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Specifying Treated Wood

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Presentation Outline

- Treated wood in the 2010 NBCC and other uses
- Overview of CSA O80 Series: Wood Preservation
- Understanding Use Categories 1 through 5A
- Products and Use Categories for specific exposures
- Treatment requirements for plywood and lumber
- Selecting species for strength, stability and treatability
- Selecting the appropriate preservative
- Pre- and post-treatment conditioning
- Third party quality assurance
- Appropriate and inappropriate product substitution
- Handling of treated wood to maximize durability
- Long term performance

Treated Wood in the 2010 NBCC

- Where wood is required to be treated to resist termites or decay, such treatment shall be in accordance with CSA O80.1-08, “Specification of Treated Wood” Table 2, “Use Categories for Specific Products, Uses and Exposures”

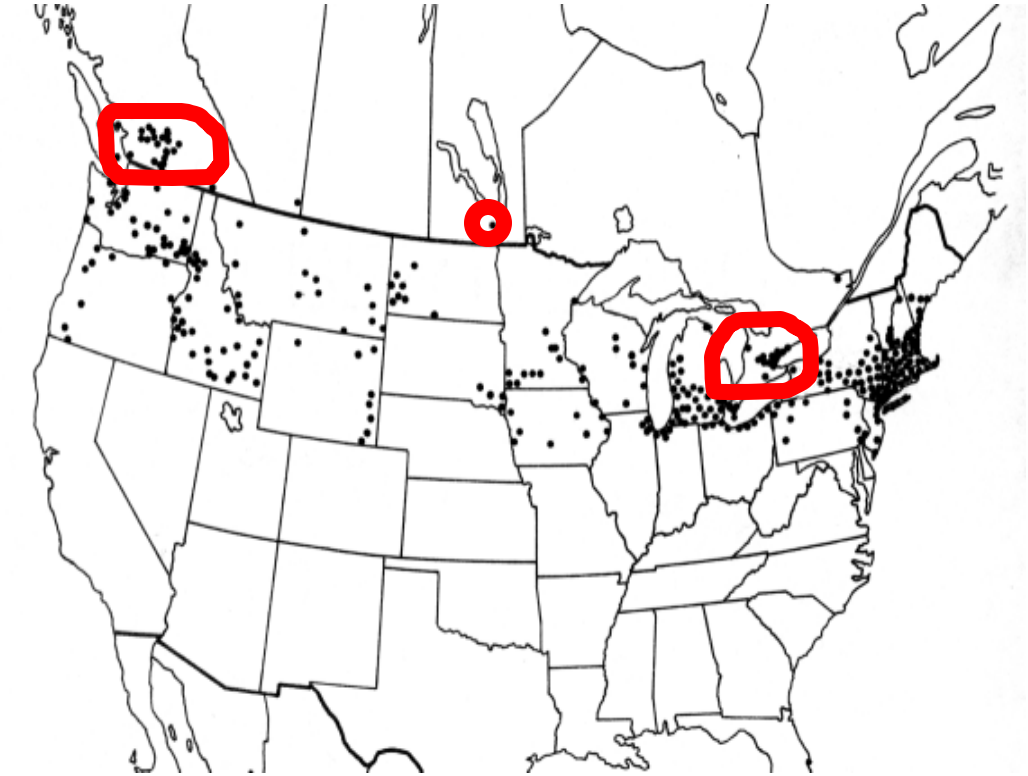
- Wood that is required to be treated to resist termites or decay shall be identified by a mark to indicate the type of preservative being used and conformance to the relevant required use category

Treated Wood in the 2010 NBCC

- In localities where termites are known to occur, clearance between structural wood elements and the finished ground level directly below them shall be not less than 450 mm and, except as provided in Sentence (2), all sides of the supporting elements shall be visible to permit inspection, or
- structural wood elements, supported by elements in contact with the ground or exposed over bare soil, shall be pressure-treated with a chemical that is toxic to termites.

