Shore Seines for Reservoirs - Part I - Design and Performance

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Based on the studies to introduce active gears in reservoirs, a prototype shore seine was designed and tested, the details of which are presented in this communication. The results revealed that the operation of this gear could effectively control the proliferation of under-exploited species.

Entangling nets, gill nets, lines and cast nets which are widely used in reservoirs are effective to fully exploit the fishery due to their selective nature and limited sphere of operation. Continued operation of these gears resulted in the proliferation of under exploited species in most of the reservoirs. To maintain the composition of icthyofauna at the desired level and to step up production, it is necessary to evolve and introduce less selective active gears. Availability of fishing areas devoid of underwater obstructions in the present day reservoirs necessitated the operation of such gears like shore seines and trawls. Znamensky (1967) and David *et al.* (1969) stressed the significance of shore seines in exploiting the reservoir fishery resources in large scale.

Materials and Methods

The dimensions of the prototype of the shore seine (Fig. 1 and Table 1) were determined based on bottom relief and depth of the fishing ground through soundings. The net was designed following the recommendations of Voinikanis- Mirskii as referred by Friedman (1969) and Baranov (1960).

The net having a length of 179.20 m along the head rope and maximum depth of 12.70 m consisted of 5 major sections, two outer wings (A & E), two inner wings (B & D) and a central landing part (C). Each section is formed of vertical panels, the depth of which increases progressively from the outer to the central part. Both ends of head and foot rope of each section are provided with

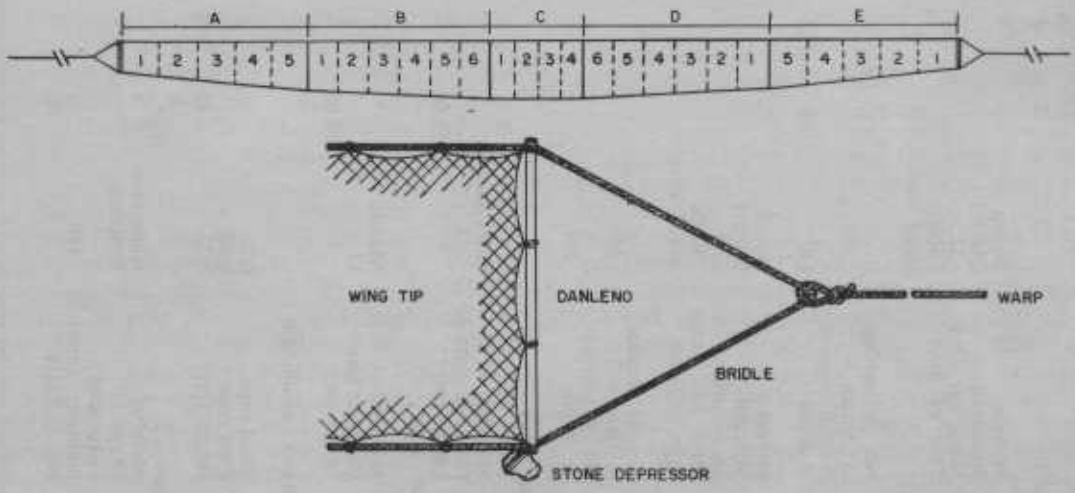

Fig. 1 Design of the prototype shore seine

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Table 1. *Details of the prototype shore seine*

Webbing	A/E 1	2	3	4	5	B/D 1	2	3	4	5	6	C C1	C2	C3	C4
Material	Nylon														
Specification	210/5/3														
Mesh bar (mm)	27.5														
Type of knot	Single trawl knot														
No. of meshes in length	200														
No. of meshes in depth	140	168	182	201	212	218	227	236	245	254	270	270	270	270	270
Selvage	Nylon														
Material	210/6/3														
Specification	27.5														
Mesh bar (mm)	Single trawl knot														
Type of knot															
No. of meshes in length	200														
No. of meshes in depth	001														
Head rope															
Material	Polyethylene														
Diameter (mm)	12														
Length (m)		39.00							39.60					22.00	
Foot rope															
Material	Manila														
Diameter (mm)	12														
Length (m)		33.00							33.00					22.00	
Hanging co-efficient															
Head rope	0.7					0.6							0.5		
Foot rope	0.60					0.5							0.5		
Height (m)	5.77	6.90	7.50	8.28	8.70	9.87	10.35	10.77	11.18	11.59	12.32	12.77			
Floats															
Material	Aluminium														
Shape	Spherical														
Dimension diameter (mm)	150														
No. of floats		10						10				8			

