



Design and operational characteristics of small meshed purse seine nets with pocket operated off Ratnagiri, Maharashtra

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Abstract

The small meshed purse seine net with pocket, locally called '*ghan*' in Ratnagiri consisted of bunt (*Mand*), main webbing, pocket and wing (*Kan*). The stretched height of few sections of main webbing is kept higher than other sections so as to achieve vertical slackness. This extra slackness caused the formation of pockets between the sections of main webbing of the net. The net was 72 m in length, 82 m in depth and was fabricated by joining 46 numbers of vertical sections of webbing of polyamide (PA) knotted netting having mesh size of 30 mm. The hanging coefficient along the floatline and lead line varied from 0.57 to 0.81 and 0.60 to 0.87 respectively. The net was operated using single wooden boat with the aid of an unpowered skiff. The depth of operation was always less than the depth of the net. The time required for setting, pursing, hauling and brailing varied from 2 to 2.5 hours.

Keywords: Design, small meshed purse seines, purse seines with pocket

Introduction

Purse seine has been in operation commercially for more than two decades in Ratnagiri. The purse seine was basically designed and operated for sardine and mackerels. Other fishes like ghol, shrimps, catfishes, pomfrets and ribbonfishes are also often caught by the net. Aspects of classification, structure and operation of purse seine nets have been discussed by Ben-Yami (1987, 1994), Sainsbury (1996) and others. The design, construction and operational details of purse seines have been reported by many authors (Iitaka, 1971; Sadanandan *et al.*, 1975; Verghese, 1976; Mukundan *et al.*, 1980). The purse seine operation for sardine and mackerel along the Indian coast was first attempted by the FAO experts worked along the Malabar (Kerala) coast and Mangalore (Karnataka) coast during 1970s (Sadanandan *et al.*, 1975). In Maharashtra, purse seining was introduced in the year 1983 along the coast of Ratnagiri.

The total number of purse-seiners in Maharashtra was 288, out of which 167 were operated from Ratnagiri (Anon, 2007). This paper presents the

design details of small meshed purse seine nets with pocket. The rigging of the nets, material used, mesh size and mode of operation are also described.

Material and Methods

The present investigation was undertaken during the period from August, 2009 to May, 2010. The information regarding design and construction of purse seine nets were recorded following Hellevang (1971) and Sadanandan *et al.* (1975). The particulars of the purse seine net operators of Ratnagiri and the vessel details were recorded following Sreekrishna and Shenoy (2001). The design of gear was documented following Nedelec (1975).

Results and Discussion

The technical specifications of the small meshed purse seine net with pocket operated from Ratnagiri are presented in Table 1 and the design is presented in Fig. 1. The net is locally known as *Ghan* because of smaller mesh size of the main webbing of the net. The main parts of the net were the bunt (*Mand*), main webbing and wing (*Kan*). The net is fabricated by joining 46 vertical sections of webbing. The stretched

height of few sections of main webbing is kept higher than other sections so as to achieve vertical slackness. Six such sections are attached with few sections of the main webbing with comparatively lower stretched length. This extra slackness caused the formation of pockets between the sections of main webbing of the net. The bunt part is located at one end of the net and wing at the other end. At both ends of the net, choke with bridles were provided with thicker twines and large meshes. The depth of

bunt and wing was less than the depth of main body. The selvedge pieces with rigged floats and sinkers were laced to the respective sides of each sections of the main webbing separately using polyamide (PA) twine of size 210D/6/3.

The average length and depth of the small meshed purse seine with pocket operated in Ratnagiri were 72 m and 82 m respectively. Sadanandan *et al.* (1975) observed that the length and stretched depth of the

Table 1. Technical specifications of small meshed purse seine net with pocket operated from Ratnagiri

