AN EXPERIMENT CONDUCTED WITH A FLOATING TRAWL NET OFF COCHIN

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The paper deals with an experiment with a floating trawl net off Cochin, using a pair of curved otter boards and a transducer mounted on the head rope of the net. 32 hauls were made with different towing speeds and warp length keeping one factor constant for varying parameters of the other factor. The working data for 32 hauls are presented and the effect in the fishing depth of the net due to the variation in one factor is mentioned. The 'fishing depth' is indicated in this paper as the distance between the head rope and the bottom. The usefulness of similar experiments with an added information on the angle of leading warp at the stern for the exploitation of column fishes in Indian waters is indicated in this paper.

INTRODUCTION

The floating trawl or mid water trawl has remained an untried gear in India so far though it had been in use elsewhere for, the past one decade or so. But even in those countries, the design and methods of operation of the net has not yet been well defined.

This paper deals with an experiment conducted with a floating trawl off Cochin waters. The aim of the experiment was to study the feasibility of measuring the fishing depth of the floating trawl net on the basis of towing speed, warp length and the leading angle of the warp at the stern. The towing speed here is correlated to the R. P. M. of the engine.

Success in achieving this aim will enable the trawlers along the Indian coast to exploit the column fishes with out the help of electronic equipment such as netzsonds. For all the trawlers in India to instal such a costly equipments on board the fishing vessels will take a decade or more and until such time the exploitation of the column fishes need not be delayed. Hence the initiation of this experiment.

As prelimary for the introduction of floating trawl in Indian waters, the author

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carried out a series of experimental fishing with a floating trawl from a shrimp trawler of 10.4 meters OAL in Cochin waters, for 5 days in May and June, 1963. Observations were made for different warp lengths and for varying speed of tow.

Materials And Methods

The gear used was a 67.5′ four seam trawl net with a pair of vertical curved wooden otter boards of diamension 1400 mm x 700 mm and weighting 62 Kg. each (figures i, ii, and photos I, II, and III)

To record the fishing depth of the gear a transducer capable of radiating sound waves on sound beam with an angle of 25°, was mounted on the head rope of the trawl net with a help of a wooden base and was connected to the fish finder on board the vessel by a connecting cable passing through head line, wings and leading warps of the trawl net. (fig. iii)

To avoid the risk of the cable getting snapped due to the pull of the boat on the warp, a 25% excess cable length was given. The gear was shot from the stern of the vessel and during 32 hauls of 30 minutes duration each, observations were made; (1) with three different engine R. P. M. viz. 550, 600, and 650 but keeping the warp length constant and (2) with three different warp length viz. 10, 15, and 20 fathoms but keeping the R. P. M. constant.

The echograms were calibrated to mm and the distance between zero line, in this case the head line, and the bottom echo was measured and reduced to meters. Based on the depth recorded at the receiver the position of the gear was calculated and this was correlated to different R. P. M., an indication of towing epeed in proportion, for a given warp length.

Results And Discussion

Marking on the recorder, which appeared as echos from fish shoals could not be confirmed for want of catch in the net. Since the foot rope was not recorded, the exact swimming layer of the shoals could not be determined to adjust the fishing depth of the net.

The data is respect of 32 hauls made are presented at the end. Data were collected on the depth of operation, fishing depth of the net, R. P. M. of the engine, and warp length released for each haul. In addition to the above, observations were made on the direction of tide in relation to the direction of tow. But no attempt is made to correlate the effect of tide with the fishing depth for want of adequate information on tide.

In the last but one column of Table I the effect of change in meters is given. The change of warp length and the R. P. M. of the engine are the causes and the change in fishing depth of the net is the resultant effect. (The fishing depth of the net is indicated here as the distance between the head rope and the bottom)

In Table I the hauls are given in blocks of three. The first one is taken as control and the subsequent two for comparison, with the control. Measurements of warp length released and the depth of operation were originally made in fathoms but, in the table it is given in meters also for convenience.

The change in fishing depth is obtained by calculating the difference between the control and the subsequeut readings. When there is a difference between control and the succeeding haul in the depth of operation the corresponding value was added or subtracted accordingly.

