

TREATED CATAMARANS: A BOON TO FISHERMEN

Introduction:

Catamarans (Kattumarams), those graceful wooden crafts that dot the Indian seas, have served the traditional fishermen so well for centuries. A vast fleet of these lografts, numbering about 1, 00,000 units, sustain the bulk of over 2 million people dependent on the small sector (traditional) fisheries of the country. Although a very simple craft, the catamaran is highly versatile, with a design that is generally considered 'next to perfect', considering the environmental, technical and economic constraints within which it has to operate. The craft is especially suited for operations on the East Coast, characterized by vicious surfs and plunging breakers that can swamp other types of boats. Over 60% of the total marine landings on the East Coast are netted by these craft even during the present times, in spite of the introduction of mechanised fishing craft. The remarkable catamaran has endured centuries of usage and is a living symbol of the native genius of the Indian fishermen. Like 'bullock carts' on land, many experts feel, substitutes are hard to find for catamarans.

Virtues:

Some virtues that make catamarans a CHAMPION FISHING CRAFT are:

- They can be landed any where
- Their light weight facilitates easy handling and assemblages
- They are virtually unsinkable and ideally suited for cutting through the surf break-waters
- Once across the surf, they are quite fast
- Their design incorporates the built-in features of stability, buoyancy and excellent lines for speed
- Their fabrication can be done by fishermen themselves with simple artisanal tools
- They require no special energy sources for propulsion

Types of Catamarans:

Catamarans are fashioned thick sections or shaped logs of wood, lashed together by ropes. The Tamil word "Kattumaram" literally means tied wood. Basically there are two types of catamarans in operation: the 'log' type and the 'boat' type. The former is widely used in the coromandel coast of Tamil Nadu and South Andhra, and the latter in North Andhra and Orissa coasts. In the palk bay region of Tamil Nadu, a modified 'boat-catamaran' is used. The size of catamarans ranges from 3m to 10m, and is denoted in Tamilnadu by local names like 'chinnamaram' (for smaller catamarans of the size of 3m) 'periamaram' (for large catamarans of 9 m and above) etc.

Different kinds of fishing gear (Gill nets, boat-seine, long-lines, trammel net, drag net, lift net etc.,) are operated from catamarans to capture a variety of fish like sardines, mullets, anchovies, mackerel, ribbon fish, croackers, sharks, rays, pomfret as well as penaeid, non-

penaeid shrimps etc. The catamarans are often known by the fish they net or gear they employ. Thus, the term 'Kolamaram' is used for catamarans employed for flying fish fishery; 'thundilmaram' in for those involved in drift line fishery; 'Irukkumaram' in drift net fishery etc.

The catamarans are made entirely of wood. The species used in catamaran fabrication should be ideally light, buoyant and durable and should have good resistance to cracking when beached and swelling when exposed to sea water. They should also have good retention of shape, and be easily available and reasonably priced. Although no species may fulfil all these requirements, a few are traditionally favoured.



Catamarans in service

The Problem:

The wood species found useful in catamaran fabrication fall under the category of 'broad leaved soft woods' which are all naturally non-durable. The timber for catamarans is used in an unsheathed and unprotected form. It is, therefore subjected to rigorous conditions of weathering (exposure to sun, hot beach sands, desiccating winds), mechanical wear and tear and rapid biodeterioration both on land and in the sea, as the catamarans are used for about 8 hours a day in the sea and are kept on the beaches the rest of the time.

The alternate wetting and drying causes surface splits, cracks and dimensional changes. This condition is also favourable for infestation of marine fungi, which renders the timber very soft, increases water absorption and promotes borer attack. Although it was thought earlier that the catamarans are free from marine borers, it is now known that they are attacked by these destructive organisms (marine borers are specialised organisms which tunnel the wood, much like the termites on the land and destroy it}. Due to a combination of the above factors, frequent repairs or replacements of logs are to be done. On an average, the catamarans have a short service life of 5-7 years.

ii) Non-availability of Catamaran grade timber:

An enormous quantity of timber (approximately 1, 50,000 to 2, 50,000 m³ for 1, 00,000 units at ~ 1.5 - 2.5 m³/catamaran) exists in the catamaran form in the country.