WEBBING	Specifications								
	Bunt	Main webbing -shorter panels	Main webbing longer panel	Wing	Wing-end	Top selvedge	Bottom selvedge	Top selvedge of bunt	Bottom selvedge of bunt
Number of sections	1	38	6	1	-	-	-	-	-
Material	PA	PA	PA	PE	PP	PE	PE	PP	PP
Type of knot	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl
Twine size, (Denier/dia)	210Dx 8x3	210D x6x3	210Dx 6x3	1.25 mm	3 mm	1.5 mm	2.5 mm	2 mm	4 mm
Stretched mesh size (mm)	18	30	30	35	150	24	125	24	125
No. of meshes in length	1423	915	915	470	80	29025	5951	1092	127
No. of meshes in depth	2236	1830	2745	1046	150	7	11	7	7
Stretched length (m)	25.62	27.45	27.45	16.2	-	720	755.1	26.22	15.9
Stretched depth (m)	40.26	54.9	82.35	36	-	0.16	1.37	0.16	0.87
Hanging coefficient at float line	0.57	0.66	0.66	0.81	-	0.96	-	0.95	-
Hanging coefficient at lead line	0.60	0.7	0.7	0.87	-	-	0.96	-	0.96
Vertical hanging coefficient	0.82	0.75	0.75	0.58	-	-	-	-	-
ROPES AND LINES			Specifications						
Float line	PP 12 mm dia. 723 m								
Leadline	PP 12 mm dia. 747 m								
Line for attachment of purse ring bridles	PP 10 mm								
Purse line	PP 24 mm dia. 909 m								
Wing-end bridle	PP 14 mm dia. 2.7 m								
Purse ring bridles	PP 14 mm dia. 4.5 m								
Tow line	PP 24 mm dia., 115 m								
Lifting line	PP 10 mm dia., 19 m								
OTHER ACCESSORIES			Specifications						
Floats	Expanded PVC 130 mm L x 85 mm dia; spindle-shaped: 866 nos. EVA160 mm L x 120 mm dia; spindle-shaped; 57 nos. PI 85 mm L x 85 mm dia; apple-shaped; 5357 nos.								
Sinkers	Pb 38 mm L x 33 mm dia, 220 g., spindle shaped: 4180 nos.								
Purse rings	120 mm dia circular brass rings; 2.5 kg each: 53 nos.								

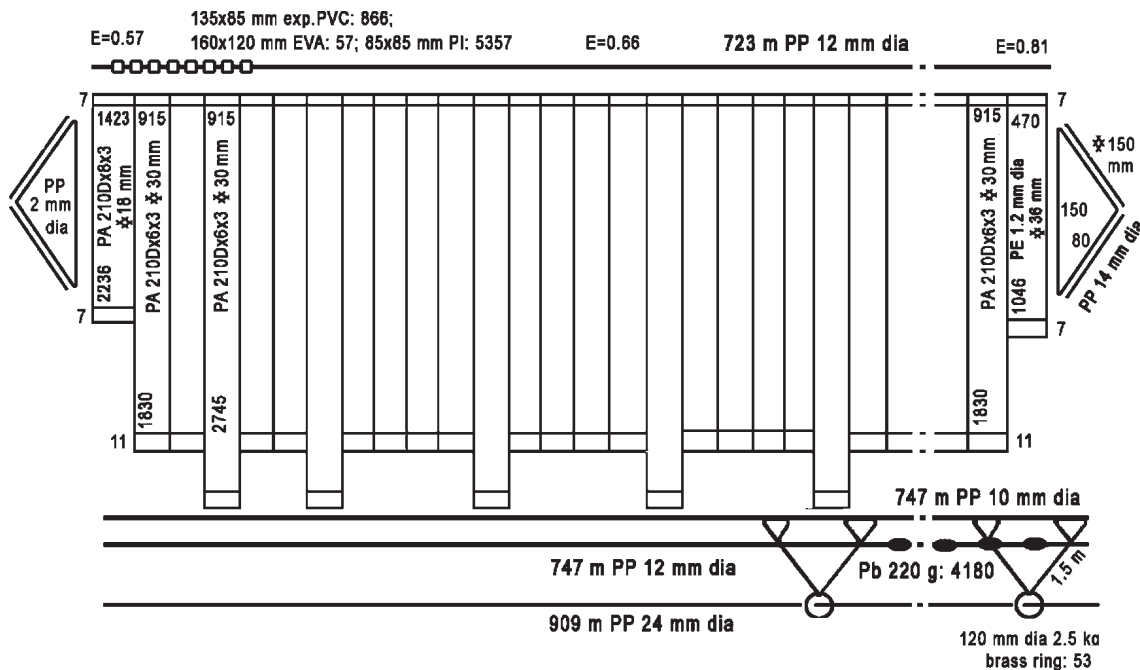


Fig. 1. Design of small meshed purse seine net with pocket operated from Ratnagiri

purse seines of Goa were 176 to 223 m and 40 to 44 m respectively. Mukundan *et al.* (1980) presented the design details of two purse seine nets of Cochin which had the length of 350 m and 300 m and depth 39 and 39.8 m respectively.

