years fishermen have cut by trial and error methods the various shaped pieces that go together to constitute a net. For an experienced twineman this takes many years to perfect and usually a great many costly mistakes on the way. Sometimes a certain taper will be started, and after a number of cuts it may be obvious that it is wrong and another different taper must be used to rectify the mistake. This will lead to either a badly shaped net or, in some cases, complete waste of that piece.

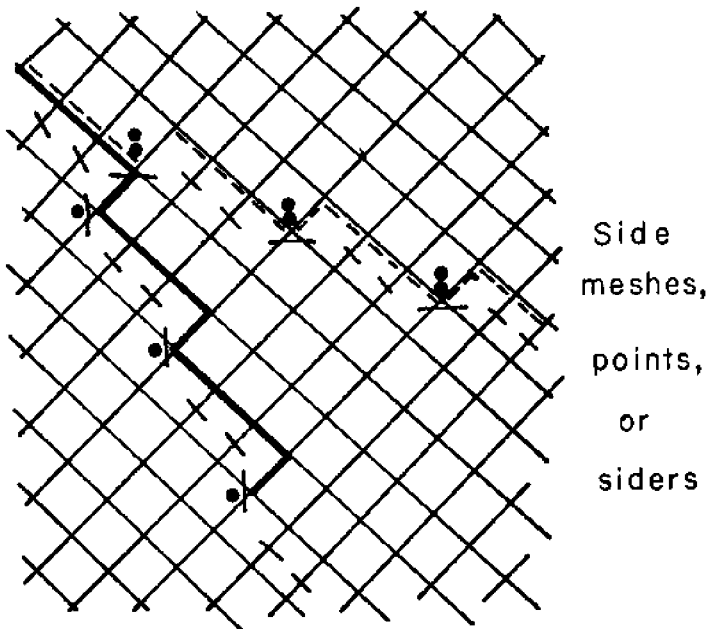
At the net loft of the Department of Fisheries and Marine Technology of the University of Rhode Island these inefficiencies have been overcome by the use of two simple formulas for the two different types of net tapers. Only a basic knowledge of arithmetic is required to apply the formulas, and after a few attempts, the simplicity of the calculations and their practical importance become apparent.

An example of the various shapes that must be cut from rectangular webbing in order to produce the whole trawl is shown in the diagram of the Yankee 35 Trawl. Generally the "body taper" is used, but when a very fine taper is required the "jib taper" becomes necessary.

BODY AND JIB TAPERS



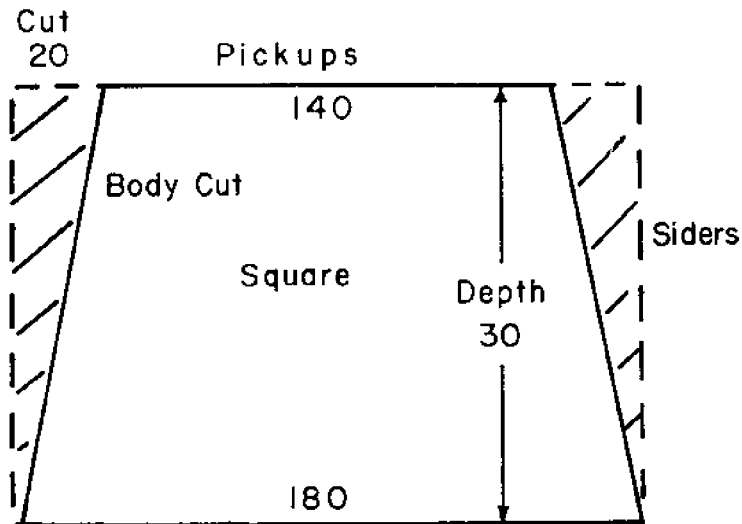
Top meshes or pickups



↘ Indicates taper cuts; note that cutting 2 side bars of 1 mesh leaves a point, marked • or a mesh, marked ◻

- ↘ Body tapers 2 bars to 1 point.
- ↘ Jib tapers 2 bars to 1 mesh.

THE BODY CUT



The web must be tapered in such a way that 20 meshes are lost in a depth of 30.