eyes for joining with the adjacent section. At the extreme ends of outer wing danlenos are fixed. Stone depressors of 2–3 kg are attached to the lower ends of the danlenos. The bridles are of equal length and are attached to the head and foot ropes as in Fig. 1a. Aluminimum floats (150 mmØ are fixed at an interval of 3–4 m all along the head rope. Since the weight of manila foot rope, (28 kg) is sufficient to keep the net along the bottom, no sinkers are provided. The length of the warp (polyethylene rope 12 mm Ø) is the same as that of the head rope.

The net was payed from a flat bottomed (LOA 4.30 m) boat. The boat followed a rectangular course during the process of operation. On completion of paying out the ropes from both ends were hauled up and the net assumed the shape of an arc. The foot rope was held in close contact with the bottom in order to prevent the escape of fish. As the net approached the shore the fishes were guided to the central landing portion from where they were removed after lifting the net ashore.

The prototype was operated in the upper and middle reaches of Hirakud reservoir from April 1978 to July 1980.

Results and Discussion

The catch composition of the prototype is given in Table 2. As evident from the same, this gear puts pressure on all types of fishes irrespective of species. Major carps constituted 14.45% of the total landings and the rest were cat fishes and miscellaneous fishes.

The suitability of the mesh size used is evident from the fact that the net avoided gilling of the predominant species. Voinikanis-Mirskii (Quoted by Friedman, 1969) advocated that the shape and height of the net depended on the bottom relief. The prototype is found to be suitable for operation in depth up to 10 m stretching over a distance of 180–200 m from shore. The dimensions of the net is in agreement with the suggestion of Baranov (1960). According to him optimum level between the force drawing the net together with water is achieved when the maximum depth of the net is 30% more than the depth of the ground, and in the case of wings the extra depth can be 10% of the depth.

Table 2. *Species-wise catch composition of the prototype shore seine*

	Weight kg	% by wt.
Carps		
Catla catla	50.75	7.20
Labeo rohita	20.50	2.90
Cirrhinus mrigala	7.65	1.08
Labeo fimbriatus	7.20	1.03
Labeo calbasu	2.55	0.36
Labeo bata	13.25	1.88
Cat fishes		
Mystus seenghala	60.80	8.64
Mystus aor	1.30	0.18
Silonia silondia	141.40	20.06
Pungasius pungasius	1.65	0.23
Wallago attu	31.80	4.52
Miscellaneous species		
Rohitee cotio	296.10	42.03
Gudusia chapra	10.30	1.48
Cirrhinus reba	24.60	3.49
Barbus serana	3.50	0.49
Rita chrysea	1.12	0.16
Notopterus chitala	28.75	4.08
Notopterus notopterus	1.35	0.19

The proportion between the length of the head-rope and foot-rope has been disputed by some workers. While Garner (1976) recommended for a slightly longer foot rope, Znamensky (1967) is of the view that a foot rope shorter than the head rope will avoid the risk of entangling with underwater obstructions. George (1971 & 1981) observed shorter foot rope in Indian shore seines. A shorter foot rope is used in the present study. Friedman (1969) suggested a bag for localising as well as preventing the escape of fish. But in this net the central part is so designed as to serve the above purpose.

The above findings show that shore seines can be introduced in reservoirs for judicious

exploitation of the fishery. In order to avoid capture of the juvenile carps the operation of the net has to be restricted to particular seasons and area.

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