Treated Wood in the 2010 NBCC

Termite Infestation in Canada



Southeast coast
Vancouver Island,
Sunshine Coast,
Okanagan

Winnipeg

Southern Ontario

Treated Wood in the 2010 NBCC

- Structural wood elements shall be pressure-treated with a preservative to resist decay, where the vertical clearance between structural wood elements and the finished ground level is less than 150 mm* (see also Articles 9.23.2.2. and 9.23.2.3.), or

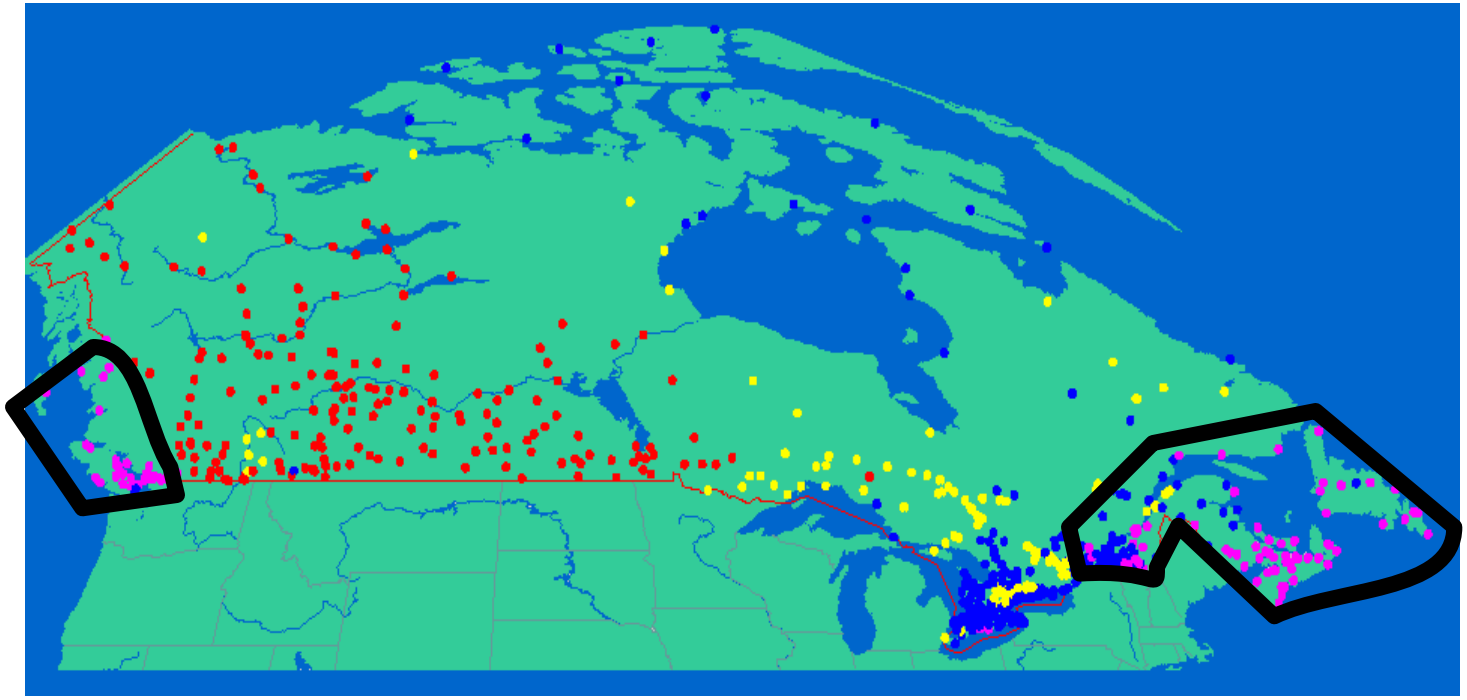
**Ground level always rises*

Treated Wood in the 2010 NBCC

- Structural wood elements shall be pressure-treated with a preservative to resist decay, where:
- the wood elements are not protected from exposure to precipitation,
- the configuration is conducive to moisture accumulation, and
- the moisture index is greater than 1.00.

