Environment and Economics

Treated Wood: the Win Win Solution
A Case Study by the Western Wood Preservers Institute

Abstract

*When Mark Silversten decided to expand his **Genoa's on the Bay**, an Olympia landmark restaurant, to provide for boater access and outside dining, he found himself immersed in a debate between sound economics and environmental regulation. Three years, numerous meetings, detailed research and much negotiation, later the debate was resolved to the satisfaction of all parties when an all treated wood design was used for the expansion, opening in the summer of 1998. In the end, it was good science and common sense that made the precedent setting project possible. This case study outlines the events that lead to the Win-Win situation.*

Dead in the Water

The popular dining spot was essentially unchanged since it was set on piling in 1963 after being barged from the site of the 1962 Worlds Fair in Seattle where it served as the "Home of the Living Light," an American Plywood Association exhibit. Sitting over the water at the point where two arms of Budd Inlet meet, the restaurant offers an exquisite view of the south Puget Sound. Finding that the existing piling foundation was sound, Silversten set out in 1990 to expand his eatery in harmony with the revitalization of the harbor area.

The first step in reaching his dream of an expanded facility was to secure the array of permits from federal, state and city agencies. He was told at the outset that he should use steel and concrete construction, as treated wood would not be allowed because of "environmental concerns." The proponent complied, getting his permits from the Corps of Engineers, State Fish and Wildlife and the city based on a steel and concrete design. When bids were solicited, the small businessman's dream became a nightmare. The proposed construction was so expensive that the project was, without a doubt, economically infeasible. "**The costs for the steel concrete design were so high that the project was dead in the water**" according to Mr. Silversten.

How About Wood?

In a last ditch effort to save the project, Mr. Silversten contacted the Western Wood Preservers Institute to explore the use of treated wood. Based on the available information the Institute indicated that the use of treated wood was possible, would most likely be more economical and in compliance with the state agency Memorandum of Agreement.[1]

Economics Sound

The project was redesigned using treated wood and cost data gathered. The data showed that construction with treated wood would cost significantly less than the steel/concrete alternative. **The savings on just the installed cost of the nineteen piling was over $30,000.**

[1] "--An Agreement Concerning the Use of Treated Wood in Aquatic Areas--" August, 1995. Memorandum of Agreement Between The State of Washington Department of Ecology and Department of Fish and Wildlife.

Request was made to the City of Olympia to modify the Shoreline Development Permit to allow the use of pressue treated wood. New lower approved retention leverls would be used and all materials would be treated using the Best management Practices[2] (BMPs) to minimize any environmental impacts and comply with the state's Memorandum of Agreement. In requesting the change Mr. Silversten's letter concluded, "**After extensive review of construction alternatives and exonomic restraints the utilization of treated piling would be the most viable alternative.**" A review before the city's Hearing Examiner was scheduled for early 1997.

Comparative Costs of Genoa's Piling Structure

Material	Ave. Installed Cost	Cost as a % steel
Steel/Concrete	$56,400	100%
Creosote TW	$24,900	44%
ACZA TW	$26,200	46%

Environmental Evaluation Key

The biggest challenge for the project was to evaluate the environmental appropriateness of treated wood. The project faced strong anti-treated wood perceptions held by the city planners and local Fish & Wildlife officials. The first step was a site specific evaluation and risk assessment to see if, indeed, treated wood was an appropriate material for the profect. The Institute contracted with Aquatic Enviromental Sciences (AES) of Port Townsend to conduct the site review and evaluate using either creosote or ACZA / ACA (Ammoniacal Copper Zinc Arsenate or Ammoniacal Cooper Arsenate), the most likely appropriate preservatives for this type of marine application. Using strict scientific protocol, information was gathered from the site ranging from water flow data to sediment samples. The sediment samples were evaluated by Analytical Resources Incorporated (ARI) for polynuclear aromatic hydrocarbons (PAH), Copper and total organic carbon to establish the baseline condition of the site. The baseline data, combined with the project design information, were evaluated using Risk Assessment Models[3] to predict the impact of the project. The results were compared to state and federal standards for sediment and water quality. The Washington State "Marine sediment quality standards" (WAC 173-204-320) are the most important as they establish the sediment criteria that will "have no adverse effects, including no acute or chronic adverse effects on biological resources...."[4] According to Dennis Hayward, WWPI Executive Director, *"At industry's insistence the Risk Assessment Models were developed, and updated, based upon the best available science and are conservative in terms of assuring protection of the environment."*

[2] *Best management Practices for the Use of Treated Wood in Aquatic Environments,* USA version, revised July 1996, Western Wood Preservers Institute, 36 pages.

