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Wood Preservation for Durable Fishing Boats: Extending Timber Life Against Marine Threats

*Chamundeshwari Bitli, Kishore M , Kranthi Kumar D, Mahdavi K, Neha P[1], Prasanna Laxmi U, Sirisha H, Sravani K, Usha Rani A and Vaijanth A
College of Fishery Science, Narasapuram, Andhra Pradesh Fisheries University, India
*Corresponding Author's email: chamubitli@gmail.com

Wood is widely used in fishing boat construction, yet most secondary timber species decay quickly when attacked by fungi, termites, beetles and marine borers. Chemical preservation protects timber, increases its service life and makes less-durable species economically usable. This popular article explains the need for preservation, ideal properties of preservatives, major types of preservatives, selection criteria and practical treatment methods suitable for boat building and marine structures. Proper treatment reduces maintenance costs and supports sustainable use of available timber resources.

Keywords: Wood preservation, fishing boats, marine borers, timber treatment, chemical preservatives, fungi, termites, boat building

Introduction

Fishing boats, jetties and harbour structures remain continuously exposed to moisture, seawater and biological attack. Naturally durable woods such as teak and sal offer good resistance, but their supply is limited and expensive. As a result, secondary timber species are now commonly used in boat building. These species, however, are highly susceptible to fungal decay, termite attack, wood-boring beetles and marine organisms if left untreated. Wood preservation is the process of impregnating timber with suitable chemical preservatives before use. The treatment greatly improves durability and strength, allowing even less-durable species to perform well under severe marine conditions. This article presents the objectives, requirements, types of preservatives and practical methods of wood preservation in a simple format useful for students, farmers, boat builders and fisheries professionals.

Why Preservation Is Essential for Fishing Boats

Timber loses strength when fungi, insects or marine borers invade it. In seawater, shipworms and other marine borers can destroy hull planks and frames within a short time. Untreated timber also suffers from fungal decay in humid conditions and termite attack in coastal storage yards. Properly preserved timber resists these agents, retains structural integrity for many years and reduces frequent replacement costs. Preservation also enables the safe and economical use of locally available secondary species that would otherwise be unsuitable for marine duty. In fisheries applications, longer-lasting boats and jetties mean lower operating costs and better resource utilisation.

Figure 1. Traditional wooden fishing boat operating in a marine environment where continuous exposure to seawater, sunlight and moisture accelerates timber deterioration


(A) fungal decay


(B) termite attack


(C) marine borers (shipworms)


(D) wood-boring beetles.

Figure 2. Major biological agents responsible for timber deterioration

Ideal Characteristics of a Wood Preservative

An effective preservative must be highly toxic to fungi, termites, beetles, marine borers and fouling organisms, yet remain reasonably safe for handlers. It should penetrate deeply into the timber and fix firmly so that leaching is minimal. The chemical should not corrode metal fasteners such as nails and bolts, nor reduce the mechanical strength of the wood. Additional desirable properties include low cost, easy availability, simple application, low fire hazard and, most importantly for fishing boats, the ability not to contaminate water or taint fish products.

Main Types of Wood Preservatives

- **Oil-Type Preservatives**

Coal-tar creosote and **creosote–petroleum mixtures** are among the oldest and most effective preservatives for outdoor and marine use. They provide excellent protection against all major wood-destroying organisms, penetrate well and are relatively inexpensive.

Advantages: Strong biological protection, good penetration, non-corrosive and suitable for heavy-duty outdoor structures. Limitations: Strong odour, increased timber weight, difficulty in painting and possible contamination of fish products.

- **Organic Solvent-Type Preservatives**

These are prepared by dissolving toxic chemicals such as copper naphthenate or (historically) tributyltin compounds in petroleum solvents. The concentration of active ingredients can be controlled precisely.

Advantages: Treated timber can be painted, polished or glued after the solvent evaporates; the appearance of wood is largely retained.

Limitations: The higher cost and flammability of many solvents require careful handling.