Treated Wood in the 2010 NBCC

Canadian Locations with Moisture Index >1



Moisture Index: ● <0.7 ● 0.7-0.85 ● 0.85-1
● >1 Western BC, Gulf of St. Lawrence, Maritimes

Treated Wood in the 2010 NBCC

- Structural wood elements used in retaining walls and cribbing shall be pressure-treated with a preservative to resist decay, where
- the retaining wall or cribbing supports ground that is critical to the stability of building foundations or
- the retaining wall or cribbing is greater than 1.2 m in height.*

** Excludes most raised beds*

Treated Wood in the 2010 NBCC

- Where wood is protected in accordance with UC1 or UC2 using an inorganic boron* preservative_the wood shall be
- protected from direct exposure to water during and after the completion of construction, and
- separated from permeable supporting materials by a moisture barrier that is resistant to all expected mechanisms of deterioration in the service environment if the vertical clearance to the ground is less than 150 mm.

** Extended exposure to rain causes leaching*

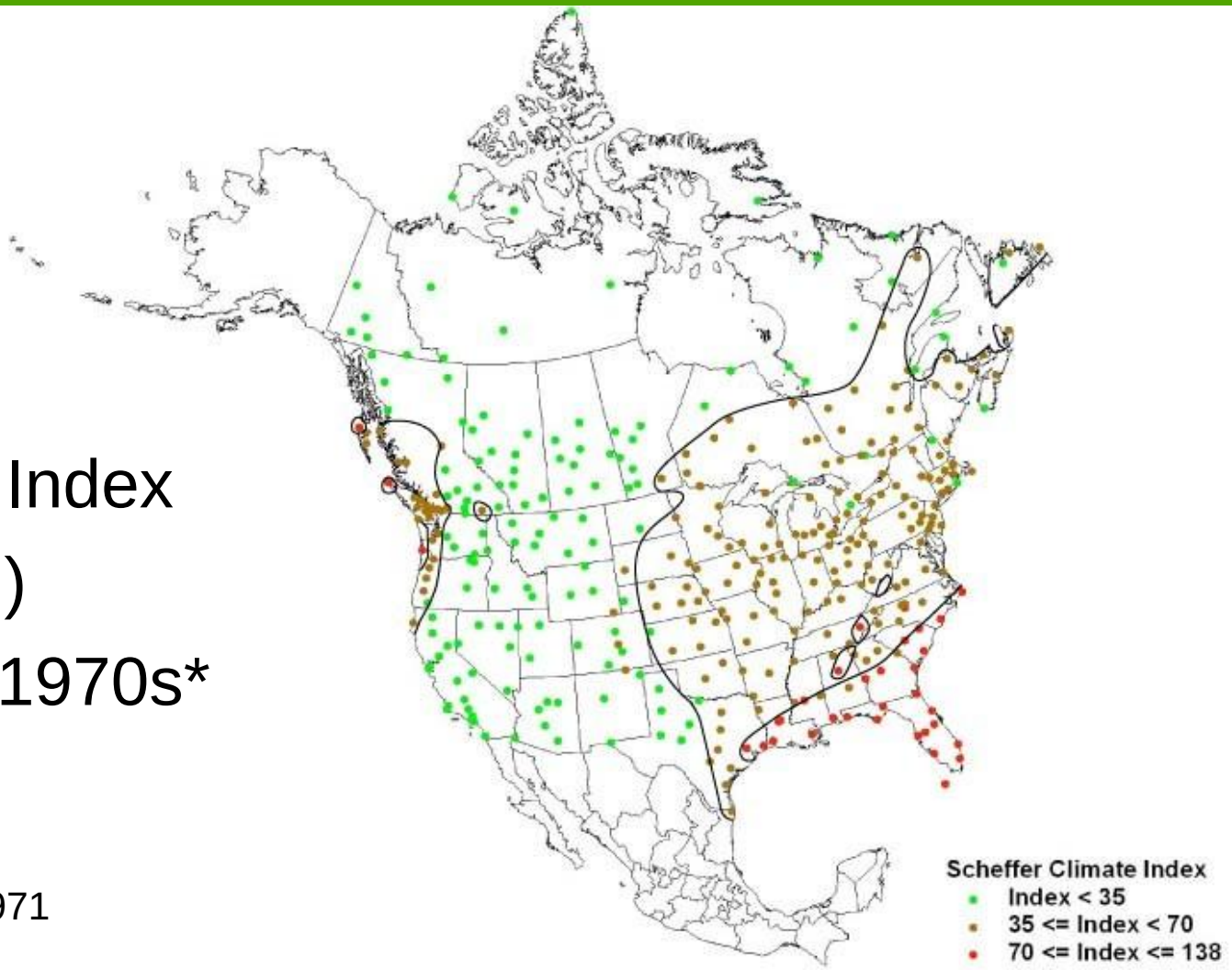
Other Uses for Treated Wood

- Any wood structure exposed to rain where design life is more than a few years and
  - Safety is important
  - Appearance is important

- Any wood component in a building that may get wet and stay wet and
  - Is not easy to inspect
  - Is difficult to replace

Climate Change Increasing Decay Hazard

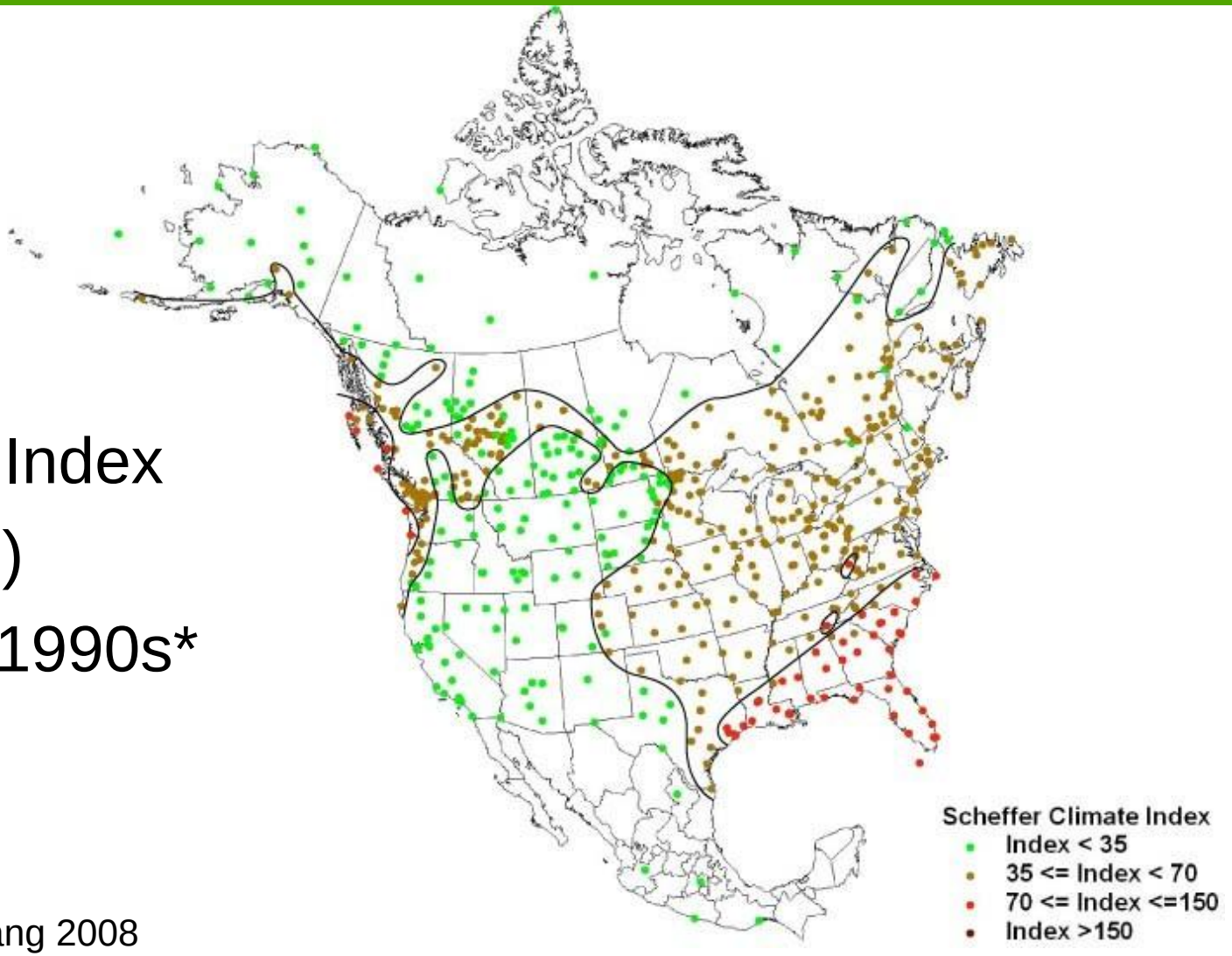
Scheffer Index
(T°, Rain)
1940s – 1970s*