[3] Computer Risk Assessment Models for evaluating environmental impacts of treated wood used in aquatic applications were developed for WWPI by Dr. Kenneth Brooks (AES) for all major preservatives including CCA, ACZA, ACQ, Creosote and Pentachlorophenol. The literature reviews and models are available to the public and regulatory agencies.

[4] WAC 173-204-100(3)

The final report was issued by AES in January, 1997 and concluded:

> ***"ACZA treated piling can be used in this project without exceeding either water, or sediment quality criteria established in Washington State for the protection of aquatic life. Conventionally treated creosote piling are marginally unacceptable at this site. Until new data describing the loss of PAH from piling produced using Best Management Practices is available, we cannot recommend creosote in this project."***[5]

The Risk Assessment for Creosote showed that, because of the slow currents and high levels of existing PAHs, at the site, the addition of new creosote piling would not be appropriate. The Genoa's site is located in an area of historically heavy industrial and community activities having the potential to contribute PAHs, including extensive creosote piers, storm water run off, sewage discharges, fueling activities and natural sources like forest fires. While total PAH was below the state standards, the Risk Assessment indicated that the use of creosote could result in three of the sixteen individual PAHs evaluated in the sediments to be close to or slightly above the state standards.

The Risk Assessment for ACZA showed that the product was totally appropriate. The report concluded that even on the first day of immersion of the treated wood, when preservative loss is the highest, as well as during and following construction:

> ***"Water column concentrations of copper, zinc and arsenic, associated with ACZA treated piling, predicted within 2 cm of the piling surface, are lower by a factor of at least 22 than either the Washington State or EPA water quality criteria. These concentrations decrease rapidly with time and reach background levels within two weeks."***[6]

> *"Sediment concentrations of copper associated with ACZA treated piling are lower than the Washington State Sediment Quality Criteria by a factor of 26 at a distance of 30 cm from the piling."*[7]

After consideration and scientific evaluation of all the factors, the Risk Assessment concluded,

> ***"From an environmental perspective, ACZA is the preferred treated wood product for this project."***

Judgement Day

The City of Olympia planning office and the local habitat manager from Fish and Wildlife continued to object to the proposal to use treated wood. The whole issue came to judgement on February 10, 1997 when interested parties submitted detailed written materials and debated the matter before the city's Hearing Examiner, Campbell Kintz. Following the somewhat contentious hearing, the Examiner spent nearly two months evaluating all the materials and issued his legal decision in early April, approving the use of treated wood.

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[5] Amended Environmental Risk Assessment for Genoa's project, Dr. Kenneth Brooks, Aquatic Environmental Sciences, January 29, 1997. 11 pages, page 6

[6] Ibid page 7

[7] Ibid

Significant Findings

- ☐ Regarding appropriate standards and the city's claim that lower standards should be used the examiner concluded: *"First, the Hearing Examiner, as well as the City, is bound by standards stated in WAC Chapter 173 and* ***to require the applicant to meet stricter standards would be arbitrary and capricious."***[8]

- ☐ Regarding the Risk Assessment models, *"Accepting that the model may not be completely accurate... the Examiner finds that the predicted copper levels are so far below permitted standards that there is more than a sufficient margin of error to find that the levels of copper likely to occur will be insignificant. "[To assure the model predictions].. is reasonably accurate, this decision includes a condition that requires applicant to monitor the amount of copper that is in fact released."*[9]

- ☐ Regarding the compliance with the Memorandum of Agreement provisions for consideration of avoidance factors: *"Among those factors is cost. The Hearing Examiner finds that the cost differences between using steel/concrete pilings or using wood pilings justifies using wood pilings in this case."*[10]

- ☐ The examiner defined the issue as, *"..will the impact [of using treated wood] be sufficiently small or insignificant so as to be consistent with applicable City of Olympia and Washington State regulations and policies and otherwise acceptable."*[11]

  The Examiner concluded: *" Upon reviewing all the evidence of record the Hearing Examiner finds that the answer to this question is a qualified "yes." The impact will be sufficiently small so long as the conditions of approval imposed by this decision are satisfied."*[12]

Decisions and Conditions

The hearing examiner approved the request to modify the application to allow the use of ACZA treated wood with conditions that mirrored the applicants proposal. Conditions included:

- ❇ Use only material certified as produced in compliance with the Best Management Practices as per the Western Wood Preservers Institute.