- **Water-Borne Preservatives**

Inorganic salts such as Chromated Copper Arsenate (CCA), Acid Copper Chromate (ACC) and Chromated Zinc Chloride (CZC) are dissolved in water. Chromium acts as a fixing agent that locks the toxic components inside the wood and reduces leaching. After treatment, timber is dried for several weeks to complete fixation.

Advantages: Inexpensive, odourless, lightweight and paint-ready.

Limitations: Require controlled application temperatures, additional drying time and limited long-term resistance to weathering unless surface coatings are applied.


A. Coal tar


B. Copper naphthenate


C. CCA

Figure 3. Wood treated with…

Selecting the Right Preservative and Treatment Method

For fishing boats, the main requirement is resistance to continuous seawater exposure and marine borers. Oil-type or modern copper-based systems are preferred when maximum

protection is needed, and appearance or weight are secondary considerations. Water-borne formulations are suitable for interior frames where cleanliness and low odour are important. Sapwood of almost every species absorbs preservatives readily and must always be treated. Dense heartwood of naturally durable species may need little treatment under mild conditions, but continuous marine exposure demands full preservative treatment regardless of species. Timber species also differ in treatability; some allow almost complete penetration while others resist chemical uptake.

Practical Methods of Application

1. Surface Application

Brushing, spraying or brief dipping coats only the outer layers. The timber should be thoroughly debarked and at least two coats applied after the first has dried. This simple method is useful for repairs, freshly cut surfaces and construction sites, but offers only modest protection.

2. Soaking and Hot-and-Cold Bath

Complete immersion allows deeper absorption. In the hot-and-cold process, timber is heated in the preservative to about 90 °C; trapped air expands and escapes. On cooling, the remaining air contracts and draws the solution deeper into the wood. This method is suitable for medium-sized boat components.

Figure 4. Hot-and-cold bath method of timber preservation. Heating expels air from wood cells, while cooling draws preservative deep into the timber.

3. Boucherie Process

Freshly felled green poles are connected to an elevated reservoir of preservative. Hydrostatic pressure forces the solution through the sapwood, gradually replacing the natural sap until the liquid emerging from the opposite end has the same concentration as the original solution. Ideal for long spars and poles.