*Scheffer 1971
Setliff 1986

Climate Change Increasing Decay Hazard

Scheffer Index
(T°, Rain)
1970s – 1990s*



*Morris & Wang 2008

Overview of CSA O80 Series

- Originally for industrial products
  - Poles, ties, bridge timbers, docks

- Rise of residential treated wood market required new standards
  - Decks, fences, gazebos

Overview of CSA O80 Series-08

Based on a Use Category System

- Matches level of treatment to decay/termite risk
  - Formalizes some earlier categories. Adds others
- Derived from USA AWPA standards
- Compatible with ISO 21887
  - Committee secretariat and chair were Canadian
- Designed to be more accessible to specifiers
  - Start at Table 1 to understand use categories
  - Go to Table 2 to locate products and uses

Understanding Use Categories

CSA O80.1 Table 1*

Use categories and associated service conditions

Use Category	Service Conditions	Use Environment	Typical Products
UC1	Interior, above ground, dry	Protected from weather	Interior framing
UC2	Interior, above ground, damp	Protected but can be exposed to moisture	Sillplates

* Available at www.durable-wood.com

Understanding Use Categories

CSA O80.1 Table 1

Use categories and associated service conditions

Use Category	Service Conditions	Use Environment	Typical Products
UC3.1	Exterior above ground, coated	Protected by coating. Free draining	Coated millwork, siding, trim
UC3.2	Exterior above ground uncoated	Exposed to all weather cycles	Deck boards, joists, railing, fence boards

Understanding Use Categories

CSA O80.1 Table 1

Use categories and associated service conditions

Use Category	Service Conditions	Use Environment	Typical Products
UC4.1	Exterior ground contact	Exposed to all weather cycles	Fence and deck posts
UC4.2	Exterior ground contact Critical uses	Exposed to all weather. High decay potential	PWF, Utility Poles

Understanding Use Categories

CSA O80.1 Table 1

Use categories and associated service conditions

Use Category	Service Conditions	Use Environment	Typical Products
UC5A	Coastal waters including brackish water	Continuous salt water exposure	Piles, bulk-heads and bracing
UC5B	Not encountered in Canadian Waters		

Understanding Use Categories

- UC 1
- UC 2
- UC 3.2
- UC 4.1

Understanding Residential Product Groups

CSA O80.1 Clause 4.3.2

- Product Group A
- Above Ground, UC 3.2
- Thickness < 25mm
  - a) Easily inspected, light duty, appearance grade. Low decay potential. Design life not limited by decay.
  - b) Construction materials behind cladding such as battens for rainscreen or roofing.
- Products: Fence boards, rainscreen battens
- No contact with untreated wood, unless durable
  - Prevents direct attack by mycelium of decay fungi