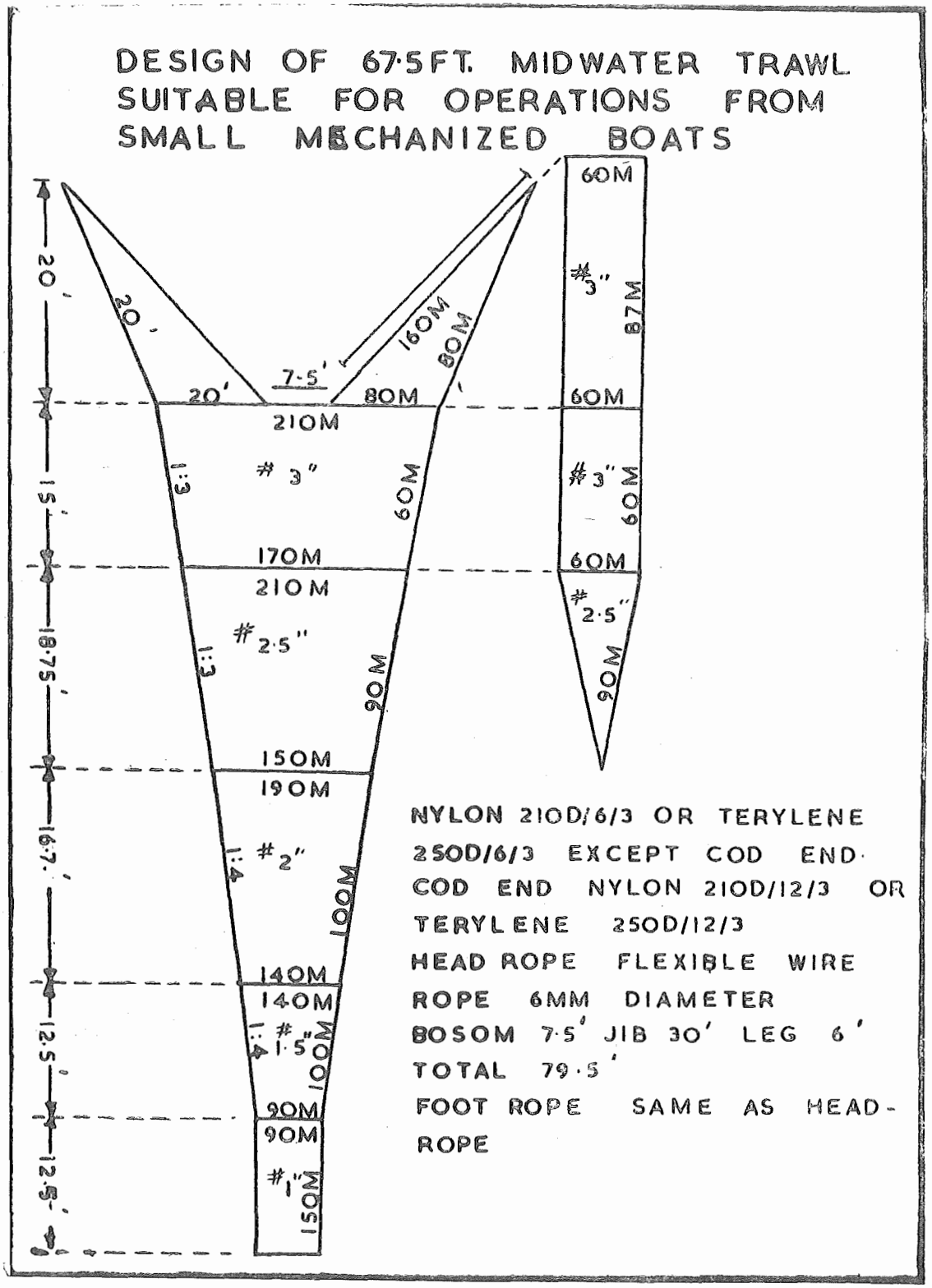
DESIGN OF 67·5FT. MIDWATER TRAWL SUITABLE FOR OPERATIONS FROM SMALL MECHANIZED BOATS
20'
15'
18·75'
16·7'
12·5'
12·5'
20'
20'
7·5'
80M
160M
80M
210M
#3"
1:3
60M
170M
210M
#2·5"
1:3
90M
150M
190M
1:4
#2"
100M
140M
140M
1:4
#1·5"
100M
90M
90M
#1"
150M
60M
#3"
87M
60M
#3"
60M
60M
#2·5"
90M
NYLON 210D/6/3 OR TERYLENE 250D/6/3 EXCEPT COD END.
COD END NYLON 210D/12/3 OR TERYLENE 250D/12/3
HEAD ROPE FLEXIBLE WIRE ROPE 6MM DIAMETER
BOSOM 7·5' JIB 30' LEG 6'
TOTAL 79·5'
FOOT ROPE SAME AS HEAD-ROPE

