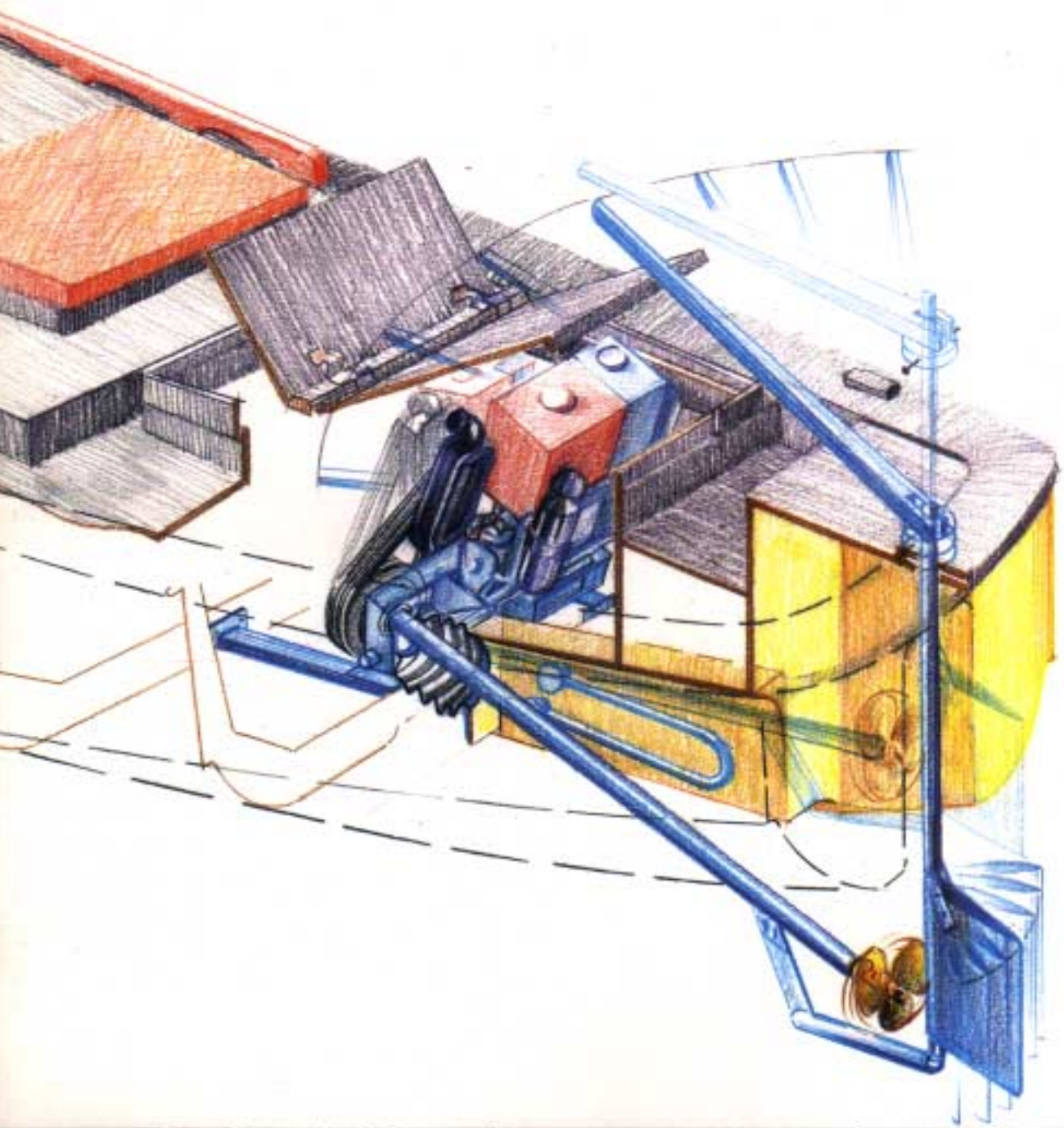
BOBP/MAG/14

Building A Liftable Propulsion System for Small Fishing Craft

THE BOB DRIVE



E. AMALORE

BOBP
For Fisheries Development
BAY OF BENGAL PROGRAMME

Building
A Liftable Propulsion System for Small Fishing Craft
THE BOB DRIVE

by

O Gulbrandsen
Consultant Naval Architect
and
M R Andersen
Small Craft Specialist (APO, BOBP)