Understanding Residential Product Groups

CSA O80.1 Clause 4.3.2

- Product Group B
- Above Ground, UC 3.2
- Thickness < 40mm
  - a) Turned, profiled, easily inspected, appearance grade. Low decay potential. Life not limited by decay.
  - b) Lumber < 150mm wide (excludes sillplates)
- Typical Products: Spindles, deck boards.
- No contact with untreated wood, unless durable
  - Prevents direct attack by mycelium of decay fungi

Understanding Residential Product Groups

CSA O80.1 Clause 4.3.2

- Product Group C
- Above Ground, UC 3.2
- Thickness < 40mm
- Width > 150mm
- Easily inspected (excludes sillplates)

- Typical Products: deck joists, ledger board

Understanding Residential Product Groups

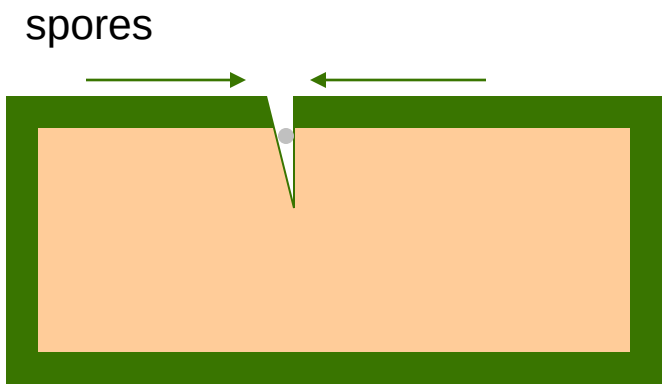
CSA O80.1 Clause 4.3.2

- Product Group D
- Ground Contact, UC 4.1
- Thickness > 40mm < 155
- Easily inspected

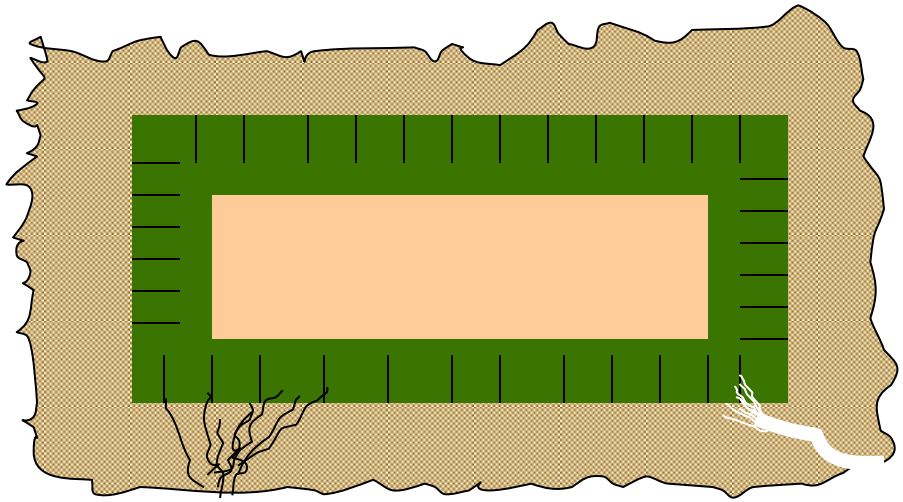
- Typical Products: Fence and deck posts

Understanding Residential Product Groups

- Shallow penetration OK for above ground, low decay hazard, if cuts are field-treated.



- Structural and ground contact needs incising



Understanding Use Categories

- UC 1
- UC 2
- UC 3.2
- UC 4.1

Group A

Group C

Group B

Group D

Determining the Use Category for Products

- CSA O80.1 Table 2* (alphabetical)

Product	End Use	Exposure	UC	Clause
Batten - plywood	Rainscreen cavity	Above ground	3.2	9.7
Batten - sawn	Rainscreen cavity	Above ground	3.2	9.2.2.5
Bender board	General	Ground contact	4.1	9.2