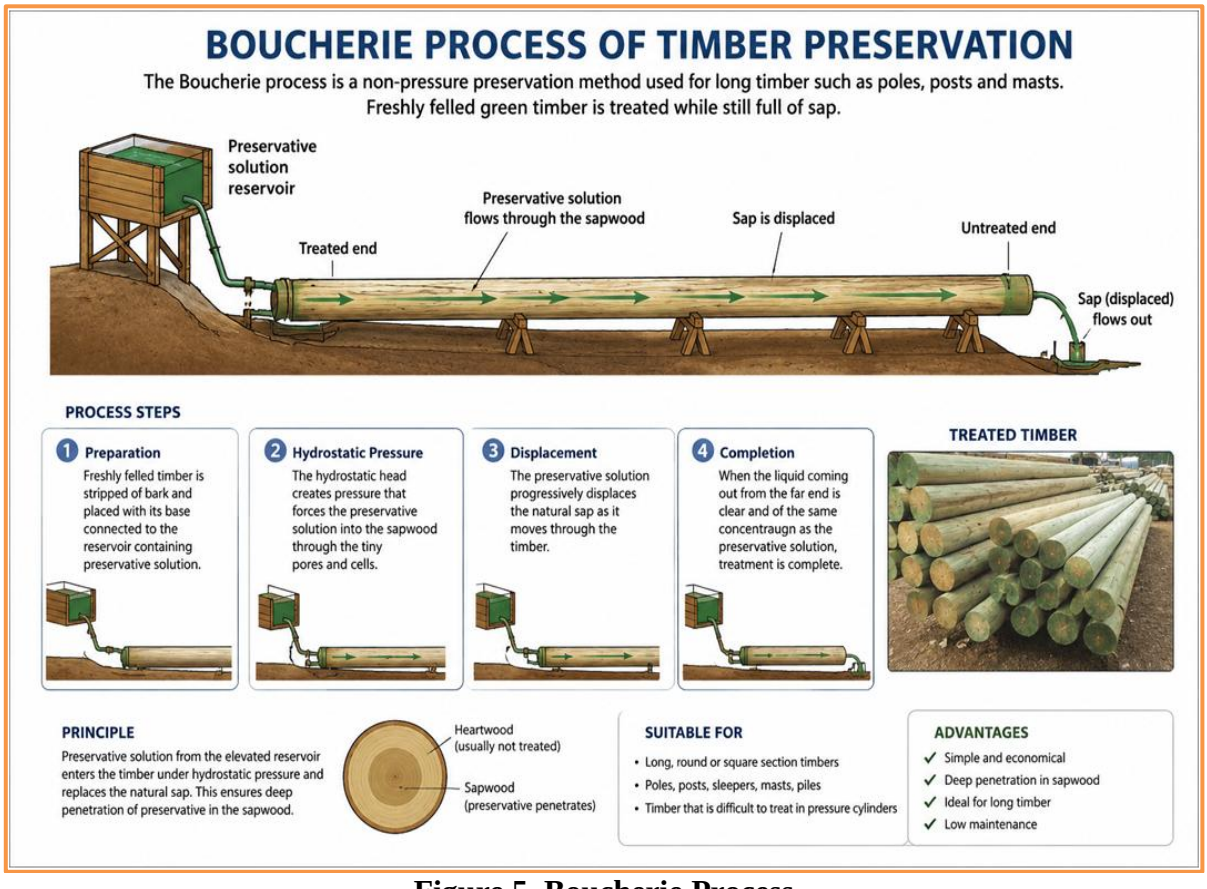

Figure 5. Boucherie Process

4. Pressure Treatment

This is the most reliable industrial method. Timber is placed inside a sealed cylinder. Vacuum first removes air, then high pressure forces the preservative deep into the cells.

4a). Full-cell process maximises retention and is preferred for severe marine exposure.

4b) Empty-cell process uses less chemical while still providing adequate protection for many applications.

5. Diffusion Process

Preservative paste or concentrated solution is applied, and the timber is stacked under cover. Chemicals slowly migrate through the moist wood. Useful when pressure facilities are not available.

Applications in Fisheries

Preserved timber is extensively used for fishing-boat hulls, decks, frames, keels, jetties, fish-landing platforms, harbour piles and coastal storage structures. Correct choice of preservative and treatment intensity transforms secondary species into durable marine material, significantly extends service life and lowers long-term maintenance costs.

oil-borne preservatives	surface-applied preservatives	pressure-treated timber

Figure 6. Common preservative systems used in timber protection: oil-borne preservatives, surface-applied preservatives and pressure-treated timber

Conclusion

Wood preservation is an essential practice that enhances the durability, strength and service life of timber used in fishing boats and marine structures. By protecting wood against fungi, termites, beetles and marine borers, preservative treatment allows even less-durable secondary species to be used safely and economically. Selection of the right preservative and treatment method must match timber species, environmental exposure and intended use. Modern preservation techniques reduce replacement costs, support sustainable forest utilisation and ensure that timber structures remain strong and serviceable for decades. Boat builders, fisheries professionals and coastal communities therefore benefit greatly from adopting proper wood-preservation practices.

References

1. Forest Products Laboratory. (2021). Wood Handbook: Wood as an Engineering Material. U.S. Department of Agriculture, Forest Service.
2. Bureau of Indian Standards. IS 401: Code of Practice for Preservation of Timber.
3. FAO. (1986). Wood Preservation Manual. Food and Agriculture Organisation of the United Nations.
4. Desch, H. E. & Dinwoodie, J. M. (1996). Timber: Structure, Properties, Conversion and Use. Macmillan Press.