Bay of Bengal Programme
Madras, India

1993

INTRODUCTION

Motorization of small fishing craft has contributed considerably to fisheries development in the Bay of Bengal region over the last few decades. In Indonesia. Thailand and Bangladesh the most common engines by far for small fishing craft, are the 5 - 15 hp range of multipurpose diesel engines used for water pumps, generators, power tillers and small tractors. The advantages of this type of engine, compared with the specially marinized diesel engine, is the low cost and easy availability of both engines and spare paris.

Two methods for the installation of these engines have been developed and widely introduced.

The conventional inboard installation, where the propeller shall is fitted through the keel structure, is used in boats operating from harbours or sheltered beaches.

In the 'longtail' installation, the engine Sits on top of the transom and the propeller shaft goes through a long tube to the propeller.

These two methods of installations are, however, not suitable for boats that have to land on surf-beaten beaches.

The Bay of Bengal Programme (BOBP) undertook a project for development of beachlanding craft and their propulsion systems in India and Shri Lanka in 1979. The main challenge was to develop a propulsion system that could be fitted to a variety of air-cooled and water-cooled diesel engines that were available locally, provide good manoeuvrability when crossing the surf, permit rapid retraction of the propeller and the rudder and be strong enough to withstand both the impact when landing on the beach and the rough handling by users.

Only outboard motors had previously proved satisfactory for surf crossing, but, except in the case of small craft, this solution had economic limitations due to its high operating cost and the short service life of the motor Further, outboard motors have to be imported from Japan, Australia, Europe or the USA, while the multipurpose kerosene or diesel engines are now manufactured, or assembled, in many developing countries.

This manual describes the final version of the liftable propulsion system developed by BOBP and called the BOB DRIVE. The B0B Drive has undergone long-term trials in India and Shri Lanka and been found to be acceptable to fishermen operating from open surf beaches and from shallow water outlets. A variety of fishing craft, from FRP beachlanding craft and plywood canoes in India to narrow outrigger canoes in Shri Lanka, have been fitted with the BOB Drive and it has worked satisfactorily in all of them.

This manual is intended to be used by skilled mechanics in small workshops having a lathe and welding equipment It should also be of interest to engine manufacturers, boat builders, teachers in lisheries training institutes and extension workers in small-scale fisheries.

The projects for development of fishing craft, including liftable propulsion systems for beachlanding and negotiating shallow water outlets, were sponsored by the Bay of Bengal Programme's project "Small-Scale Fisherfolk Communities in the Bay of Bengal" (GCP/RASI118/MUL). They were executed by national fisheries institutions and BOBP in cooperation with engine manufacturers and dealers, boatyards, engineering workshops and fishedolk.

The Bay of Bengal Programme (BOBP) is a multiagency regional fisheries programme which covers seven countries around the Bay of Bengal - Bangladesh, India, Indonesia, Malaysia, Maldives, Shri Lanka and Thailand. The Programme plays a catalylic and consultative role: it develops, demonstrates and promotes new technologies, methodologies and ideas to help improve the conditions of small-scale lisherfolk communities in member countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, and also by UNDP (United Nations Development Programme) and AGFUND (Arab Gulf Fund for United Nations Development Organizations). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

This manual, prepared by 0. Gulbrandsen, Naval Architect Consultani, and Mr M.R. Andersen, Small Craft Specialist, BOBP, is the result of the work done by BOBP staff, Varuna Construction & Design, Madras, fisheries officers and all those who were involved in the development and trials of the BOB Drive. It has not been cleared by the Governments concerned or the FAO.

