Prepared by the Western Wood Preservers Institute

Presented by Eddy Longshore To Wood Solutions Wood Solutions Fair

Baltimore, MD on Thursday November 14, 2013

Learning Objectives

At the end of this program, participants will be able to:

1. Participants will learn how to specify pressure treated wood products using the American Wood Protection Association’s Use Category System.
2. Participants will learn where pressure treated wood is required under the International Building Code and under the Residential Building Code.
3. Participants will learn Western Wood Preservers Institute Best Management Practices regarding the use of treated wood in aquatic and other sensitive environments.
4. Participants will develop an understanding of Interior and Exterior Fire Retardant Applications and be provided with a AWPA Use Specification Guide, WWPI’s Aquatic Guide, Best Management Practices and a list of resources where they can find more information on pressure treated and fire retardant treated wood products.
WWPI’s Mission

Provide Educational Information to Increase Awareness of Properly Treated Wood Products to:
- Homeowners
- Builders
- Architects, Specifiers, Designers
- Building Material Dealers
- Building Code Officials
- Ports & Marinas

Wood - the Real Renewable Building Product
**Treated Wood Products are Green**

**Environmental Life Cycle Assessment**

**Greenhouse Gas:**
Treated wood has lower atmospheric greenhouse gas levels (789lb-CO₂-eq) than galvanized steel (1,725lb-CO₂-eq), fiber-reinforced composite (1,908lb-CO₂-eq) and concrete (3,213lb-CO₂-eq) products.

**Fossil Fuel Use:**
Treated wood uses less fossil fuel energy (4.1MMBTU) than galvanized steel (8.4MMBTU), fiber-reinforced composite (10MMBTU), and concrete (16MMBTU) products.

**Total Energy Input:**
Treated wood requires less total energy (7MMBTU) than galvanized steel (10MMBTU), fiber-reinforced composite (11MMBTU), and concrete (17MMBTU) products.

**Water Use:**
Treated wood requires less water (46gal) than galvanized steel (106gal), concrete (180gal), and fiber-reinforced composite (1,248gal) products.

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**Treated Wood is Sustainable**

**INPUTS:**
- Seed
- Soil
- Water
- Sun
- CO₂

**30 to 80 years of Forest Management**

**OUTPUTS:**
- Oxygen
- Habitat
- Stored Carbon
- Mature Forest
- Wood Products

By the time your product has served its life, a new one will be grown and ready to replace it.

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**Pressure Treated Wood as a Building Material**

- More than 90% of all homes are built with wood.
- Less than 6% of all wood products are pressure treated.

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**Problem**

**Wood is Threatened by:**

- Carpenter Ants
- Wood boring beetles
- Termites
- Decay Fungi
- Fire
Wood Durability vs. Wood-Destroying Organisms

A complex issue, impacting
- Homeowners
- Architects, Engineers, Designers
- Builders, Developers, Realtors
- Lenders, Insurance Companies
- Building Code Officials
- Pest Control Industry

Termites cause over $5 billion worth of damage each year in America.

Some examples of damage

Exposure to Moisture
Decay Fungi & Rot in Wood

When you finally see it...
Sometimes much too late…

it’s usually too late

Deterioration Zones

1 = Low
2 = Moderate
3 = Intermediate
4 = High
5 = Severe

Note: Lines defining areas are approximate only. Local conditions may be more or less severe than indicated by the region classification.
The Solution

- Treat the wood with preservatives in the outer shell of the wood to repel and protect the wood from marine borers, insects and decay.
- Result: Service life measured in decades, not years.
- Reliable physical and mechanical properties.
- It is readily available, safe, easy to work with, and cost effective.

American Wood Protection Association

- Founded in 1904
- International, nonprofit technical society
- Standards writing organization for the wood preserving industry in U.S.
- Provides a technical forum for industry, research and users.
- Protects consumers by ensuring uniform product performance.
- Reference in all building codes.
- Updated Annually - Currently the 2013 Edition

Who Determines If Wood Preservatives Are Safe For People And The Environment?

- All Wood Preservatives Must be Registered.
  - The U.S. Environmental Protection Agency (EPA)
- Regulated & Controlled Industry.
- Detailed Risk Reviews for Human Health and Environmental Impacts.
- Product Labels Designate in What Building Applications the Treated Wood May Be Used.
How is Wood Pressure Treated?

preserved wood:

Typical treating plant

Preservative, Mix and Water Storage Tanks.

Treating Cylinder

Practices to Enhance the Treating Process for Western Species

- Incising
- Pre-Drilling
- Drying Prior to Treatment

How is Lumber and Plywood Pressure Treated?

Western Species MUST be Incised.
A series of incisor knives are mounted on drums.