Albizia chinensis (Albissi or Siris) is the most favoured species especially for boat type catamarans in Andhra Pradesh. This timber is also preferred by Tamilnadu fishermen for log-type catamarans, followed by *Paraserianthes falcataria* (Earlier, species like *Melia dubia* and *Albizia moluccana* imported from Sri Lanka were used, but their supply ceased many

years ago). Timber of *A.chinensis* has become increasingly scarce over the years in Eastern Ghats and other places. A limited quantity of *P. falcataria* grown in the coffee and tea plantations (primarily in Kerala) is extracted and brought to Tamilnadu to meet the demands of catamaran fishermen. This practice may not continue for too long. Other species like *Ailanthus excelsa*, *Gyrocarpus jacquini* etc., are used to a very limited extent. The predominantly dry deciduous forests in the States of Tamilnadu and Andhra Pradesh (where catamarans are extensively used) do not support luxuriant growths of Kattumaram quality timber species.

iii) Phenomenal hikes in prices:

An annual requirement of timber for catamaran is estimated to be around 15,000 to 25000 m³ even at a conservative 10% replacement every year. The demand is expected to grow every year with increasing fishermen population. The shortages in supply have resulted in phenomenal hikes in price in recent years. Compounding the problem is the fact that the traditional fishermen are a highly conservative community steeped in age old practices in usage. A boat type catamaran of the most preferred species, *chinensis* and *falcataria* is currently priced at ~ Rs.32, 000/ and Rs. 25,000/ respectively, as against Rs.8, 000/- to Rs.10, 000/- in 1980. Since the very livelihood of fishermen depends on their craft material, they are not able to procure the timber of their choice at prices they can afford, and a "crisis situation" is currently prevailing warranting immediate remedial measures.

Treated Catamarans for the benefit of poor traditional fishermen:

Under these circumstances, there is an obvious need for rational utilization of the existing resources by adopting scientific techniques in management and usage, especially when it is realised that the current practices are generally unscientific, based mostly on age-old traditions. Of prime importance in this context, would be an enhancement of service life that would result in an investment reduction and also aid in checking the drain of the already meagre resources. It has now been well established that by preservative treatment, durability of timbers could be enhanced by as many as 5-8 times the normal life on land and at least 4 times under the more rigorous marine conditions. The wood preservation technology is readily available in the country, well tested, does not involve high costs and more important, does not call for any basic changes in the designs. By imparting pressure treatment, not only can an improvement of service life be achieved, but also, several non-durable secondary species, hitherto not in usage, could be profitably utilized.

This was demonstrated in longterm exposure trials of test panels carried out with a number of Indian timbers treated with preservatives at various Indian harbours by the Marine Centres of the Institute of Wood Science & Technology. Long and painstaking field trials under actual service conditions were also carried out with CCA (Copper Chrome-Arsenic) treated catamarans on the East Coast. In these trials, *chinensis* (reyya) Catamarans launched in 1968 at Visakhapatnam, Andhra Pradesh and treated with CCA preservative, here given a continuous service life of 24 years (5 times the normal life). In on-going tests initiated in 1986 with CCA treated catamarans made of a much cheaper non-conventional timber species whose availability is much better, i.e., *Bombax ceiba* is highly non-durable in untreated condition (6 months to 1 year in marine exposure trials).

Similar tests have also been undertaken by the Institute at Chennai (madras) in 1990, with log-type *P. falcataria* catamarans. The condition of these catamarans is also very sound.

Under a World Bank sponsored project a total of 100 catamarans made of *Bombax ceiba* were launched at Andhra Pradesh (Visakhapatnam, Krishnapatnam) and Tamilnadu (Chennai). Recently, under a project funded by Ministry of Environment and Forests, Govt. of India three new species were tried for catamaran fabrication viz. *Albizia lebbek*, *Maesopsis eminii* and *Tetrameles nudiflora*. A total of 40 catamarans made of these three species were launched in Tamilnadu in 2009-10 and are performing well.

The above results indicate the potential and need for introduction of treated catamarans for the benefit of poor, traditional fishermen.

The Technique and the Economics

Treatment of catamaran logs is best carried out by forcing wood preservatives (chemical formulations toxic to decay causing organisms) into the timber, under vacuum pressure. A number of preservatives are commercially available, but the most preferred one is CCA (Copper-Chrome-Arsenic), a water soluble fixed-type composition well suited to several Indian localities. Treatment of timber is to be carried out in "pressure treatment plants" which are of two types, i.e., (1) Fixed and (2) Mobile plants (mounted on a suitable vehicle). Logs with smaller girths (such as the raft type catamarans used in Tamil Nadu and South Andhra Coasts) can be easily treated in mobile treatment plants; while for boat-type catamarans employing large girth plants are required.