* Available at www.durable-wood.com

Requirements for Plywood and Lumber

- Ten years ago it was simple
  - Preservative CCA
  - Penetration 10mm
  - Retention
    - Above ground: 4.0 kg/m^3
    - Ground contact: 6.4 kg/m^3
- New preservatives have various retentions
- New standards have various penetrations
- Today, don’t worry about penetration/retention

Specify

- Use Category ✓
- Residential product Group (if applicable) ✓
  - Excludes CCA
- Wood Species
- Preservative (ACQ and CA interchangeable)
- Post treatment conditioning (if applicable)
- Labeling as CSA compliant
- 3rd Party quality assurance (if available)

Selecting the Appropriate Wood Species

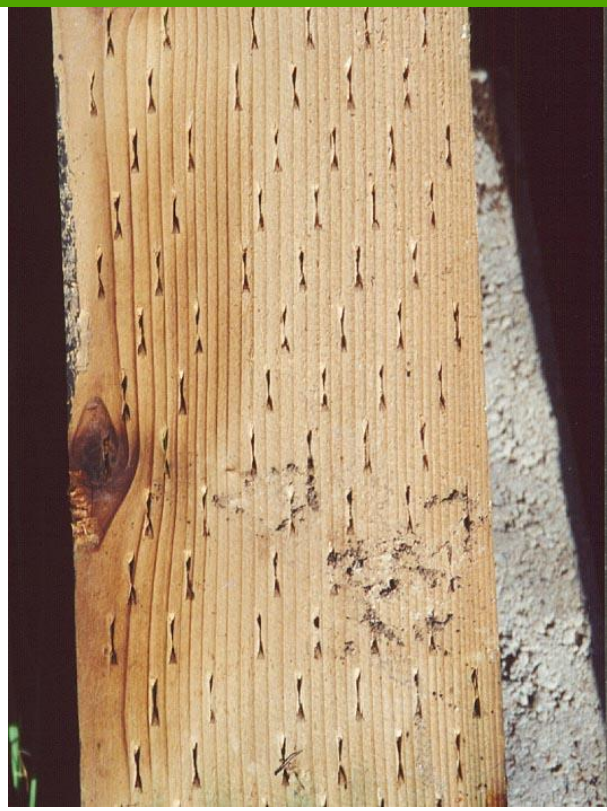
- Strength
  - Douglas fir is very strong but not very treatable
- Stability
  - Lodgepole pine is stable but not very treatable
- Treatability
  - Hemlock is treatable but not very stable
  - Pacific silver fir is very treatable but not as strong

Selecting the preservative

Interior framing	SBX (borate)
Residential lumber	ACQ or CA
Shingles	CCA
Plywood	CCA
PWF	CCA
Utility poles	CCA
Bridge timbers	Pentachlorophenol
Railroad ties	Creosote
Piling	Creosote

Pre- and post-treatment conditioning

- Drying
  - Ideally air drying to 25% MC
  - Kiln drying can be too aggressive
- Incising
  - Perforation improves penetration
- Fixation
  - Required for CCA treated wood
- Re-drying
  - Normally required for borate treated framing



Quality Assurance

- November 2010: none of the material in the stores is certified as meeting CSA standards
- NBCC requires marking for CSA compliance
- QA available from various inspection agencies
- Third party QA by
  - Canadian Wood Preservers Bureau (Ontario)
  - CLSAB (Abandoned)

Product Substitution

Product	Substitute	OK	Not OK
ACQ	CA	Always	
ACQ or CA	CCA	Plywood Shingles	Other residential
ACQ or CA	Borate	Indoors	Outdoors
CCA	ACQ or CA	Plywood Shingles	PWF

Care and Handling to Ensure Durability

- Where possible fabricate prior to treatment
- Ideally allow to air dry before installation
- Place uncut ends in ground contact

- Field treat all cut ends
- Cap tops of posts to shed water
- Apply water repellant if checking is a concern