The drums rotate drawing the wood thru the incisor.

The minimum number of incisions is 750 per square foot.

How is Lumber and Plywood Pressure Treated?

Pressure Treatment Process

- Dry wood is loaded into cylinder
- Initial vacuum pulls out air
- Liquid preservative chemicals fill cylinder

Wood Is Loaded on Trams and Inserted Into Cylinder

Cylinder Door Is Closed and Vacuum-Pressure Treating Cycle Begins
Pressure Treatment Process

Pressure forces preservative chemicals into wood

Remaining liquid emptied for later use

Final vacuum removes excess liquid

Preservative Families

Oil-Type & Waterborne

- WWPI Members Produce Only Products that are Listed in AWPA Standards
- SPTA Members Produce Products that are Listed in AWPA Standards or ICC Evaluation Service Criteria
- Regardless All Products are Inspected by 3rd Party Accredited Agencies
**Waterborne Preservatives**

- ACQ – Alkaline Copper Quat
- ACZA (Chemonite) – Ammoniacal Copper Zinc Arsenate
- Borates
- CA-C – Copper Azole
- CCA – Chromated Copper Arsenate
- MCQ & MCA - Micronized Copper
- Non Metal Preservatives – PTI & EL²

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**ACQ**

“Preserve Wood” & “Nature’s Wood”

Douglas fir / Hem fir / Southern Yellow Pine
- AWPA Book of Standards
- ICC Evaluation Service Report
- Ground & Fresh Water Contact

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**ACZA**

“Chemonite”

SBX - Borates

PacBor-TimBor-HiBor-Advance Guard-SilBor

- AWPA C-31 – “Where its application is continually protected from liquid water”
- Sill Plate & Interior Framing Applications
- Colorless – often with blue-green dye
CA-C
Wolmanized® Outdoor®

Douglas fir / Hem fir / Southern Yellow Pine
✓ AWPA Book of Standards
✓ ICC Evaluation Service Report
✓ Ground & Fresh Water Contact

CCA

Douglas fir / Hem fir / Southern Yellow Pine
✓ AWPA Book of Standards
✓ Ground, Fresh & Salt Water Immersion

CCA

Industry Voluntarily Modified EPA Registered Uses for CCA.
✓ Since Dec. 31, 2003 – CCA is not used in consumer and residential applications. Except for Permanent Wood Foundations and Shingles
✓ CCA is still approved for industrial end use applications such as plywood, highway construction, utility poles, piling and agricultural.
✓ EPA does NOT Recommend the Removal of Existing CCA Structures or Installations.

MCQ & MCA
MicroPro™

✓ Micronized Copper Products
✓ MCQ – “SmartSense”
   ✓ Hem Fir / SYP
✓ MCA – “LifeWood”
   ✓ Hem Fir / D Fir / SYP
✓ ICC Evaluation Service Report
✓ Light, fresh appearance, slightly darker than untreated wood
✓ Above Ground, Ground & Fresh Water Contact
Non Metallic Preservatives

Non Metallic, Carbon-based Ingredients Using Organic Chemistry

PTI Wolmanized® L³ Outdoor® Wood

- Douglas fir, Hem fir, SYP
- AWPA Book of Standards
- ICC Evaluation Service Report
- Above-ground Use Only
- PTI = AWPA Designation (propiconazole, tebuconazole, imidacloprid)
- Very Little Color Unless Colorant is Added for ID Purposes
- Low Impact on Hardware & Coatings

EL² Ecolife™

- Douglas fir, Hem fir, SYP
- AWPA Book of Standards
- ICC Evaluation Service Report
- Above-ground Use Only
- EL² = AWPA Designation (DCOI, Imidacloprid)
- Very Little Color Unless Colorant is Added for ID Purposes
- Low Impact on Hardware & Coatings

Care & Maintenance

- Waterborne treated products can be painted or stained.
  (Follow manufacturers recommendations.)

- Water repellent coating recommended annually.
Oil-Type Preservatives

- Creosote
- Pentachlorophenol
- Copper Naphthenate

Creosote

Pentachlorophenol

Copper Naphthenate

Only AWPA Approved Preservative for Field Treatment
End Cuts in Western Softwood Species MUST Be Field Treated To Meet Code!

Field Treatment: Cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with AWPA M4.

Treat End Cuts to Prevent Decay!

Copper Nap Brands (at least 2% copper solution)

- JASCO Copper-Green
- Copper-Brown
- Termin-8
- CUPRINOL Green #10
- WOLMANIZED End Cut Solution
Wood Used Above Ground

Wood used above ground in the following IBC Sections:

Section 2304.11.2

Joists, Girders & Subfloor

Wood joists or the bottom of a wood structural floor closer than 18” or wood girders when closer than 12” to exposed ground in crawl spaces or unexcavated areas located within the periphery of the building foundation.