Fig. 1

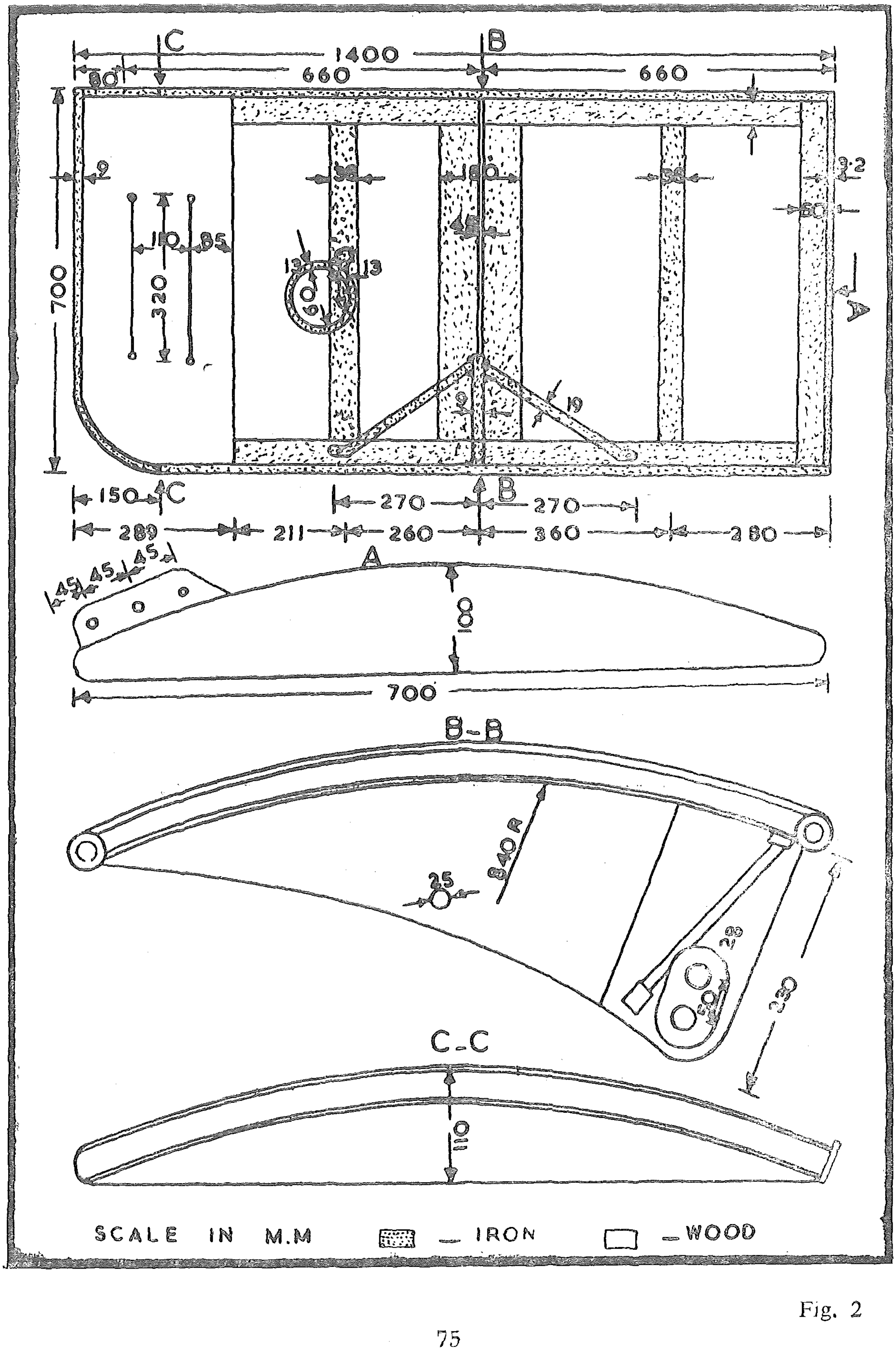

Fig. 2

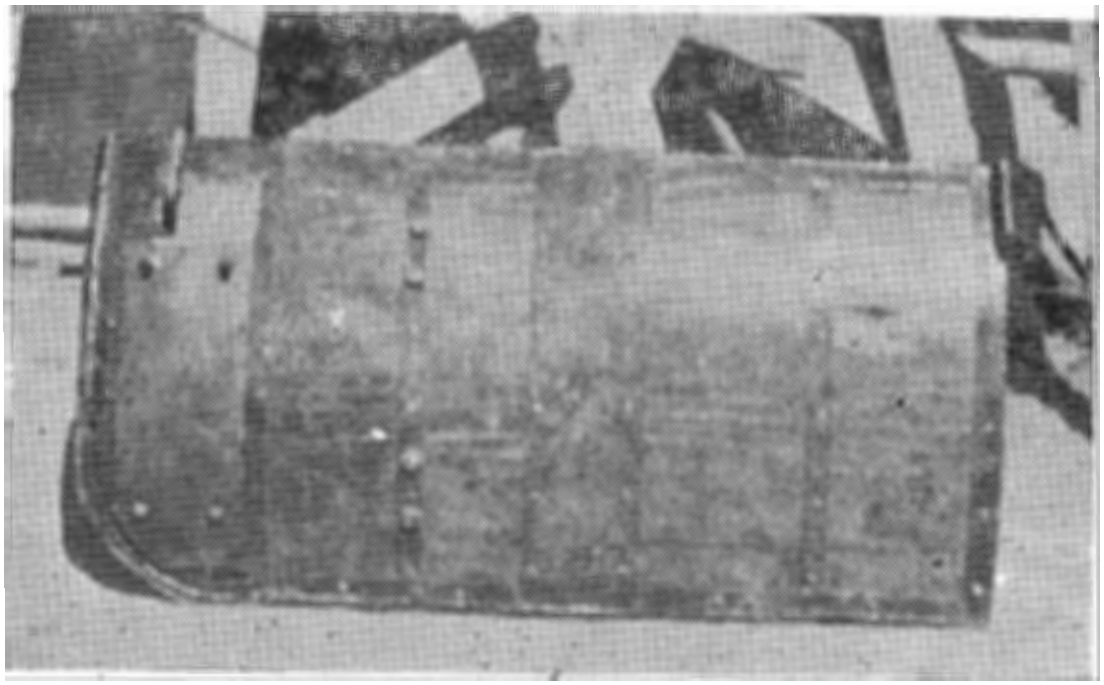

Photo I

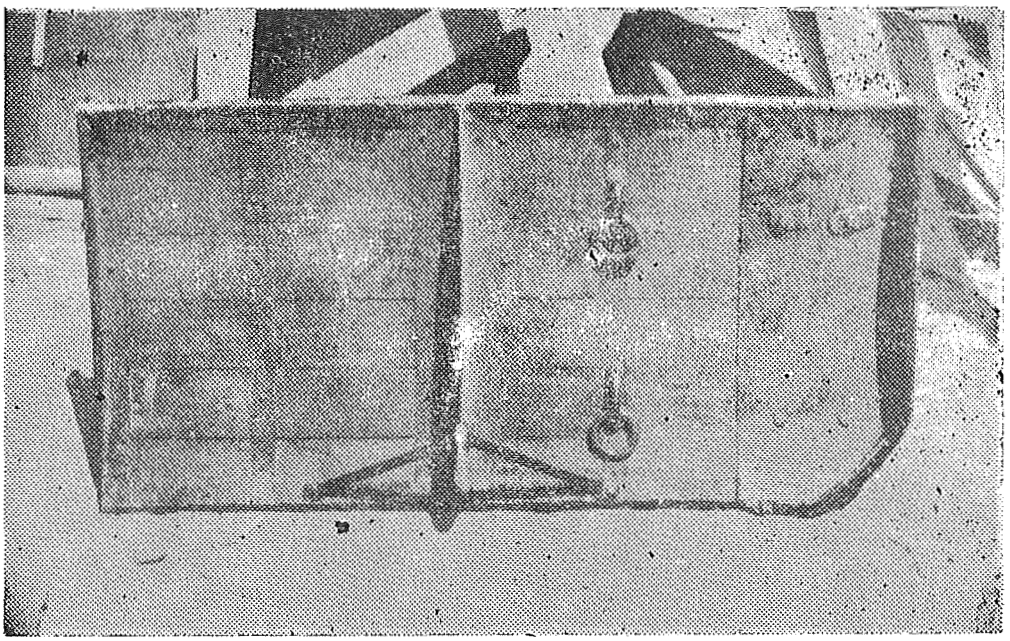

Photo II

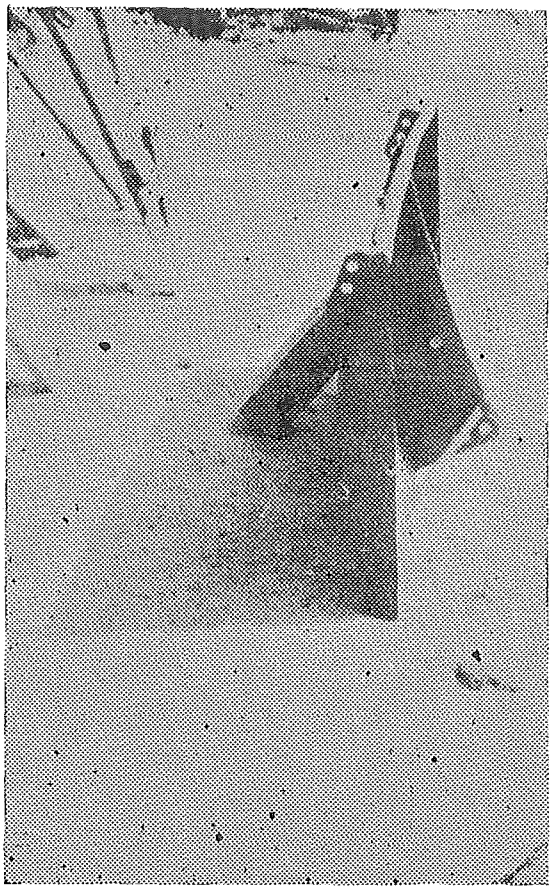

Photo III

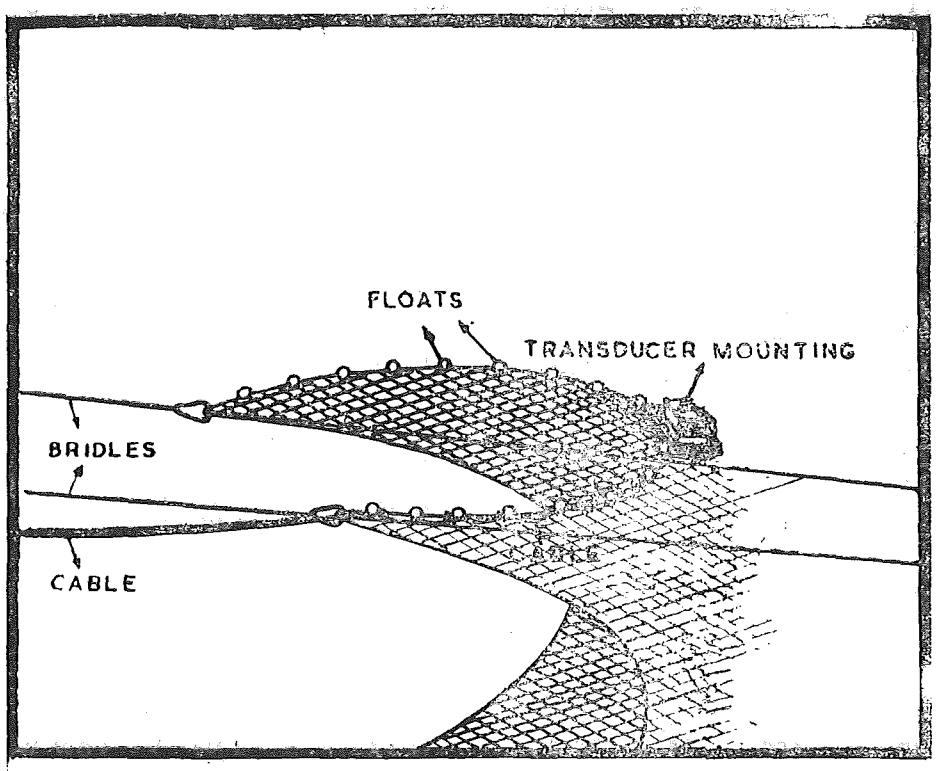

FIG-3

TABLE I DETAILS OF DATA ON THE DEPTH OF OPERATION, FISHING DEPTH OF NET, R. P. M. AND WARP LENGTH FOR EACH HAUL.

Date	Depth of operation		R. P. M. of engine	Warp length		Fishing depth in meters, Fishing depth is given here as the distance between head rope of net and bottom	Change in Fishing depth in meters	Remarks.