LIST OF MATERIALS
FOR SIDE OR TOP MOUNTED ENGINE

Does not include:

(a) Alternative large rudder, page 22

(b) Freshwater cooling system and cooling oil in tunnel, pages 29, 30

(c) Seawater cooling system, page 31

(d) Forward mounted engine, chassis, flexible stuffing box and tunnel, pages 34, 3536

(e) Tunnel, watertight bulkhead and rudder platform, pages 23, 24, 25, 26

NOTE: Unless otherwise stated, **all** dimensions are in mm. It metric sizes are not available, use nearest equivalent in inches.

Abbriviations : L = Length, D = Diameter, ID = Inner diameter, T = Thickness

	ITEM	QTY.	PAGE NOS.
MILD STEEL	Plate,T=6,400x 600	1	14,33
	Plate,T=8,75x130	1	8
	Flatiron, 6 x 40, L = 1200— See alternative	1	16
	Flatiron; 6 x 50, L = 2000	1	14
	Flatiron, 8 x 50, L = 600	1	15,27
	Flatiron, 15 x 100. L = 600	1	8,9
	Flat iron, 20 x 40, L = 1000, Top mounted L = 1200	1	17
	Rod,D=32,L=145	1	15
	Rod,D=45,L=105	1	15
	Rod,D=60,L=45	1	19
	Tube OD = 60.3, T = 6.3, ID 47.7, L = 1570	1	8
	TubeOD=13.5,ID=7.7,L=20	1	9
	Channeliron6x40x75,L=1000	1	27
	PlateT=4,65x170	1	20
	Strip2x25,L=320	1	21,22
STAINLESS STEEL 316	Strip 3 x 40, L =1200 — See alternative	1	16
	Rod D = 6, L = 1200 — See alternative	1	16
	RodD=10,L=330	1	20,21
	RodD=16,L=260	1	20
	Rod D = 35, L = 45 — Alternative tube ID = 24	1	10
	Propeller Shaft D = 25.4 or D + 28, L = 1470	1	10
	Tube 1 1/2" ASTM SCH 5S, OD =48.3, ID = 45, L = 70	1	10
	Tube 1/4" ASTM SCH 10S, OD = 13.7, ID 10.4, L = 60	1	9
BRONZE	Rod D = 65, L = 80 — Alternative tube ID = 24	1	9
	Rod D = 48, L 30 — Alternative tube ID = 24	1	10
	Propeller	1	5, 6

ITEM	QTY.	PAGE NOS.
Hex Bolt M6x 75	2	26
Hex Bolt M 10 x 75	8	27
Hex BoltM 10x 100	6	25,26
Hex Bolt M 12 x 50	4	18
Hex Bolt M 12 x 120 – Alternative 12 x 200 for top mounted	2	17, 33
HexNutM6	2	
Hex Nut M 10	14	
Hex Nut M 12	10	
Washer M 6	2	
Washer M 10	14	
StudM10x50	2	12, 13
Hex Bolt M IOx 30	5	19,27
Hex Bolt M 10 x 60	2	20
Hex Bolt M 16x 60	2	19
Hex Nut M 10	14	
Hex Nut M 16	8	10, 19
Spherical roller bearing SKF 22205 CC or equivalent		9, 12
Oil Seal OD = 47, ID = 32, B = 7	3	8,9
Key, Stainless steel 316, 6 x 6 x 35		10, 12
Key, Stainless steel 316, 6 x 6 x 40		10, 12
Washer, Stainless steel 316, T 3, OD 32, ID = 17		12, 13
Quick coupling, hydraulic 1/4'		12,38
Grease gun with flexible hose and quick coupling		38
Grease cup No. 4, 1/4' BSP		15
Grease 2kg	1	12,38
V-belt pulley for engine, cast iron	1	5,11
V-belt pulley foL propeller shaft, cast iron	1	5, 11
V-belts	1 set	5, 18
Bellows, neoprene		28
Hoseclip, Stainless steel, D 190		28
Rod, Copper5x t60		21
Timber, heavy, sawn, 65 x 1400 (for 2		21
Timber, heavy, sawn, 40 x 200 x 1400 (for 2)		21
Timber, heavy, sawn, 32 x 200 x 450 (for 2)		21