Section 2304.11.2.2

Wood Supported by Exterior Foundation Walls

Wood framing members that rest on concrete or masonry exterior foundation walls & are less that 8” from exposed ground.
Section 2304.11.2.3
Exterior Walls Below Grade

- Wood furring strips or other wood framing members attached to the interior or exterior masonry or concrete walls below grade.

Section 2304.11.2.4
Sills and Sleepers

All foundation plates or sills and sleepers on a concrete or masonry slab, which is in direct contact with earth, and sill which rest on concrete or masonry foundations.

Section 2304.11.2.5
Girder Ends

The ends of wood girders entering exterior masonry or concrete walls having clearances of less than 0.5” on tops, sides and ends.

Section 2304.11.2.6
Wood Siding

- Wood siding, sheathing & wall framing on the exterior of a building having a clearance less than 6” to the ground.
Section 2304.11.2.7
Posts or Columns

Posts or columns supporting permanent structures and supported by a concrete or masonry slab or footing that is in direct contact with the earth.

Section 2304.11.3
Laminated Timbers

The portions of glued laminated timbers that form the structural supports of a building and are exposed to weather and not protected from moisture.

Section 2304.11.4
Wood in Contact with the Ground or Fresh Water

Wood used above ground in the locations specified in the following Sections:
2304.11.4.1
2304.11.4.2.

Section 2304.11.4.1
Posts or Columns

- Posts and columns supporting permanent structures that are embedded in concrete that is in direct contact with the earth, embedded in concrete that is exposed to the weather, or in direct contact with the earth.
Section 2304.11.4.2
Wood Structural Members

- Wood structural members supporting moisture-permeable floors or roofs that are exposed to weather such as concrete or masonry slabs.

Section 2304.11.5
Supporting Member for Permanent Appurtenances

- In geographical areas where needed, wood members which support buildings, balconies, decks or porches if exposed to weather and without adequate cover protection.

Section 2304.11.6
Termite Protection

In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing.

Section 2304.11.7
Wood Used in Retaining Walls & Cribs

- Wood installed in retaining or crib walls.
How To Specify With the AWPA Use Category System

### Use Category System

**What Is It?**

- Based on end use biodeterioration hazard
- 5 Use Categories based on exposures & expected product performance.
- Categories range from weather protected (UC1 mild exposure/lowest risk) to salt water marine (UC5 severe exposure/highest risk).
- Separate Use Category for fire retardants.

### Use Category 1 (UC 1)

- Interior Construction
- Not in contact with ground or foundations
- Protected from weather
- Protected from interior sources of water
- Insect Hazard Only

### Use Category 2 (UC 2)

- Interior Construction
- Not in contact with ground
- Protected from weather
- Subject to dampness and occasional sources of water
- Decay Fungi and Insect Hazard
Use Category 3 (UC 3)
- Above Ground; Exposed to the Weather
  - UC3A: Coated & rapid water runoff
  - UC3B: Uncoated or poor water runoff
- Decay Fungi and Insect Hazard

Use Category 4 (UC 4)
- Ground or Fresh Water Contact; Exposed to Weather
  - UC4A: Deck supports
  - UC4B: Foundation, building poles
- Subject to Fungal and Insect Hazards

Use Category 5 (UC 5)
- Wood Used in Salt or Brackish Water
  - Exposed to marine borer attack
  - Construction such as marine piles, docks, bridges

Use Category F - UC F
- Fire Retardant Treated Wood
- Above Ground Use Only
- Two Risk Groups – Determined by Weather Exposure
  - UC FA: Interior - Continuously protected from weather
  - UC FB: Exterior - Exposed to weather or wetting
Section 2303.1.8.1
Quality Mark - Identification

All preservative-treated wood shall bear the quality mark of an inspection agency which has been accredited by the American Lumber Standards Committee and complies with the requirements of the ALSC Treated Wood Program or equivalent.

Section 2303.1.8.1
Quality Mark - Required Information

- Identification of the treating plant
- Type of preservative
- Minimum Preservative Retention
- End Use for which it was treated
- AWPA Standard
- Identity or Logo of the Accredited Inspection Agency
Fasteners and Connectors for Preservative Treated Wood

- Fasteners in contact with preservative-treated wood shall be of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper.
- **Exception:** Plain carbon steel fasteners in SBX/DOT and zinc borate preservative-treated wood in an interior, dry environment shall be permitted.

What Do The Chemical Manufacturers Recommend?