BODY TAPER	=	$\frac{2 \text{ CUT}}{\text{DEPTH} - \text{CUT}}$
IN BARS/POINT		

$$\text{Cut} = \frac{\text{Bottom} - \text{Top}}{2} = \frac{180 - 140}{2} = 20$$

$$\text{e.g. } \frac{2c}{d - c} = \frac{2 \times 20}{30 - 20} = \frac{40}{10} = 4$$

Required taper is 4 bars to 1 point

e.g. Belly top 50, bottom 140, depth 80

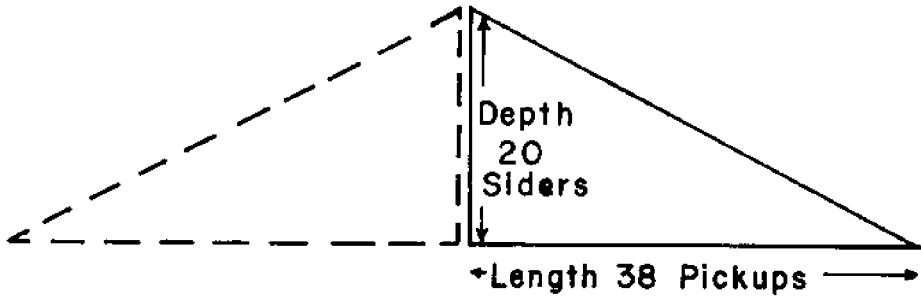
$$\text{Cut} = \frac{\text{Bottom} - \text{Top}}{2} = \frac{140 - 50}{2} = 45$$

$$\text{Taper} = \frac{2c}{d - c} = \frac{2 \times 45}{80 - 45} = \frac{90}{35} = \frac{18}{7} = 2 \text{ and } 4/7$$

Required taper is 18 bars to 7 points

This taper is nearly 2½ bars to a point which can be made by alternating 2 in 1, 3 in 1. It should be noted that a fraction can be split in a number of ways. For example the 18/7 could be 9 in 3 and 9 in 4 so that the required number of bars are cut in the required number of points.

THE JIB CUT



Used only for fine gusset and shaping sections when a finer taper than that produced by cutting "all bars" is needed. Note that length replaces cut.

Often two of these pieces are joined sider to sider in an isosceles triangle to give a jib strengthening section.

The web must be tapered in such a way that 38 pickups are lost in a depth of 20. (See above diagram.)

$\text{JIB TAPER} = \frac{(2 \times \text{DEPTH}) - 2}{\text{LENGTH} - \text{DEPTH} + 1}$
IN BARS/MESH

Note that 3 replaces 2 if full isosceles triangle is cut

$$\text{e.g. } \frac{(2 \times 20) - 2}{38 - 20 + 1} = \frac{38}{19} = 2$$

Required taper is 2 bars to 1 mesh

e.g. Depth 19, length 27

$$\frac{2d - 2}{1 - d + 1} = \frac{38 - 2}{27 - 19 + 1} = \frac{36}{9} = 4$$

Required taper is 4 bars to 1 mesh

TAPER TABLE

Body Cut Depth 100		Jib Cut Length 100	
Taper	Cut	Taper	Depth
1B/4P	11	1B/4M	12
1B/2P	20	1B/2M	21
1B/1P	33	1B/1M	34
2B/1P	50	2B/1M	51
3B/1P	60	3B/1M	61
4B/1P	67	4B/1M	68
5B/1P	71	5B/1M	72
6B/1P	75	6B/1M	76
8B/1P	80	8B/1M	81
10B/1P	83	10B/1M	84
12B/1P	86	12B/1M	87
18B/1P	90	18B/1M	91
23B/1P	92	23B/1M	93
B = Bar P = Point		B = Bar M = Mesh	

The above table was compiled from the body and jib cut formulas and checked by cutting each one. To use the table simply extract body or jib taper for required cut or depth if the depth or length, respectively, is 100.