	in fms.	in meters		in fms.	in meters			
21-5-'63								
1.	10	18.29	550	10	18.29	11.25		
2.	10	18.29	600	10	18.29	12.00	1.25	Tow with the tide
3.	10	18.29	650	10	18.29	13.50	2.25	
4.	10	18.29	550	10	18.29	11.25		
5.	10	18.29	550	15	27.45	9.00	2.25	Tow against the tide
6.	10	18.28	550	20	36.58	6.75	4.50	
7.	10	18.29	600	10	18.29	12.00		
8.	10	18.29	600	15	27.45	10.50	2.50	Tow with the tide
9.	10	18.29	600	20	36.58	7.50	4.50	
10.	11	20.11	650	10	18.29	13.50		
11.	10	18.29	650	15	27.45	10.50	1.17	Tow against the tide
12.	10	18.29	650	20	36.58	7.50	4.17	
22-5-'63								
13.	11.5	20.72	550	10	18.29	14.25		
14.	11	20.11	550	15	27.45	13.00	1.86	Tow against the tide
15.	11	20.11	550	20	36.58	10.50	4.36	
16.	10	18.29	550	15	27.45	15.00		
17.	12	21.95	600	15	27.45	15.87	2.87	Tow with the tide
18.	10	18.29	650	15	27.45	17.25	2.25	
19.	12	21.95	600	10	18.29	15.00		
20.	10	18.29	600	15	27.45	12.75	1.40	Tow with the tide
21.	10	18.29	600	20	36.58	9.37	1.97	
22.	11.5	20.72	650	10	18.29	16.50		
23.	10	18.29	650	15	27.45	13.50	0.57	Tow against the tide
24.	11	20.11	650	20	36.58	9.75	6.14	
26-6-'63								
25.	10	18.29	550	10	18.29	13.50		
26.	11	20.11	550	15	27.45	12.00	3.32	Tow with the tide
27.	12	21.93	550	20	36.58	9.75	5.39	
28.	12	21.93	600	10	18.29	17.25		
29.	12	21.93	600	15	27.45	13.50	3.75	Tow against the tide
30.	...	Cable broke	...	...	.....	.....	...	
28-6-'63								
31.	10	18.29	600	10	18.29	10.87		
32.	9	16.47	600	15	27.45	7.12	1.97	Tow with the tide
33.	9	16.47	600	20	36.58	4.12	4.93	

