

INCREASING THE SPREAD OF SHRIMP TRAWLS

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As a result of a series of experiments on the new shrimp trawler M/V Antillas, it was found that a relatively simple modification produced a marked increase in

Table 1 - Method of Attachment and Spread of Otter Boards

Test	Method of attachment	Calculated Spread of Otter boards	
		Angle	Feet
1	Trawl on pad eyes rear of door; cables towed from stern davits	11°15'	58.8
2	Trawl on pad eyes rear of door; cables towed from hook	10°15'	53.6
3	Trawl on end of door; cables towed from stern davits	10°15'	53.6
4	Trawl on end of door; cables towed from hook	8°40'	45.3

the spreading power of the otter boards. (The Antillas is owned by the Gibbs Corp. and operated in exploratory fishing and gear research under a cooperative agreement with the U. S. Fish and Wildlife Service). Common practice in the south-



FIGURE 1 - THE EXPERIMENTAL SHRIMP TRAWLER M/V ANTILLAS.

ern shrimp fishery is to attach the float lines and foot lines to brackets on the trailing end of the otter boards. Attachment of these lines to pad eyes on the back side of the board, opposite to the after or long pair of chains, was found

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to increase the spread of the boards by more than 18 percent, as shown by a comparison of Items 2 and 4 in Table 1.



FIGURE 2 - LIFTING AN OTTER BOARD TO A STERN DAVIT ON THE ANTILLAS. (NOTE: THE CABLE IS TOWED DIRECTLY THROUGH THE BLOCK.)

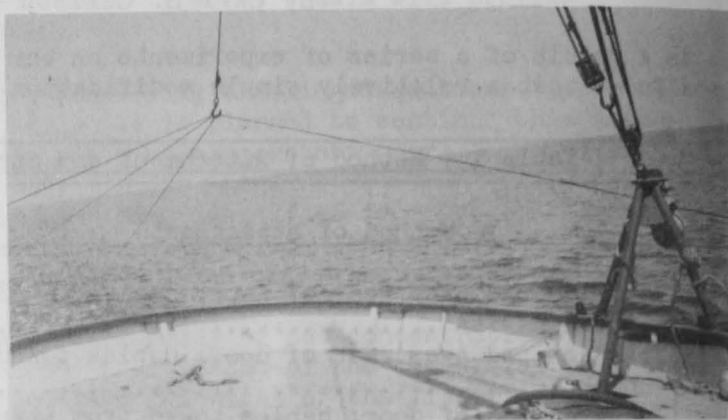


FIGURE 3 - TOWING THE CABLES THROUGH A HOOK TO DUPLICATE COMMON PRACTICE IN THE SHRIMP FISHERY.

The otter boards used in these experiments were a standard set measuring 40 inches high and 9 feet long, and the trawl was a 100-foot flat trawl, having legs to bring the total length along the foot line to 109 feet. During the tests, the variable-pitch propeller and the revolutions of the engine on the Antillas were adjusted for a power output between 90 and 100 hp., which is frequently used by commercial fishermen when trawling for shrimp with the type of gear tested.

The length of the towing cables was held at 50 fathoms to permit more accurate observations on floats attached to the trailing ends of the otter boards and to provide a fair chance for the boards to spread. While many commercial fishermen seldom tow the trawl with less than 100 fathoms of towing cable, this would not affect the validity of the results, for the relative spreading power of the otter boards would remain the same.



FIGURE 5 - EXPERIMENTAL WINCH USED ON ANTILLAS HAVING A CAPACITY FOR 600 FATHOMS OF 7/16-INCH DIAMETER CABLE.



FIGURE 4 - METHOD OF ATTACHING PAD EYES AND CHAFING CHAIN TO OTTER BOARDS. (NOTE: TO OBTAIN MAXIMUM VERTICAL OPENING OF NET AND TO ASSURE ITS TENDING BOTTOM, PAD EYES SHOULD BE AS NEAR TOP AND BOTTOM OF BOARDS AS POSSIBLE.)

The Antillas is fitted with a special winch to fish in depths up to 200 fathoms, and a pair of davits (one located on each side near the stern) for experimental gear-development work. These davits are shown in figures 2 and 3. The method of towing both cables from a hook over the stern for comparative tests between the conventional method of towing shrimp trawls and the experimental method also is shown in figure 3. When using the stern davits the cables are towed directly through the blocks.

Figure 4 shows the pad eyes, attached to the rear side of the otter board, and a portion of the $\frac{1}{4}$ -inch diameter chain 30 links long which was used for attaching the trawl. The pad eyes consist of a U-shaped eye of $\frac{1}{2}$ -inch diameter stock welded to a $\frac{1}{2}$ x 2 x 5-inch plate and are fastened to the boards by $\frac{3}{8}$ -inch diameter bolts. They are shown as attached between the main towing chains, but should be located as near the top and bottom of the boards as possible to assure maximum vertical opening of the net and its tending bottom. The weight shown on the back side of the door is removable, but its use together with adjustment of the chain-towing bridle has permitted fishing at depths in excess of 115 fathoms with otherwise standard shrimp gear.

The spread of the otter boards was determined from the Antillas by taking bearings with a sextant on floats attached to the trailing end of the boards, and the use of trigonometric formulas. Table 1 presents the data and spread under various conditions.

Tests 1 and 3 were made by towing through the stern davits. When towing in this manner an initial advantage exists, for the towing cables are spread a distance of about 15 feet when leaving the stern, in contrast to towing from a hook as shown in figure 3. In this comparison the additional spread attributable to the pad eyes over the conventional method is only 5.2 feet or about 10 percent, reflecting somewhat the initial advantage of towing from stern davits. However, a comparison of Items 2 and 4 (where the cables were towed from a hook) shows a difference in favor of the pad eyes of 8.3 feet or over 18 percent. A comparison of Items 2 and 3 reveals that the influence of the pad eyes is equal to the restriction of the difference between towing from stern davits and a hook. A comparison of Items 1 and 4 shows that the experimental stern davits on the Antillas coupled with pad eyes resulted in an increased spread of 13.5 feet or nearly 30 percent over the conventional method of operating a shrimp trawl.

