

Design and technical specifications of steel purse seiners operating along Ratnagiri coast of Maharashtra

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■ **ABSTRACT** : Recently, steel purse seiners were introduced in Ratnagiri, Maharashtra. The present study was an attempt to document the design and technical aspects of steel purse seiners presently operated from Mirkarwada fishing harbour of Ratnagiri. For the steel purse seiners operating along Ratnagiri coast, overall length was recorded to be 19.55 to 19.85 m, breadth at midship 5.79 m to 6.1 m, depth of vessel 3.1-3.65 m, length of freeboard 1.27 m to 1.50 m, draught 1.82 to 2.14 m and length of keel 16.72 m. The steel purse seiners were fitted with engines having maximum horse power of 350 and the minimum horse power recorded was 175 hp.

■ **KEY WORDS** : Purse-seining, Steel purse seiners, Design, Technical specifications

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Purse-seining is one of the most advanced and efficient fishing methods in the world over with its origin in United States in 1920. Purse-seine net is basically a wall of netting equipped with purse-rings along its lower edge. It is mainly aimed at catching dense, mobile, pelagic fishes and includes all the elements of searching, hunting down and capture. This method of fishing is mostly used for capture of pelagic shoal forming species such as mackerels, sardines, ribbon fishes, cat fishes, tunas etc. A special cable known as purse-line is passed through the purse-rings, enabling the fisherman to enclose the fish shoal from the bottom. Thus the bowl like space is created in which the fishes are enclosed and prevented from escaping. Purse-seining may be carried out by a single vessel, by a pair of vessel or by a combination of large auxiliary vessels.

Recently, steel purse seiners were introduced in Ratnagiri, Maharashtra. The present study was an attempt to document the design and technical aspects of steel purse seiners recently introduced and presently operated from Mirkarwada fishing harbor of Ratnagiri,

Maharashtra.

Bardarson (1971) studied the deck equipment for purse seine operated with Icelandic type purse seining. Hamuro (1971) studied on automation of fishing with Danish seines, purse seines and design criteria for mid water type purse seine. Hellevang (1971) observed the method of operation of Peruvian purse seines. He observed the shooting of the gear was similar to any conventional one boat seine operation. A power skiff was used for the operation. Sadanandan *et al.* (1975) reported the design, construction and operational details of the purse-seines operated from Goa, for sardines and mackerel. Verghese (1976) studied the introduction of purse seine fishing along Indian coasts from 36 ft and 57 ft vessels for sardine and mackerel. Levi (1981) described two-boat purse seine, 75.76 m long and 6.97 m deep with two 4.24 m purse boats to fish in shallow estuaries for Menhaden (*Brivooortia*). Boely *et al.* (1988) attempted study on the big purse seiner fishery in the Java sea. The encircling purse seine first appeared in the Java Sea around the 70's and latter became one of

the main gears used to fishing small pelagic species. Panikkar *et al.* (1991) has recorded data from selected units of purse-seiners of size 12.8 m with 110-120 HP engines operating at Cochin Fisheries Harbor during 1989-90. Ben-Yami (1994) observed that Tuna purse seiners vary considerably in size. Industrial tuna purse seiners are usually large vessels whose length ranges between 45 and 85 m, sometimes over (up to 100-110 m). Sainsbury (1996) has described the purse seiners operating along west coast of Africa where vessels of 105 m (350 ft) or more operate nets of 1600 m (5350ft) long by 100 m (330 ft) deep. Sreekrishna and Shenoy (2001) reported the typical deck arrangement of one boat purse seiners with forward wheelhouse arrangement. Michael and Winner (2003) described the vessel used in the study was 7 mullet skiff; a flat-bottomed, bow-driven boat capable of running in shallow water. The skiff had a large, open net well that allowed the purse seine to be deployed quickly from the stern. Jadhav (2010) studied the wooden purse seiners operated from Ratnagiri which had an overall length of 13.5 to 16.7 m, breadth 6.6 to 7.2 m, whereas the depth was 1.82 to 3.03 m. The tonnage of vessel ranged from 15 to 25 tonnes. Non-motorised skiff of 5.5 m in length was used in Ratnagiri. Yingyuad and Chanrachkij (2010) has described that the Thai purse seiners are made of wood, size between 10 to 120 gross tonnage and length overall (LOA) was between 12 to 24 m.