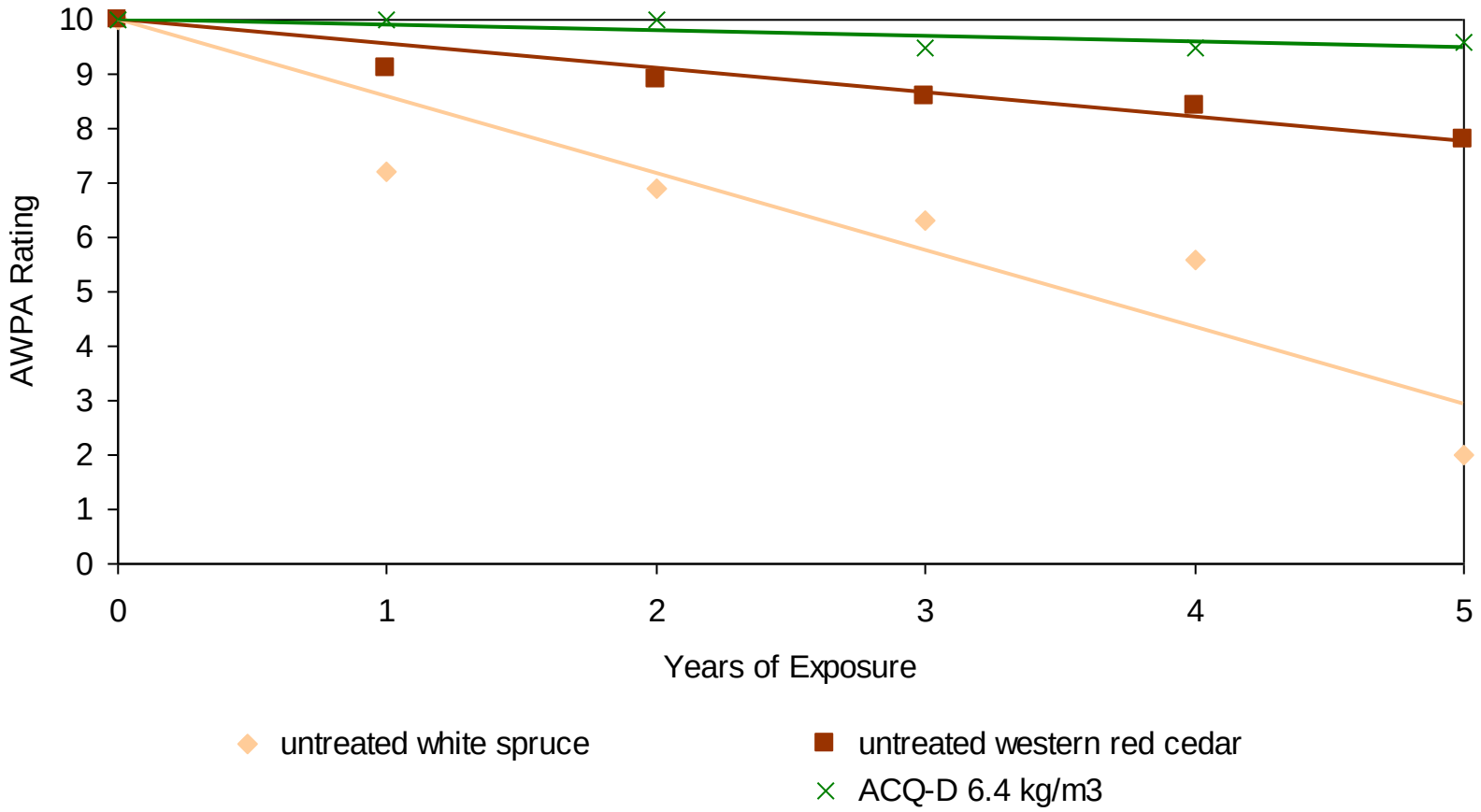
Long Term Performance

How long does it last?

- Documented life in FPInnovations field tests when treated to CSA O80 Standards
  - CCA treated jack pine roundwood posts >>60 years
  - CCA treated WRC shingles/shakes >>30 years
  - CCA treated unincised hem-fir decking >>30 years
  - CCA treated incised SPF lumber in soil >>25 years




Long Term Performance



Any Questions