

# EVOLUTION OF SUITABLE TYPE OF BOTTOM TRAWLS FOR THE MEDIUM SIZE STEEL TRAWLERS OF ORISSA FISHERIES DEPARTMENT

K. N. KARTHA

Central Institute of Fisheries Technology, Willingdon Island, Cochin-682003

This paper deals with the results of fishing operations conducted with conventional trawls of size 22.3 - 25.6 m. and gear of 32 m. long wing and bulged belly designed and developed at this Institute, from four medium size trawlers of Orissa Fisheries Department during 1970-71 and 1971-72 fishing seasons. By employing suitable and standard size gear there was proper utilisation of the engine power with resultant increase in the total landings of shrimps and bottom and off bottom fishes.

## INTRODUCTION

The availability of dense population of fish shoals off Paradeep region was reported by Poliakov (1962). Mechanised fishing by means of small and medium size wooden trawlers was introduced in Orissa coast during 1961 (Mishra *et al.* 1972). As the State Fisheries authorities were experiencing certain technical difficulties in rigging the steel trawlers (size 16.15 m. OAL) with suitable trawl gear and accessories, this Institute was requested for assistance in this regard in 1971. The design aspects of the trawl gear and accessories evolved for the steel trawlers and their performance are discussed in this communication.

## MATERIALS AND METHODS

Informations were collected regarding the available engine power and engine power utilised by the trawlers for towing the existing gear system for the evolution of suitable gear and accessories to be used from the steel trawlers. A detailed survey of the gear and accessories operated from the trawlers were also undertaken.

The steel trawlers KALINGA I, II, III & CORPFISH-IV identical in design and construction were built in Poland as side trawlers in the year 1965 and imported to India during 1965 and 1966. All these trawlers were fitted with 170 HP Rolls Royce diesel engines of British

make developing 1800 r.p.m. at a cruising speed of 8 knots. For side trawling, two gallows were fixed, one at the fore and the other at the aft of starboard side of the vessel.

The conventional trawl nets used from the Polish trawlers during 1970-71 in combination with single slitted oval type doors of 146 x 86 cm. weighing 80-86 kg. described by Poliakov (*loc. cit.*) are given below:

1. 24.4 m. (80') two-seam : 2 nos.
2. 22.3 m. (73') four-seam : 3 nos.
3. 25.6 m. (84') four-seam : 7 nos.

All the nets were having short belly and throat pieces. The total length of

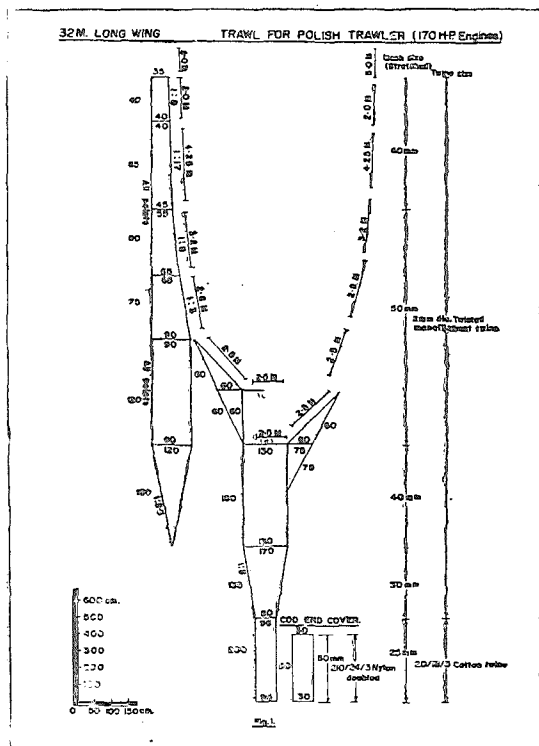


Fig. 1

32 m. long wing trawl for Polish trawler (170 H. P. engine)

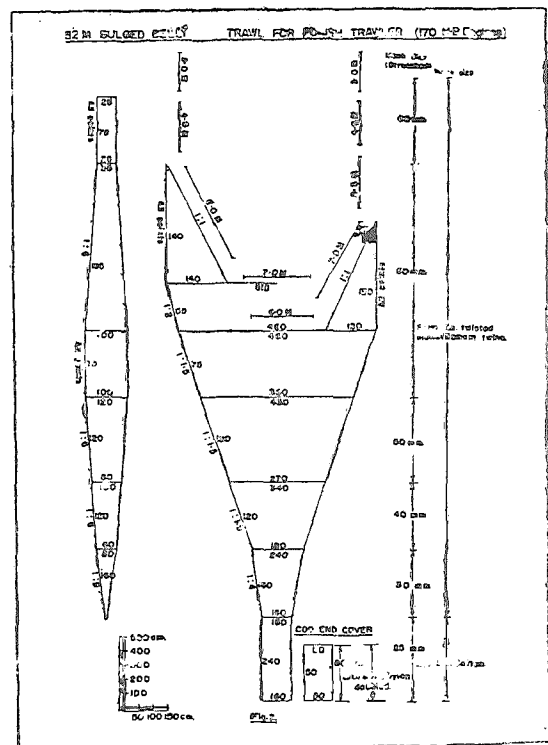


Fig. 2

32 m. Bulged belly trawl for Polish trawler (170 H.P. engine)

the net from mouth to cod end was 50-55% of head rope length. The width of the side panel of four-seam nets was very small and not proportionate to the width of upper and lower panels.