■ METHODOLOGY

Mirkarwada minor fishing harbor situated on the west of the Ratnagiri city about 2 km away from Ratnagiri with a geographical distribution of 16° 59' 42" N latitude and 73° 16' 14" E longitude was chosen for the present study. The detail information regarding the

design of steel purse-seiners were undertaken by physically sampling the units and by collecting the information from purse-seine operators. Collected data was analyzed for the required parameters with the appropriate statistical procedures wherever required (Snedecor and Cochran, 1967). The design of steel purse seiners were prepared and were drawn to the scale and depicted in the offset tables.

■ RESULTS AND DISCUSSION

During the present study there were six steel purse seiners operated from the Mirkarwada fishing harbor of Ratnagiri which were constructed at Kundapur, Karnataka state. The overall length of the steel purse seiners of Ratnagiri was observed as 19.89 ± 0.0490 m where as breadth was about 5.8433 ± 0.0513 m and depth was about 3.2916 ± 0.07573 m. Length of freeboard was recorded as 1.3553 ± 0.0311 m, draught as 1.9362 ± 0.0445 m and the length of keel as 16.72 ± 0.0000 m. The horse power of engine installed on the steel purse seiners was 320.83 ± 29.16 hp with maximum horse power of 350 and minimum horse power was 175 hp. Gross tonnage recorded was 87.51 ± 1.7849 tonnes. The recorded specifications of steel purse seine vessels are detailed in Table 1 and prepared design is depicted in Fig 1.

Wheelhouse (2.4 m length, 2.1 m breadth and 3.30 m height) was located aft side. Berthing arrangement was made within the wheelhouse. The engine room was beneath the cabin. Fish hold was located in front of the winch located athwart ship. The number of fish holds observed for steel purse seiners were in the range of 13 to 16, each with a capacity of 1 to 2 tonnes and having dimensions of length 1.2 m, breadth 1.2 m and height 1.8 m. A purse davit was located at the port side of the vessel.

Table 1: Specifications of steel purse seine vessels operating along Ratnagiri coast

Sr. No.	Specification	Ratnagiri			
		Mean	Minimum	Maximum	Standard error
1.	Overall length (m)	19.89	19.55	19.85	± 0.0490
2.	Breadth at midship (m)	5.8433	5.79	6.1	± 0.0513
3.	Depth of vessel (m)	3.2916	3.1	3.65	± 0.0757
4.	Draught (m)	1.9362	1.82	2.14	± 0.0445
5.	Freeboard (m)	1.3553	1.27	1.50	± 0.0311
6.	Length of keel (m)	16.72	16.72	16.72	± 0.0000
7.	Horse power (hp)	320.83	175	350	± 29.1666
8.	GRT (t)	87.51	85.02	96.4	± 1.7849

