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Comparative Evaluation of Different Types of Otter Boards in Small Scale Trawling Operations

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The cost of construction of different types of otter boards viz., flat rectangular, 'V' form and oval slotted otter boards were compared and repair and maintenance charges for each type of otter board during the course of operation were also compared. It was found that, all along the south West Coast, flat rectangular otter boards were preferred by the fishermen. The 'V' form otter boards were not popular.

Key words: Otter boards, construction cost

Vessels of varying LOA (32' - 54') made of steel or wooden hull operate on the Southwest coast of India. They are operating at a depth range of 30 - 170 m, fishing for shrimps, cephalopods and fin fish of commercial value. The horsepower of engines used in these vessel ranges from 90-160. Each type of vessel tows different type of trawl gear. The otter boards used are made either of wood with steel reinforcements or with steel only, having different shapes like flat rectangular, 'V' form or oval slotted. Each type has its own characteristic design pattern and operational nature depending on fishing conditions. Conventional otter boards are flat-rectangular wooden boards with steel reinforcements. Oval slotted and 'V' shaped boards, introduced more recently are made of steel. A series of otter board designs for Indian waters were described by Kuriyan *et al.* (1964) and Satyanarayana *et al.* (1962). Satyanarayana & Mukundan (1963), and Mukundan (1970) carried out studies on modifications of existing designs of otter boards. A comparison of performance of flat rectangular and 'V' form otter boards was carried out by Kunjipalu *et al.* (1984). In this paper an attempt is made to compare the construction and maintenance cost and the longevity of these three types of otter boards which are used in the small scale commercial trawling off Southwest coast of India.

Materials and Methods

Data on the design and fabrication details of different types of otter boards were collected from four different fabricating units functioning along the Southwest coast of India during 1996-97. Two units each were selected from Quilon and Cochin, the main fishing centers, along the Southwest coast. The cost of construction of otter boards were collected in detail from each center and averages were taken for comparison. The average life span and cost of maintenance of these otter boards for one fishing season were also taken into account for comparing the over all performance.

Results and Discussion

The design and construction of the otter board is a subject of great importance for the economy of trawling (Mukundan, 1970). The otter boards are designed to match the size of the net (Koyama, 1962) and the horse

power of the engine (Miyamoto, 1958) for better trawling results. Presently the size and weight of otter boards are based on the horsepower of the installed engine and details are shown in Table 1.

The flat-rectangular boards of wood and steel construction are one of the earliest known designs and are still the most widely used type for otter trawling. Lift-drag ratio, which is an index of hydrodynamic efficiency of this type of boards, is typically 1.14 (FAO, 1974). The main draw back of this type of board is its poor performance on uneven grounds, where the stability of the board is poor and the chances of overcoming obstacles on the ground is very low and the board will dig into the ground (Brett, 1962). 'V' shaped boards were first developed in the 1950's and introduced into Indian small-scale trawling only a few years ago. It is simple in design and is constructed of mild steel. The main plate is bent along the horizontal plane to form a 'V' shape of approximately 15-20 degree. The main disadvantage is its inferior spreading force. The lift-drag ratio is 1.23 (FAO, 1974), which is only marginally better than flat- rectangular boards. Oval otter boards were noted for improved performance on rough or hard grounds and the rounded corners of the board permit easy ride over obstacles without causing instability. Angle of attack is typically 35 degree and lift-drag ratio varies from 1.25 to 1.36, depending on the design variation (FAO, 1974). Slots in the design increase the hydrodynamic efficiency of the board.

