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Fullscale experiments with a new midwater 3-foil
type and standard Waco and süberkrüb otterboards.

by

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ABSTRACT

The experiments included comparative spread and depth measurements with equal rigging of a large blue-whiting trawl for 1500 HP vessel engine (6 to 8 m² boards) and a 600 HP 4-panel combination trawl (4 to 4.5 m² boards). The 1500 HP 3-foil board proved to match the Waco boards with regard to spreading efficiency while the smaller board did not. It also had the advantage (for deep water blue whiting trawling) of the waco board of being very depth stable with speed.

1. INTRODUCTION - DESCRIPTION.

The 3-foil otterboards were designed and constructed by a commercial otterboard manufacturer, and the Institute was parttaking in the first fullscale tests of the boards in connection with testing of the large trawls for blue whiting fishery.

A first design of the boards (7 m² area) had no keel and also due to other shaping patterns it was not considered particular useful for close bottom-contact fishing.

An improved design (see fig. 1.) was fitted with a solid steel keel of 30 cm height. As seen from the drawing the foils are partly overlapping, giving approximately 16 percent reduced projected area compared to total foil area. The overall scope ratio is 2/3, the same as for the Waco boards, while it for the separate foils is 3/2.

The illustrated otterboards of 6 m² area (1050 kp weight) were dimensioned for a 1500 HP trawler. They were tested with identical gear and rigging in comparison with Süberkrüb otterboards of 6 m² (1130 kp) and 8,5 m² (1740 kp) and 6 m² area (1300 kp) Waco boards.

A smaller version of the improved design was made for a 600 HP trawler and tested in connection with combination on/off bottom trawling experiments. On this boards the warp attachment brackett was made different from that in the illustrated case. In addition a flap system for foil chord-length adjustment was fitted. The projected area of each board was 3,8 m², total front surface area 4,5 m² and weight appr. 700 kp.

2. SPREAD EFFICIENCY RESULTS.

The first measurements with the 7 m² boards established, after adjustments of sweep and warp attachments, rather poor spreading efficiency compared to both Süberkrüb and Waco, as shown in Fig. 2. The boards required also larger angles of attack than within the designed ranges. However, for all trials speeds the boards went stable and quiet, and were easy to handle.

For the illustrated improved design the spreading efficiency was found to be as good as for the Waco board (see Fig. 2.) and especially within higher speed ranges. On projected area basis the efficiency was even better.

The results with the small boards were rather discouraging as the measured spread was far from matching that of 4,5 m² Waco and Süberkrüb boards. Most likely this was due to too limited obtainable angles of attack, which hopefully will be clarified in further experiments.

3. STABILIZED DEPTH CONDITIONS.

Although being not so heavy, the 3-foil boards attained about the same depth in simular towing conditions as the Waco boards, and went far deeper than the Süberkrüb boards. See Table 1 (next page).

Table 1. Stabilized headline depths (M) for 2000 M/M Blue Whiting trawl.
600 m warps.

a) 100 m sweeplines. 370 kp weights.

	Rpm	Speed Knots	Süb. 6,0 1130 kp	Süb. 8,5 1740 kp	Waco 6,0 1300 kp	3-foil 1400 kp
Low	310	2,8	185	225	250	270
High	350	3,5	150	150	210	220

b) 175 m sweeplines. 620 kp weights.

	Rpm	Speed Knots	Waco 6,0 1300 kp	3-foil 6,0 1050 kp
Low	310	2,9	270	255
High	350	3,6	-	200

For deep water fishing (Blue Whiting) the stabilized depth conditions, are very important because of its influence on the needed warplengths.

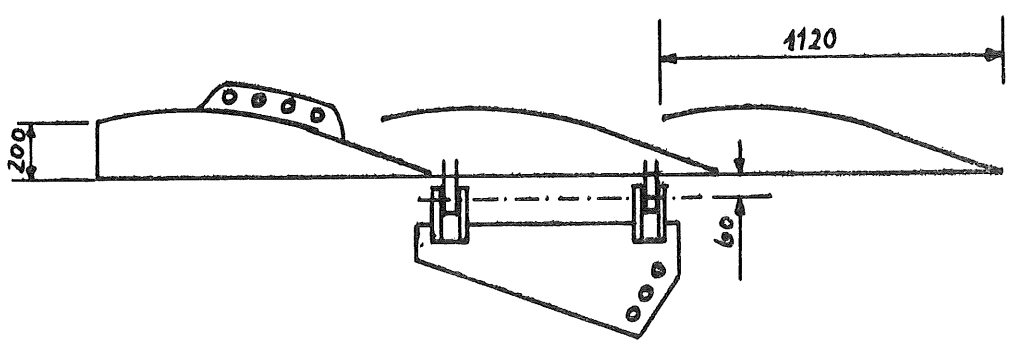
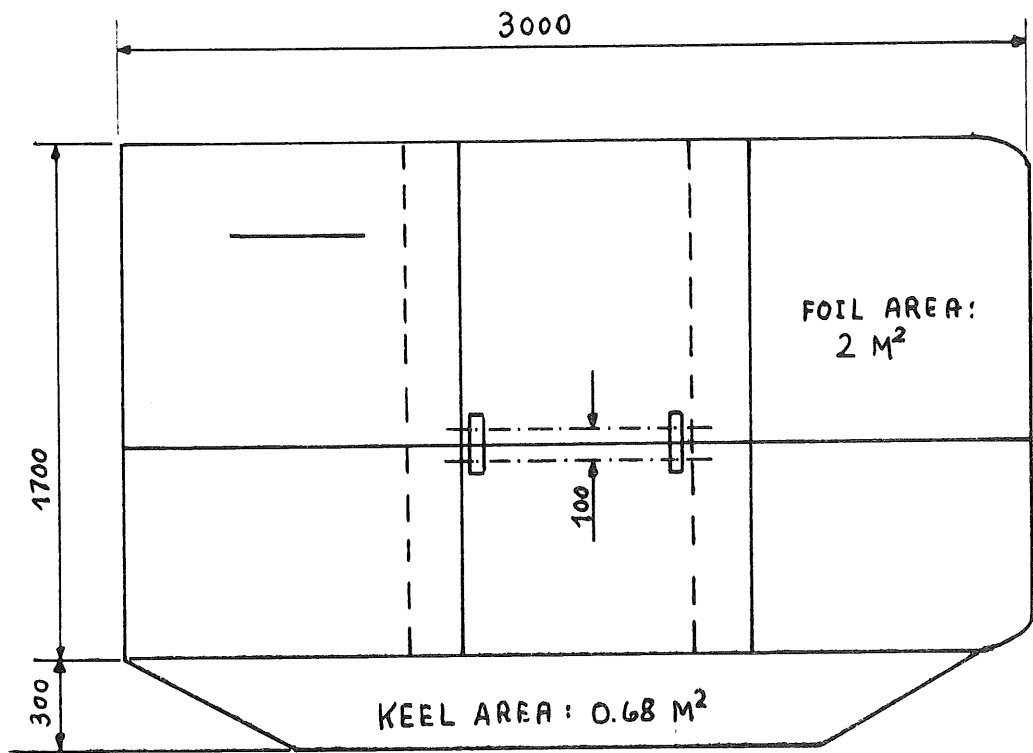