Thus, the existing gear and accessories operated from the steel trawlers were found to be undersized in relation to the power developed by the engine as the r.p.m. indicated during trawling was only 800-900 at a trawling speed of 2-2.5 knots which is 45-50 % of the total r.p.m. of the engine. Hence the necessity of developing a larger and standard size gear for utilising the maximum power available was keenly felt and hence steel trawlers were accordingly rigged with

TABLE I

Sl. No.	Detailed particulars of work	Long wing type	Bulged-belly type
1.	Size of trawl nets prepared (H. R. Length)	32 m.	32 m.
2.	No. of trawl nets prepared in each category	2	2
3.	No. of meshes fabricated for the preparation of the webbing (single knot)	4,01,600	10,26,400
4.	No. of persons engaged/day for the fabrication work	44	44
5.	No. of days taken for fabrication	6	14
6.	Total no. of persons engaged	264	616
7.	No of persons engaged/day for assembling and mounting work	5	5
8.	No. of days taken for assembling and mounting work	3	6
9.	Total no. of persons engaged for the above work	15	30
Average no. of meshes prepared/day		:	71,087
Average no. of meshes prepared/person		:	1,615

32 m. long wing and bulged belly trawls designed and developed in the Institute for the capture of bottom and off-bottom fishes including shrimps.

The design, construction details and method of rigging of the 32 m. long wing and bulged belly trawls are shown in Figure 1 and 2. The details of total number of meshes prepared and the labour involved for the fabrication, assembling and mounting of these trawls are presented in Table I and II. The otter boards used were heavier pairs of rectangular type of size 182 x 91 cm.

weighing 130 kg. each described by Satyanarayana and Nair (1962).

#### RESULTS AND DISCUSSION

The details of the fishing operations, total catch of prawn and fish landed along with the value realised and the percentage composition split up for each species during 1970-71 and 1971-72 fishing seasons are shown in Table III & IV. Since the State Fisheries authorities were concentrating on commercial trawling operation from steel trawlers by using improved gear and accessories, only the

TABLE II  
Particulars of accessories used for rigging trawl gear of each category

Name of parts		Long wing Trawl (32 m.)	Bulged belly Trawl (32 m.)
1.	HEAD ROPE:		
	Material	Manila	Manila
	Size in mm.	25	25
	Length in m.	40	40
2.	FOOT ROPE:		
	Material	Manila	Manila
	Size in mm.	25	25
	Length in m.	45	45
3.	BOLCH LINE:		
	Material	Twisted Monofilament	Twisted Monofilament
	Size in mm.	6	6
	Length in m.	80	80
4.	SIDE ROPE:		
	Material	Twisted Monofilament	Twisted Monofilament
	Size in mm.	10	10
	Length in m.	60	130
5.	FLOATS:		
	Material	Aluminium	Aluminium
	Shape	Round	Round
	Size in mm. (dia)	152	152
	Extra buoyancy	1600 gm.	1600 gm.
	Total no. used	15	15
6.	SINKERS:		
	Material	Lead	Lead
	Shape	Spindle	Spindle
	Size	30 mm. dia. hole of 400 gm. each	30 mm. dia. hole of 400 gm each
	Total no. used	87	73
	Weight in kg.	34.8	29.2

TABLE III

Catch details and the value realised during two fishing seasons

Fishing season	1970-71	1971-72
Gears used	22.3 to 25.6 m. trawls (Conventional design)	32 m. long wing and bulged belly trawls (C.I.F.T. design)
No. of trawlers operated	4	4
Engine r.p.m. range at trawling speed of 2 - 2.5 knots	800-900	1200-1300
No. of fishing days	115	143
Total catch (in kgs.)		
Prawn	6324.25	47,944.50
Fish	154138.00	3,13,371.50
Total:	<u>160462.25</u>	<u>3,61,316.00</u>
Average catch per day (in kg.)		
Prawn	55.00	335.00
Fish	1,340.00	2,190.00
Total:	<u>1,395.00</u>	<u>2,525.00</u>
Total sale proceeds	Rs. 75,440.38	Rs. 2,90,297.62
Average sale proceeds per day	Rs. 656.00	Rs. 2,030.00
Average sale proceeds per boat	Rs. 18,860.09	Rs. 72,574.40

combined catch data for long wing and bulged belly trawl were recorded during 1971-72.

PRAWN AND FISH CATCH

It can be seen from Tables III & IV that there was remarkable increase in the total catch of prawn and bottom and off bottom fishes like pomfret, cat-fish, Bombay-duck, shark, skate and ray. The percentage increase of prawn and bottom and off-bottom fish in total catch is worked out to be 225 and 17 respectively during the two fishing seasons. The average catch per day was 55 kg. prawn and 1340 kg. fish during 1970-71 and 335 kg. prawn and 2190 kg. fish during 1971-72.

MATCHING POWER IN RELATION TO THE SIZE OF TRAWLING GEAR

Normally during trawling the engine

r.p.m. can be kept at about 75% of the total rated r.p.m. for a proper loading of the engine. An observation of the r.p.m. developed (800-900 at a trawling speed of 2 - 2.5 knots) during towing the existing gear system showed that the vessels were rigged with undersized gear and accessories. When the same trawlers were rigged with larger gear and accessories described in Fig. 1 and 2, the power utilised was increased to proper loading of the engine as indicated by the increase in r.p.m. from 800-900 to 1200-1300 at a trawling speed of 2 - 2.5 knots. The increase in catch recorded during 1971-72 substantiates the fact that the gear and accessories developed were suitable and of standard size for these trawlers.

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TABLE IV

Percentage composition split up for species

Fishing season	1970-71	1971-72
1. Prawn	4.00	13.40
2. Pomfret	8.70	11.80
3. Sciaenids	43.30	38.10
4. Cat fish, Bombay duck, shark, skate and ray	26.80	29.60
5. Miscellaneous fish	17.20	17.10

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