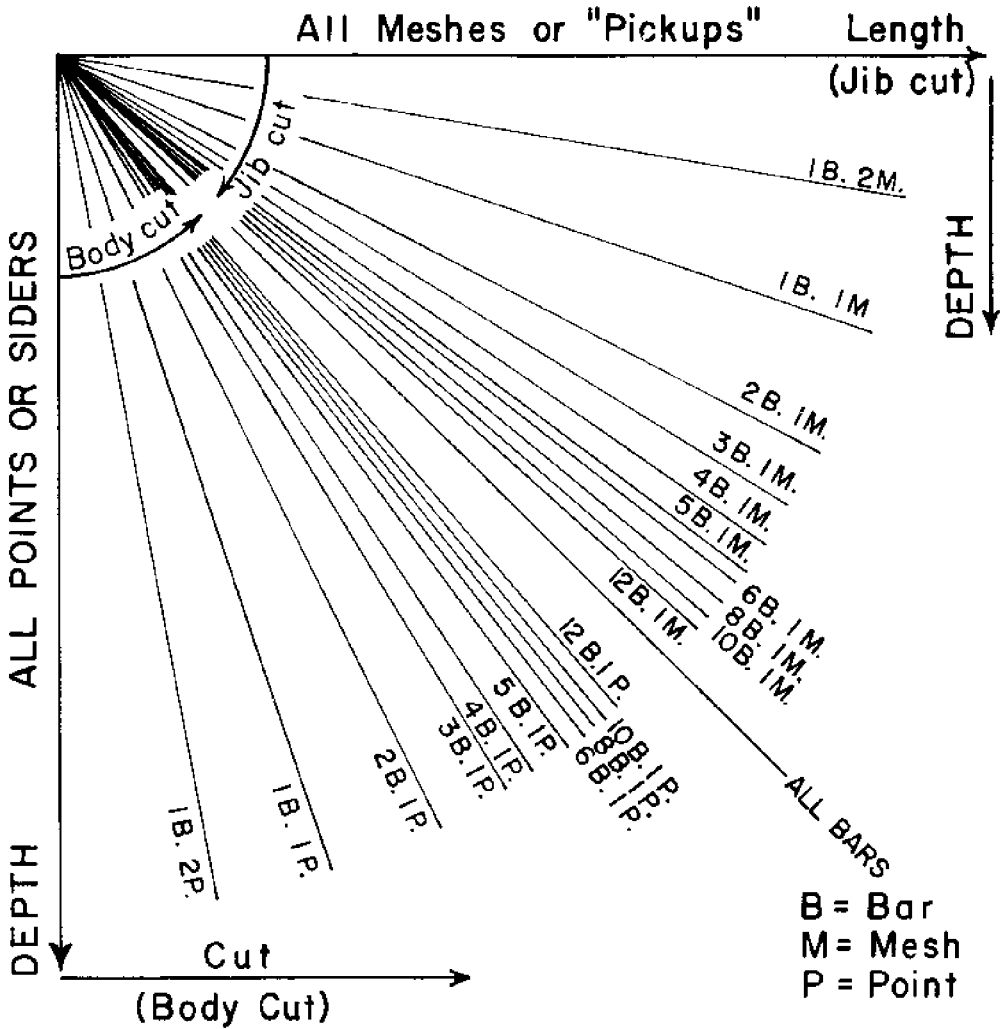
e.g. Required a cut of 55 in 100 depth, use body taper 2½ bars/1 point. That is, alternate 2 bars/1 point, 3 bars/1 point.

When the depth or length of web used, for body cut or jib cut, respectively, differs from 100, take a proportionate cut or depth for the same taper.

e.g. Required a cut of 45 in 80 depth. This would give a cut of $45 \times \frac{5}{4} = 56$ for a depth of 100.

From the table 56 cut for 100 depth gives a body taper of about 2½ bars/1 point. Therefore alternate 2 bars/1 point, 3 bars/1 point.

Resultant Angles for Net Tapers (Assuming Meshes Square)



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CONCLUSION

The body cut is used for most tapers. In fact, the jib cut need only be employed in cases where the cut is greater than the depth, looking at the web from the body cut situation. The web is turned sideways for the jib cut only because this is the manner in which it is normally handled and cut. This may cause confusion when the job is actually being done.

At first glance these two formulas may appear too troublesome to use or possibly not worth the time spent to become conversant with them. However, three well known New England "Highliners"—Captains Jim McCauley, Albert Hillier and Joe Krawiec from Rhode Island, Massachusetts, and Connecticut, respectively, have used the formulas for some time and "swear" by them. In fact, it was to satisfy the demands of these gentlemen that the formulas were derived. It is hoped that the body cut and jib cut formulas will save many other fishermen some amount of time, material and temper.