

BOBP/REP/119

TRAINING MANUAL **on** **the construction of** **FRP beach landing boats**



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The first FRP IND-30 design beach landing boat under construction during the training course at Ayyappa Boat Builders in Kakinada, Andhra Pradesh, India, under the FAO project "Safety at sea for small-scale fisheries in developing countries" (GCP/GLO/200/MUL), funded by the Swedish International Development Cooperation Agency (Sida), the International Maritime Organization (IMO) and the Swedish Maritime Administration (SMA).

Preparation of this document

This manual has been developed from information collected during the FAO project “Safety at sea for small-scale fisheries in developing countries” (GCP/GLO/200/MUL), funded by the Swedish International Development Cooperation Agency (Sida), the International Maritime Organization (IMO) and the Swedish Maritime Administration (SMA).

The manual was partly developed from the FAO Fisheries and Aquaculture Technical Paper 507: *Fishing boat construction: 4. Building an undecked fibreglass reinforced plastic boat*, by Thomas Anmarkrud. It draws heavily from the experience gained during a training course conducted in Kakinada, India for FRP boatbuilders and from current practices in India and Sri Lanka in building beach landing fishing boats.

Two boats of the FAO IND-30 design were built during the training course. Øyvind Gulbrandsen, FAO Consultant Naval Architect, was responsible for the final IND-30 design.

Abstract

This manual on construction of fibreglass reinforced plastic (FRP) beach landing boats has been prepared primarily to assist small boatyards in Tamil Nadu, India that build beach landing fishing boats, but may also be used as a guide for making good quality FRP boats as well as for FRP training in the region.

The manual should be seen as a supplement to FRP boatbuilding manuals available in the Food and Agriculture Organization of the United Nations (FAO) and other international publications. It assumes prior knowledge of FRP hand lay-up processes and terms generally used in the industry.

Recommendations on working conditions, materials and quality control are based on tropical ambient conditions and the type of boatyards likely to build such boats.

Part I of the manual contains general information on FRP materials, handling and working conditions. Part II describes the building of a hull plug and a mould and Part III describes the building of a beach landing boat. Finally, Part IV contains information on manufacturing defects and repairs.

The manual has four annexes that provide further information related to FRP boatbuilding. Annexes 1 and 2 contain a bibliography and a glossary, respectively. All drawings for the FAO IND-30 boat design are provided in Annex 3. Finally, Annex 4 contains the draft recommended construction standards for FRP fishing vessels. These standards are a part of the FAO/ILO/IMO *Safety recommendations for decked fishing vessels of less than 12 m in length and undecked fishing vessels*, which are currently under development.

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Acronyms

BLC	Beach landing craft
BOBP-IGO	Bay of Bengal Programme Inter-Governmental Organisation
CIFNET	Central Institute of Fisheries Nautical and Engineering Training
CSM	Chopped strand mat
FAO	Food and Agriculture Organization of the United Nations
FRP	Fibreglass reinforced plastic
ILO	International Labour Organization
IMO	International Maritime Organization
MEKP	Methyl ethyl ketone peroxide
MEK	Methyl ethyl ketone
PVA	Polyvinyl alcohol
PVC	Polyvinyl chloride
Sida	Swedish International Development Cooperation Agency
WR	Woven roving

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Several of the photos and illustrations used in this manual have been provided by Thomas Anmarkrud during the preparation of FAO Fisheries and Aquaculture Technical Paper 507: *Fishing boat construction: 4. Building an undecked fiberglass reinforced plastic boat*. Photos were also provided by other authors, including V. Babu Rao, during the training course in Kakinada.



Introduction

Fibreglass reinforced plastic (FRP) as a material for fishing boatbuilding was introduced in South Asia in the 1960s. It grew in popularity over the following two decades for two reasons: the escalating cost of good boatbuilding timber and the relatively lesser skills required to build small FRP boats.

FRP is ideally suited for mass production and its popularity for mass-built recreational craft in the developed world is well known. In both India and Sri Lanka, an opportunity was recognized by a few entrepreneurs for manufacturing FRP boats on a large scale. Boatyards using the latest developments and conforming to international standards were set up nearly 30 years ago to cater to the increasing demand for larger harbour-based fishing boats as well as to meet an export demand for recreational craft. In Sri Lanka, nearly all boats built today are made of FRP.

Small-scale fisheries also suffered a steady decline of catch per effort and traditional boats could no longer provide adequate earnings because of their limited range. FAO, through its Bay of Bengal Programme in the late 1980s, developed a prototype fishing boat suitable for beach-based operations and capable of an extended range of operation. This was the forerunner of the beach landing craft (BLC) in India. The growing scarcity of suitable timber for traditional beach boats saw the rapid increase of FRP BLC of many sizes and types along the east coast of India in the past two decades.

The flipside to this rapid development was the growing number of FRP boatyards where occupational safety and health conditions as well as quality control was unknown. In addition, fishers were unaware of the need for strict quality.

The tsunami in December 2004 exacerbated the problem. The huge amount of humanitarian aid, the rush to provide needy fishers with replacement boats and the mushrooming of opportunistic boatyards resulted in FRP fishing boats of even poorer quality. Thousands of boats built after the tsunami were unserviceable after just a couple of years.

Through the FAO project “Safety at sea for small-scale fisheries in developing countries” (GCP/GLO/200/MUL), funded by the Swedish International Development Cooperation Agency (Sida), the International Maritime Organization (IMO) and the Swedish Maritime Administration (SMA), it was identified that the first corrective step required was to establish safety guidelines for construction and to promote good FRP boatbuilding practices. Development of a training manual addressing the key area of quality control and boat structure was seen as a priority.

This manual draws heavily from the experience gained during a training programme conducted in Kakinada, India for FRP boatbuilders, where two FRP BLC of FAO design IND-30 were built, and from current practices in India and Sri Lanka in building beach landing fishing boats.

Recommendations on working conditions, materials and quality control are based on tropical ambient conditions and the type of boatyards likely to build such boats. Many of the hand lay-up processes described are equally applicable to other FRP boats built in the region.

Using the manual

This FRP manual is prepared for Tamil Nadu, India, but could also be used as a guide for making good quality FRP boats in the Bay of Bengal region and other regions where appropriate. Many of the applications are general and will apply to most kinds of FRP boats. It should be a supplement to FRP boat building manuals and books already available in FAO and other international publications.

This FRP manual assumes that the boatbuilder has some FRP experience and will use good practices.

Parts I and II contain general information on FRP boatbuilding and on mould and plug building, respectively. Part III describes the construction of an FRP BLC, used for fishing. Part IV focuses on FRP maintenance and repair work. Finally, Annexes 1-4 provide a bibliography, glossary, drawings for the FAO IND-30 boat design, and draft recommended construction standards for FRP fishing boats, respectively.