The material used for the purse seine at Cochin was nylon 210D/3/3 for bunt and knotless nylon 210D/2/3 for main body (Mukundan *et al.*, 1980). The purse seines used in Ratnagiri were made of PA multifilament knotted webbing of 210D/6/3 for main webbing and 210D/8/3 for bunt while polyethylene (PE) multifilament of 1.25 mm diameter was used in the wing section. The mesh size varied in different parts of the net. The mesh size used for main webbing was 30 mm and for the bunt section it was 18 mm. Sadanandan *et al.* (1975) presented the design details of purse seines off Goa which had 18 to 20 mm mesh size in all the sections.

Prado (1990) stated the actual height of a hungnet depends on the stretched height and hanging ratio. He further suggested that the actual depth should be 50% of the stretched depth of the seine at its extremities, and 60% near the centre of the net. The

mounted height or working depth of the bunt of small meshed purse seines with pocket operated from Ratnagiri was in the range of 82% of the stretched netting, main webbing was 75% of stretched netting and wing was 58% of stretched netting. The mounted height of the purse seine in Ratnagiri was on a higher side than that recommended by Prado (1990).

In the present study, the hanging coefficient was greater on the leadline than on the floatline. The hanging coefficient varied along the length of the floatline and leadline and was lower in the bunt section. The hanging coefficient was 0.57 to 0.81 along the floatline and 0.60 to 0.87 along the leadline. Mukundan *et al.* (1980) reported the hanging coefficient of the purse seine operated from Cochin varied along the floatline from 0.62 to 0.68. Sadanandan *et al.* (1975) observed the hanging coefficients of purse seines off Goa along the floatline and leadline as 0.60 and 0.65 respectively. The hanging coefficient of purse seines along the floatline as well as along the leadline observed diving the present study fall within the range as recorded by Sadanandan *et al.* (1975) and that recorded by Mukundan *et al.* (1980) along the floatline.

Surface area covered by the small meshed purse seine net with pocket of Ratnagiri was about 37,730 m² (Prado, 1990). The approximate volume surrounded by the net (Ben-Yami, 1994) of Ratnagiri at the end of the set, when the leadline reaches the full working depth of the net was 25,73, 400 m³.

The average depth of the purse seines of Ratnagiri was 11.39% of the average length of the net. In practice, according to Donald (1930), the stretched net depth of purse seine in California was only 10 to 13% of the net length. Itaka (1971) suggested a depth of 30 to 50% of the total net length.

Prado (1990) stated that the length of the purse seine was greater than or equal to 15 times the length of seiner and minimum length and depth of bunt was equal to the overall length of seiner from which the net was operated. The average length of the purse seines observed in Ratnagiri during the present study was greater than 15 times the overall length of seiner (13.5 to 16.7 m), whereas the average length and depth of bunt was greater than the average length of the vessel used to operate the net.

Polypropylene (PP) floatline of diameter 12 mm with floats of ethylene vinyl acetate (EVA), expanded polyvinyl chloride (PVC) and plastic were used. The single leadline of PP of diameter 12 mm with lead sinkers of 220 g were used. The purse line was 24 mm PP rope which was passed through 2.5 kg brass purse rings. The rings were attached to a separate line running through the bottom selvages through the fifth or sixth mesh from the leadline, using bridles.

The wooden purse seiners operated from Ratnagiri had an overall length of 13.5 to 16.7 m and were fitted with 6 cylinder inboard engine of 95 to 156 hp. The purse seine was operated mainly to catch oil sardine, mackerel and seerfish shoals moving in the surface and column waters. Single boat type purse seining with the aid of an unpowered skiff was practiced off Ratnagiri. The gear was operated using the basic principle of encircling the shoal. The shooting and hauling operations were done over the port side of the vessel. A skiff was used to hold one end of the net during pursing. The chances of escape

of fish through the bottom even before pursing are meager as the bottom rope always touches the ground. The fishes collected at the bunt end, were brailed in by brail net. The time required for setting, pursing, hauling and brailing varied from 2 to 2.5 hours. Similar observations were reported by Sadanandan *et al.* (1975), who observed the method of operation of purse seines of Goa and Boopendranath and Hameed (2007) described the single vessel purse seining operations conducted from Cochin. Purse seines were operated in the depth of less than 40 m from Ratnagiri.

The basic information on the design characteristics, rigging and modalities of operation of the small meshed purse seine nets with pocket, in Ratnagiri would help in technological innovations of the net in the coming decades.

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