- As a minimum requirement for use with Preserve, Nature Wood, and Wolmanized Natural Select, preserved wood products, hot-dipped galvanized coated fasteners should conform to ASTM Standard A-153.
- For optimum performance and longevity in treated wood, stainless steel fasteners should be considered. Stainless steel fasteners are required for Permanent Wood Foundations below grade and are recommended for use with treated wood in other severe exterior applications such as swimming pools, salt water exposure, etc. Type 304 & 316 are recommended grades to use.
- Aluminum should not be used in direct contact with this wood.

When Using Treated Wood in Aquatic and Wetland Environments

ALWAYS SPECIFY BMP STANDARDS

Best Management Practices

- Produce products which minimize any potential for adverse environmental impact
- Assure products are selected, specified and installed correctly from an environmental perspective
- Incorporate most current advances in technology
- Educate users that “less is more not better”
BMPs for Use of Treated Wood in Aquatic Environments

- Additional Treating to AWPA Standards
- Minimum Chemicals
- Clean Product
- Inspection & Rejection
- Fixation
- Field Installation Guidelines
- BMP Quality Control & Certification

Aquatic & Wetland Construction

- Cases where selection of preservative system may be of environmental concern:
  - Previously contaminated waters.
  - Very slow moving waters with no natural flushing.
- Where concerns exist, Risk Assessment Guidelines are available in the Treated wood Aquatic Guide and specific Risk Assessment Models are available online.

Aquatic & Wetland Construction

- In sensitive environments, always specify wood be treated in compliance with WWPI’s BMPs
- Require 3rd Party Inspection Agency Certification:
  - Presence of BMP Mark
  - Certificate of Compliance

Handling, Installation & Maintenance BMPs

- Always prefabricate (to degree possible) prior to treatment
- Inspect materials on site
- Use containment where needed
- Work away from water
- Field treat end cuts with care
- Collect & dispose of old materials and construction wastes properly
Examples of BMP Treated Projects

Examples of BMP Treated Projects

Environmental & Human Safety

- Consumer Information Sheets & MSDS for Treated Wood
- Handling Requirements are Same as Untreated Wood

Disposal of Treated Wood

- Reuse is the preferred option
- Never burn or mulch
- Treated wood is classified as a non-hazardous waste by Federal and State rules and can be disposed in modern lined landfill.
Fire Retardant Treated Wood

- Interior Fire Retardants
  - Lumber / Plywood
- Exterior Fire Retardants
  - Lumber / Plywood
  - Shakes / Shingle Siding

FRTW INTERIOR APPLICATIONS
- Roof Sheathing
- Roof Trusses
- Rafters
- Floor Joists
- Shelving
- Steps
- Stairways
- Studs
- Electrical Panels
- Floor Sheathing
- Plywood Subflooring
- Partition Walls
- Beams & Purlins
- Blocking & Furring
- Platforms
- Stages
- Wall Paneling
- Architectural Millwork

FRTW EXTERIOR APPLICATIONS
- Wall Coverings
- Balconies
- Deck
- Stairways
- Fencing
- Sheds
- Gazebos
- Open Air Roof Systems
- Roof Coverings
- Canopies & Awnings
- Storefronts & Facades
- Eaves, Soffits & Fascia
- Ag Buildings & Stalls
- Scaffolding & Scaffold
- Planks
- Construction Staging
Environmental Life Cycle Assessments of ACQ- and Borate-Treated Lumber

Prepared in cooperation with

ENERGY | ENGINEERING | ENVIRONMENTAL | RISK | SUSTAINABILITY

Lumber LCAs Results
Published in April/May 2011 Edition
Journal of Cleaner Production

✓ LCA of ACQ-Treated Lumber Compared to WPC Decking
✓ LCA of Borate Treated Lumber Compared to Galvanized Steel Framing

ACQ Lumber Final Results

Treated lumber deck compared to wood plastic composite deck

Normalized Impact Indicators (ACQ= 1)
Borate-Treated Lumber Final Report

- Lumber used for framing where protection from termites or decay needed
- Compared to galvanized steel framing.

General Conclusions

- ACQ-treated lumber results in lower energy and environmental impacts in comparison to WPC for 6 out of 7 indicators. Approximately equal for eutrophication.
- Borate-treated lumber results in lower energy and environmental impacts in comparison to galvanized steel for all 7 indicators.
- Life cycle impacts could be reduced even more by reusing of treated wood products following primary service.

Borate PTW Compared to Galv. Steel (Borate = 1)

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<th>Galv. Steel Framing</th>
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Value = 8.3

For More Information Go To www.WWPInstitute.org

Free APP for Android/Apple in stores under Wood Preservers
Questions?

This concludes The American Institute of Architects Continuing Education Systems Course

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