Comparison of cost of construction, life span and maintenance cost of flat-rectangular, 'V' form and oval slotted otter boards showed marked differences (Table 2) The flat rectangular type of boards required

Table 1. Dimension of different types of otter boards in relation to horse power of engine

HP of engine	Size of otter board in cm			Weight of otter boad in kg.		
	Wood	'V' type	Oval	Wood	'V' type	Oval
89	125x62.5	—	—	50	—	—
99	145x72.5	135x72.5	135x72.5	65	67	80
106	150x75	135x72.5	135x72.5	72	67	80
122	160x80	135x72.5	135x72.5	75	67	80
156	—	135x72.5	135x72.5	75	67	80

Table 2. Construction cost (Rs.) of otter boards

	Flat rectangular (wooden) 58x29"	Vee type (steel) 54x29"	Ovel slotted steel (54x29")
Wooden planks/steel plate	1200	1400	1850
Other items	1700	1465	1980
Labour	200	500	900
Miscellaneous	200	650	700
Total	3300	4015	5430
Selling price	3750	5000	6000
Maintenance cost for one fishing season	800	280	300

more repair and maintenance than the other two types. On an average, the planks were replaced in 10 to 12 months and the bridle chain got corroded in 8-10 months of continuous operation. The wooden boards needed special care even when they were not in operation. Continuous exposure to sunlight will deform the board. All these drawbacks are eliminated in steel otter boards. Construction cost of flat-rectangular wooden boards was lower when compared with the steel otter boards (Fig. 1). 'V' form boards had slightly higher initial investment but had advantages in terms of the life span and repair as well as maintenance costs. Initial investment for oval slotted otter boards was higher than that for the other two types and from the performance point of view, the two steel boards were almost identical. The slots on the oval slotted board will be helpful in reducing the towing resistance (FAO, 1974; Mukundan *et al.*, 1967), which will reduce fuel cost also.

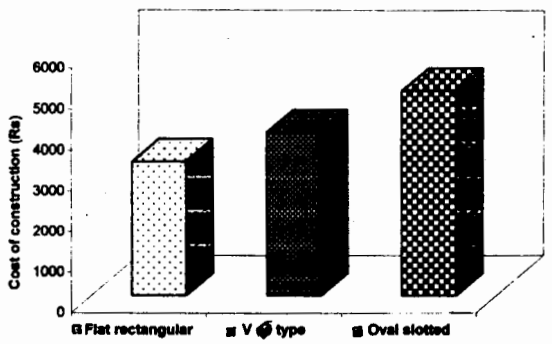

Fig. 1. Average cost of construction of different types of otter boards.

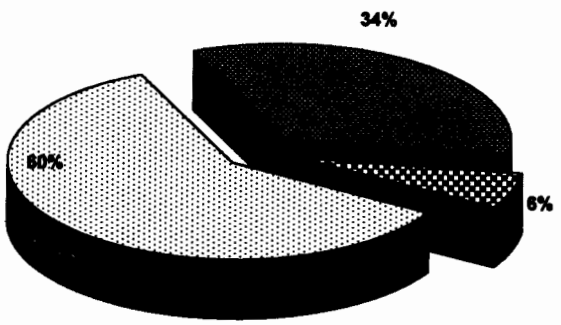

Fig. 2. Average percentage operation of otter boards in use along Cochin waters.

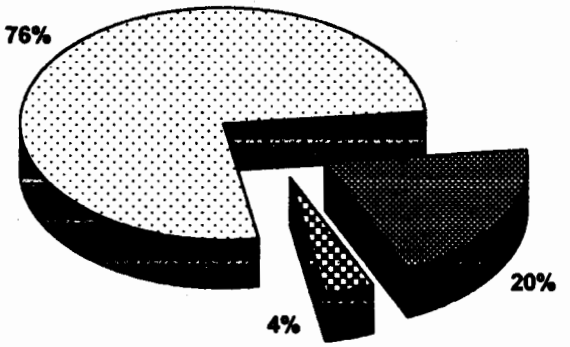

Fig. 3. Average percentage operation of otter boards in use along Quilon waters.

Results of the present study showed that flat rectangular otter boards were the most popular in this region (Fig. 2 and 3). This may be due to lack of awareness about the advantages of the other types otter boards.

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