TABLE II, SHOWING THE EFFECT OF CHANGE IN R. P. M. ON THE FISHING DEPTH OF THE NET, KEEPING THE WARP LENGTH CONSTANT

Haul No.	Warp length in fms.	R. P. M. of Engine	Fishing depth in meters	Effect of Change in meters
1.	10	550	11.25	
2.	10	600	12.00	1.25
3.	10	650	13.50	2.25
16.	15	550	15.00	
17.	15	600	15.87	2.87
18.	15	650	17.25	2.25
6.	20	550	6.75	4.50
9.	20	600	7.50	4.50
12.	20	650	7.50	4.17

TABLE III, SHOWING THE EFFECT OF CHANGE IN WARP LENGTH ON THE FISHING DEPTH OF THE NET, KEEPING THE R. P. M. CONSTANT.

Haul No.	R. P. M. Engine	Warp length in fms	Fishing depth in meters	Effect of change in meters
4.	550	10	11.25	–
5.	550	15	9.00	2.25
6.	550	20	6.75	4.45
25.	550	10	13.50	–
26.	550	15	12.00	3.32
27.	550	20	9.75	5.39
7.	600	10	12.00	–
8.	600	15	10.50	2 50
9.	600	20	7.50	4.50
19.	600	10	15.00	–
20.	600	15	12.75	1.40
21.	600	20	9.37	1.97
31.	600	10	10.87	–
32.	600	15	7.12	1.97
33.	600	20	4.12	4.93
10.	650	10	13.50	–
11.	650	15	10.50	1.17
12.	650	20	7.50	4.17
22.	650	10	16.50	–
23.	650	15	13.50	0.57
24.	650	20	9.75	6.14

In Table II the effect of change due to variation in the R. P. M. of the engine is given and in Table III the effect of change due to the variation of warp length is shown. The value for the constant warp length in Table II is taken from three different blocks and presented as such for information. It will be clear from the tables that fishing depth can be adjusted even for a small measure depending on the swimming layer of the fish school.

It was generally observed that:-

1. With the constant R. P. M., the fishing depth decreased with the increase of warp length.
2. With the constant warp length the fishing depth decreased with the decrease of R. P. M. (speed)
3. Fishing depth increases with the increase of R. P. M. (speed), (Fishing depth is indicated here as the distance between head rope and bottom.)

It is not attempted to draw conclusions from the data gathered but, it is suggested that with the added information on the angle of leading warp at the stern a definite progress can be made in the initiation of mid water trawling along Indian waters.

In mid water trawling the knowledge of the fishing depth of the gear is an important factor for the successful operation. Scharpe, Wood and Parrish have measured fishing depths with echo sounding instruments for varying speed of tow and warp lengths, and it was correlated to the angle of leading warp at the ship and it was found that this measurement of angle could give the approximate fishing depth.

Instruments similar to depth telemeter used by Mc Neely (1959) in *John N. Cobb*, in addition to echo sounder will be of great use for the success of midwater trawling in future.

But it will take many years before such equipment could be used on board the mechanised fishing vessel in India and so to reap the advantages of mid water trawling in Indian waters studies can be carried out to estimate the fishing depth on the basis of angle of leading warp at the stern of the ship for different speed and different warp lengths giving due consideration to other conditions such as current and wind directions.

The author is of the opinion that such an attempt in this direction may prove to be of use in evolving a suitable design and method of operation of mid-water trawl in Indian waters.

There are hundred of trawlers in India which fish at the bottom only, leaving the column waters unexploited. There are a few trawlers along the Indian coast which could afford to fit in electronic equipments for measuring the fishing depth of the gear, but a knowledge on fishing depth of the trawl net based on the angle of leading warp at the stern of the boat could facilitate all the trawlers to exploit the column waters by mid water trawling.

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