Since the timber species used in catamaran fabrication are non-durable and also as the logs contain considerable sapwood, they all need proper treatment. Fortunately, most of the species are easily treatable and for some, even through and through penetration could be obtained, a positive advantage.

At current prices, *Albizia chinensis* boat-type catamarans used in Andhra coast may cost about Rs.32, 000/- including fabrication. The log-type *P. falcataria* catamarans being used in Tamil Nadu coast may cost around Rs.25, 000/-. In untreated condition, the service life is about 5 years. A 4-fold increase in the same could be reasonably expected, after pressure treatment. The cost of treatment works out to be between Rs.3, 000/- per catamaran. The economic benefits in the form of reduction in investment costs are obvious.

Through preservative treatment, a number of hitherto unutilised or underutilised secondary species could also be upgraded, resulting in a much needed widening of choice of species. Thus, even a highly perishable timber like *Bombax ceiba* could be profitably used, and the benefits would be even more significant as treated catamarans of these species at current prices may cost around Rs. t 5,000/-. Similarly species like *Albizia lebbek*, *Maesopsis eminii* and *Tetrameles nudiflora* are also promising species for catamarans. These catamarans in untreated condition may not last for even 2 years. A service life of 16 years has been demonstrated for treated *B. ceiba* catamarans, while for other three species trials are going on.



LAUNCHING OF TREATED CATMARANS

By initiating these steps of conservation through preservative treatment, bio-diversity of valuable marine timbers, which are fast dwindling, could be preserved. This is encouraging news. Even though all the maladies affecting catamaran fishery cannot be taken care of, the problem concerning the craft material could be greatly alleviated through utilisation of treated catamarans. In spite of all the odds, the champion craft can still grace our seas and bring in those bountiful catches.

ECONOMICS AT A GLANCE

1.	Cost of catamaran of <i>Albizia chinensis</i>	Rs. 32000.00
2.	Cost of catamaran of <i>Paraserianthes falcataria</i>	Rs. 25000.00
3.	Cost of catamaran of <i>Bombax ceiba</i>	Rs. 12000.00
4.	Cost of treatment per catamaran	Rs. 3000/- to Rs. 4000/-
5.	Approximate number of catamarans in use	100000
6.	Quantity of timber used (@ 1.5 m 2.5 m ³) for all catamarans	150000 to 250000m ³
7.	Quantity of timbers required for replacement and fresh constructions (approximately 10% of 6) per year	15000 to 25000m ³
8.	Total cost of catamarans (about 70% of A. <i>Chinensis</i> @ Rs. 30000/- per craft and 30% of other timber @ Rs. 20000/- per craft)	Rs. 2700 million
9.	Cost of annual replacement (@ 10 % of 8)	Rs. 270 million
10.	Life of untreated catamarans	4 to 7 years
11.	Demonstrated life of CCA-treated catamarans	Over 24 years
12.	Economic benefit effected by adopting the IWST technology	Rs. 270 million per years (for fresh timber) + maintenance expenses
13.	Ecological benefit	Prevention of continuous drain of timber resources + forest conservation

(A 10% initial additional investment has assured maintenance free 4 to 5 fold service life)

Quantity of timber used for marine fishing craft is enormous, volume of timber damaged due to biodeterioration is catastrophic, the loss to the already economically underprivileged fishermen is crippling, all because of the inefficacy and inadequacy of the traditional methods (application of fish oil, vegetable oils, gums, resins and lime etc.) followed by fishermen to protect their craft. As against this, the tested technology perfected by IWST, is a boon for ameliorating the living conditions of coastal fishing population of India. Advantages of the technology are : (1) enhancement of service life of catamarans leading to investment reduction and operational (maintenance) costs; (2) widening choice of timber by utilizing hitherto unutilized or under-utilized timber species;(3) most importantly, conservation of valuable timber resources by reducing its demand for replacements, thereby allowing forests to grow leading to environmental protection.

Practical utility: enhancement of choice of timber, Tree (biodiversity) conservation, economic catamarans

End users: Fishing community, Fisheries departments

Transfer of technology

The technology is already in the end users domain and fishermen of Tamilnadu and AndhraPradesh are aware of that but in small pockets only. It is high time that we try to penetrate more areas. The technology can be transferred to any industry or individual. The institute is having a policy to transfer the technology to different stakeholders.

For detailed terms and conditions and negotiation of cost of technology, the interested parties may contact Marketing Cell of IWST. Email Id: groupco_iwst@icfre.org Phone No. 080-23340115. Office Hours- 9.00 A.M. to 5.30 P.M.