- ❇ Use a retention level of 1.5 pcf. [While the Risk Assessment was based upon 2.5 pcf, a lower retention had been requested by industry for Puget Sound and had been approved and included in the new American Wood Preservers Association (AWPA) treating standards.]

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[8] Findings, Conclusions, and Decision, File NO. 96-0451, Office of the Hearing Examiner for City of Olympia, April 8, 1997,, page 5

[9] Ibid

[10] Ibid page 6

[11] *Ibid page 3*

[12] *Ibid*

- *"the applicant shall monitor the chemical release into the water and sediment from pilings installed by the applicant."*[13]

Project Completed

Despite the Examiners decision, the local Habitat Manager for the State Fish & Wildlife continued to demonstrate opposition to treated wood by threatening to withdraw the Hydraulic Project Approval (HPA) unless the proponent agreed to increased unneeded and expensive mitigation activities. After it was demonstrated to the State office that the project met all the requirements of the Memorandum of Agreement and some project modifications were incorporated, project approval was granted.

The Project was constructed in the Spring of 1998 with the new deck and mooring area opening for business on June 15th. The ability to use a wood design rather than steel/ concrete yielded a total savings exceeding $60,000.

Monitoring proves appropriateness of Treated Wood and soundness of Risk Assessment.

As directed by the Hearings Examiner, Aquatic Environmental Sciences conducted a monitoring study with on site water and sediment sampling at the time of piling installation and four months subsequent to construction. No increase in water column concentrations of arsenic, copper and zinc were observed. ***"No significant increases in any of the analyzed sedimented metals was observed during the period beginning with the baseline and ending four months post construction."***[14]

Sediment and Water Quality Measurements at Genoa's Project.[15]

	Arsenic	Copper	Zinc
Washington Marine Water Standard ug/L	**36.0**	**2.5**	**76.6**
Measured Values at site Before & After	**ND<0.005**	**ND<0.004**	**ND<0.008**
Washington Marine Sediment Standards mg/kg	**57.0**	**390.0**	**410.0**
Pre-construction background levels mg/kg	**5.7**	**40.7**	**68.6**
During Construction (3/13/98)	**4.8**	**21.2**	**42.8**
Post Construction (7/16/98)	**ND <7.0**	**22.7**	**54.0**

[13] Ibid page 7

[14] *Environmental Levels of arsenic, copper and zinc observed in the vicinity of ACZA pressure treated wood used in the Genoa's restaurant expansion,* Kenneth M. Brooks, Ph.D., Aquatic Environmental Sciences, August 19, 1998 page 5

[15] Ibid

Genoa's - A Point Proved, a Lesson Learned

The completion of the expansion of Genoa's Restaurant utilizing treated wood is a victory for good science, common sense and good business. It confirms the validity of the Risk Assessment models developed under industry sponsorship. It demonstrated the value of site specific Risk Assessments in matching preservative types with different environments. It illustrated that environmental perceptions may not be based in fact. It shows that the state Memorandum of Agreement policy on treated wood can be met. In the works of Karen Terwilleger, Assistant Director of the Washington Department of Fish and Wildlife, in defending the effectiveness of the MOA, *"The recent Genoa's restaurant expansion proposal in Budd Inlet is an example of this [the effective operation of the MOA]"*[16]

Engineered by nature and enhanced by technology, treated wood offers the economics and structural advantages of wood, even in sensitive environments like Budd Inlet!

For additional information on this project, a copy of the Best Management Practices or guidance on the appropriate use of treated wood products please contact:

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[16] Correspondence to WWPI, September 17, 1997