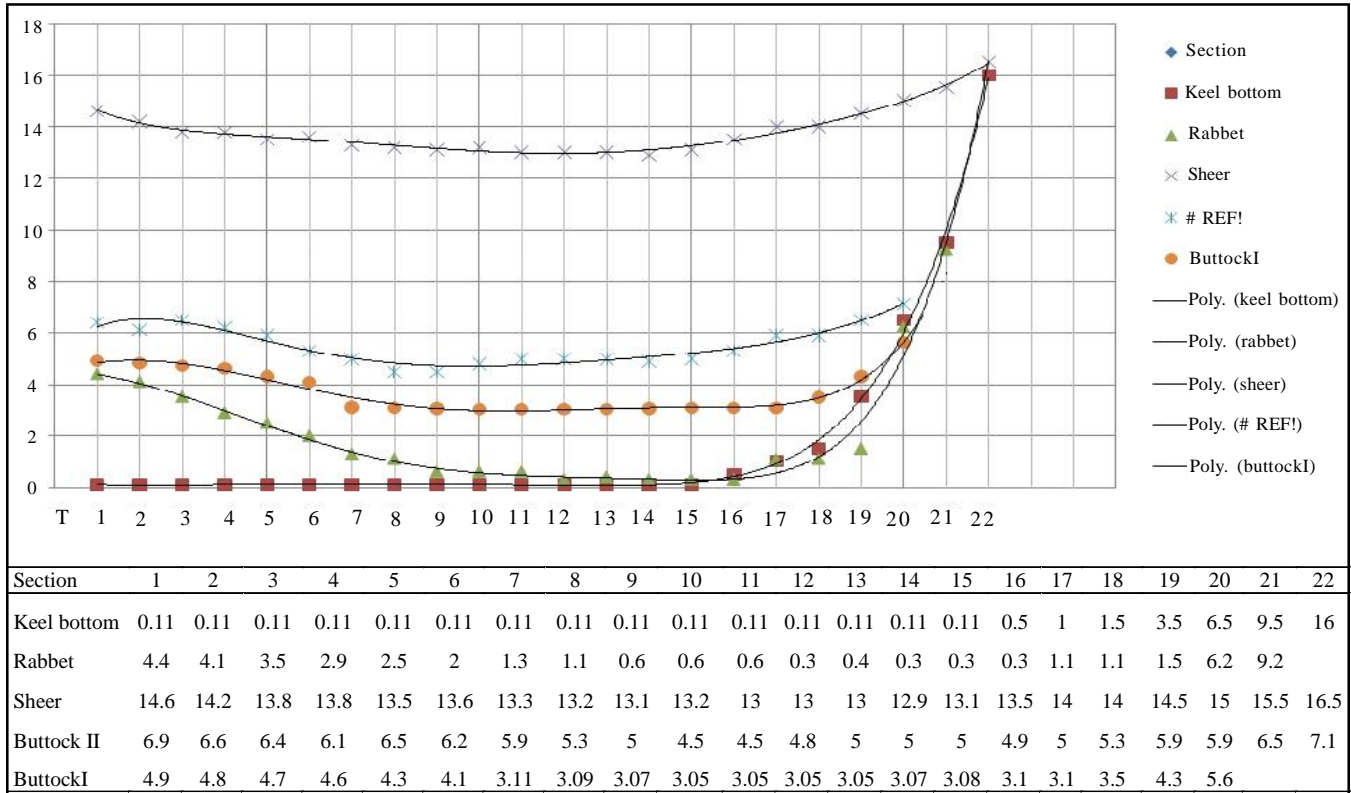


Fig. 1 : Design of steel purse seiner of Ratnagiri, Maharashtra

Two steel masts of 6.30 m were joined and ventilation system was provided for engine room.

Out of the six steel purse seiners registered in Ratnagiri, the net hydraulic power block was installed to the aft side on one steel purse seiner and the hydraulic winch with guide rollers were fitted to the starboard side. For storage of purse rings, a storage bar was placed on the bulwark at the side from which the net was set. In the remaining five steel purse seiners winch was driven by mechanical power take off. The net was stored on board the vessel with the bunt end on the top and float line and lead line on either sides.

The steel purse seiners having ‘U’ shaped hull were fitted with fixed pitch screw type bronze propeller ranging from 39–50 inches with stern tube ranging 1.2–1.5 m whereas, the length of the shaft ranged in between 0.90–1.3 m. The purse seiners, had non-motorized wooden skiff of dimensions 5.5 m length, 2.4 m breadth and 1.51 m depth and was used to hold the bunt side end of the purse seine net during the fishing operation. All the steel purse seiners in Ratnagiri were fitted with compass, global positioning system (GPS), SONAR, very high frequency

(VHF) wireless and fish finders.

Balsubramanyam (1975) investigated that by adopting latest techniques in welding larger sections of steel can be fabricated with maximum efficiency and minimum wastage of material particularly for the construction of bigger boats beyond 60 feet (Salhiadhas and Panikkar, 1989) studied that steel trawlers with an OAL of 24.95 m operated along the Kerala coast. Chennubhotla *et al* (1999) studied the steel trawlers having overall length of 23.19 m operating along the Andhra Pradesh coast. He also mentioned that there are large steel trawlers having OAL length of 24.95 m. Chennubhotla *et al.* (1999) has described the breadth at midship of steel trawlers operating along the Andhra Pradesh coast was 7.33 m and steel trawlers operating along Kerala coast was 7.44 m (Salhiadhas and Panikkar, 1989). In the present study the average breadth at midship of steel purse seiner operated along the Ratnagiri coast was 5.84m which was smaller than that along the Andhra Pradesh coast.

The average depth of steel purse seiners operated along the Ratnagiri coast was 3.29 m. None of the

researcher has studied the depth, so the result of the present study cannot be compared. (Sathiadhas and Panikkar, 1989) studied the steel trawlers operating along Kerala coast the draught recorded for these vessel was 2.8 m. Chennubhotla *et al.* (1999) described the steel trawlers operating along Andhra Pradesh coast had draught of 3.08 m whereas it was observed to be 1.93 m in Ratnagiri which is lower than the observations recorded by Sathiadhas and Panikkar (1989) and Chennubhotla *et al.* (1999). The freeboard recorded of steel purse seiners operated along the Ratnagiri coast was maximum of 1.50 m and minimum of 1.27 m. None of the researcher has studied the freeboard, so the result of the present study cannot be compared.

The documented information on the design and technical specifications of the steel purse seiners of Ratnagiri, Maharashtra would serve as a base line information for the technological modifications the vessels may undergo to increase their efficiency in the coming years.

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