



# Treated Wood Aquatic Case History

## HOMEOWNER CHOOSES TREATED WOOD OVER STEEL OR CONCRETE — SAVES \$58,000 ON HIS PERSONAL USE DOCK!

Denis Body, a retired mechanical engineer, enjoys his home on Sequim Bay on the northern end of Washington's Olympic Peninsula. Constructing a bulk head and personal use dock will complement the home's water front location. After significant study, the home owner has chosen treated wood as the appropriate balance between serviceability, environmental compatibility and economics.

In the summer of 1996 the homeowner, an engineer, submitted his plans for a 100-foot bulkhead, 155 foot pier and 30 x 15-foot dock to the county building department. He was told that because of a "Citizen Group's" recommendation for changes to the local Watershed Management Plan he would not be allowed to use creosote treated wood for the piling and bulkhead elements of the project. Using his engineering skills, Mr. Body did a complete cost analysis of the project under various product alternatives.



*Treated wood is an important product for the construction of marinas and personal use docks.*

The analysis demonstrated that the county requirement would make the project inordinately expensive. Questioning the need for the prohibition on treated wood, Body contacted Dr. Kenneth Brooks at Aquatic Environmental Sciences and WWPI to inquire about the need for the proposed restrictions.

### REGULATORY AND ENVIRONMENTAL IMPACTS

Dr. Brooks conducted a site analysis collecting water flow information and sediment samples. Utilizing models developed for WWPI, Dr. Brooks prepared a risk assessment for the project. The analysis showed that using treated wood for the project, even assuming the worst possible conditions, would not even approach the limits in the State's sediment and water

quality standards. Following an unsuccessful meeting with the Planning Department and the State Fish & Wildlife local representative, the decision was appealed to the County Commissioners. In his appeal, Mr. Body concluded, "All of the evidence indicates that the minute amount of preservative lost from preserved wood will have no affect on the biological integrity of our beach. If it did, we would not use pressure treated wood."

WWPI joined in support of the appeal, providing the scientific literature and putting the County Commissioners on notice that, lacking a scientifically based determination by the county, the Institute viewed the policy as "an unwarranted arbitrary and capricious action and [WWPI] will respond accordingly."

In September, 1996, the Commissioners considered the issue and directed the Planning Department to allow the use of treated wood. The Commissioners concluded:

- The County had no prohibition against the use of treated wood.
- Washington State has no prohibition against the use of treated wood in marine waters.
- The "Watershed Plan" is not policy and cannot be used to define county policy.
- If the State has a problem with treated wood, then the State should be responsible to allow or deny the use of treated wood through their Hydraulic Permit Approval (HPA) rules and procedures.

The State has examined the issue of treated wood in detail and developed a Memorandum of Agreement (MOA) between the Departments of Ecology and Fish & Wildlife. Neither the MOA nor the state hydraulic codes prohibit the use of treated wood. The MOA, while promoting alternatives, allows proponents to use treated wood unless there are documented concerns limiting use of the material. The State also requires that treated wood used in the water be produced under the Best Management Practices for Treated Wood used in Aquatic Environments (BMPs).

## ECONOMICS OF TREATED WOOD

### Materials Selection

Given the environmental appropriateness of treated wood at this site, the key to selection of materials was an economic and structural feasibility issue. In developing his plans, Mr. Body conducted an extensive review and analysis of available designs and materials. Several possible materials were evaluated:

- Treated Wood - Creosote, ACZA or CCA
- Green Heart - "naturally resistant" African tropical wood piling
- Plastic Coated Steel
- Concrete - (16 1/2" diameter octagonal, prestressed)
- Steel

An expanded structural analysis was conducted for treated wood and concrete designs after the other products were eliminated from consideration.

**Materials Costs** — Cost of all the materials was reviewed and compared to the costs of treated wood. The alternative products were found to be significantly more expensive when compared to treated wood: Green Heart - 150%; Plastic Coated Steel - 350%; Steel - 200-300%; Concrete- 100-200%.

**Installation Costs** — In evaluating installation costs, Mr. Body talked to various installers regarding equipment requirements, trimming issues and labor costs using standard union wage rates. Compared to wood, the alternative products are significantly more expensive to install since they require larger handling equipment as they do not float; larger pile driving equipment is necessary; and specialized design and tools may be needed for cutting and trimming after installation.

Other factors were also considered in eliminating specific products. Green Heart was eliminated because its performance is not standardized; there are conflicting reports regarding its resistance to marine organisms; and concerns exist over its lack of uniformity in diameter and taper (it is lumpy). Reported failures and lack of documentation of performance also contributed to eliminating plastic coated steel for load bearing piers. In addition, the manufacturers were unaware of methods for attaching overhead structures to plastic coated steel. A significant concern with steel piling was the difficulty in preventing corrosion requiring frequent maintenance with either sacrificial anodes or protective chemical coatings.

### THE BOTTOM LINE

Detailed design and cost estimates were developed for two alternatives: Treated Wood and Concrete. While concrete shared many of the problems of the other alternatives, and trimming to proper heights and connecting to the other materials offered special challenges, it was considered the most appropriate next to wood. The results of the comparison showed that the treated wood design could be constructed at almost 50% less than the concrete alternative.

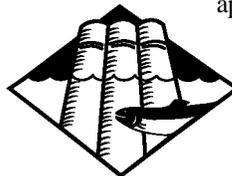


*BMP treated piling, left; Traditional treated piling, right*

### Total Project Cost Estimates

COMPONENT	CONCRETE DESIGN	TREATED WOOD DESIGN	SAVINGS
BULKHEAD	\$36,630	\$ 23,870	\$12,760
PIER/DOCK	\$86,600	\$ 41,000	\$45,600
TOTAL	\$123,230	\$ 64,870	\$58,360

**Conclusion:** This case points out that in many residential and small commercial projects in aquatic environments the use of appropriately manufactured (BMPs) and installed treated wood is environmentally sound and cost efficient. Once personal politics is overcome and science is used, the appropriateness of treated wood prevails.



If you would like more information on treated wood including the BMP manual; or if you encounter permitting problems you are encouraged to contact the Institute.

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