FIG 1. 3-foil OTTERBOARD .

5.76 M² PROJECTED AREA. 1050 KP WEIGHT

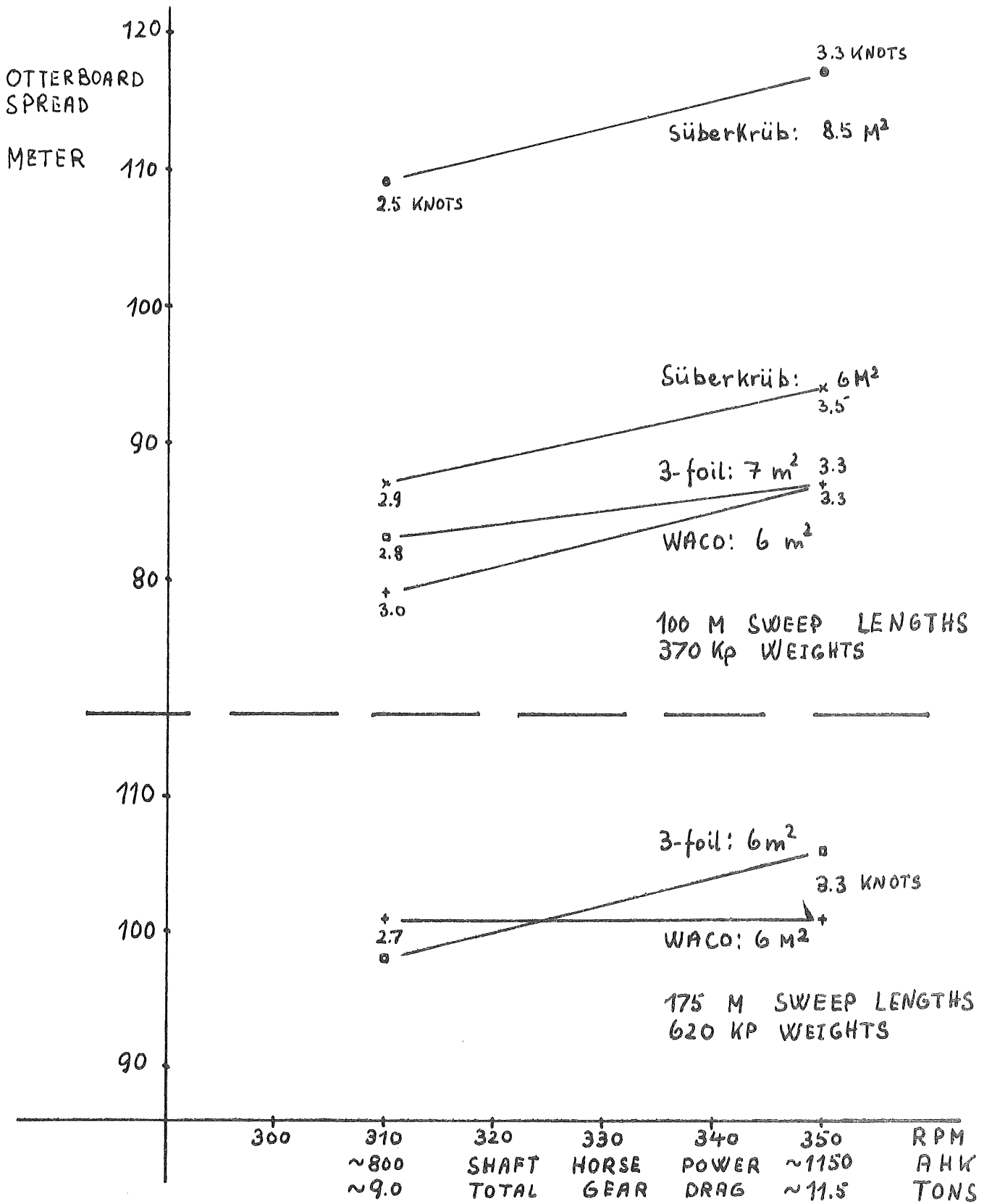


FIG. 2. OTTERBOARD SPREAD VERSUS TOWING POWER
2000 M/M BLUE WHITING TRAWL - 104 M. FISHING LINE
600 M WARPS