Wood Protection

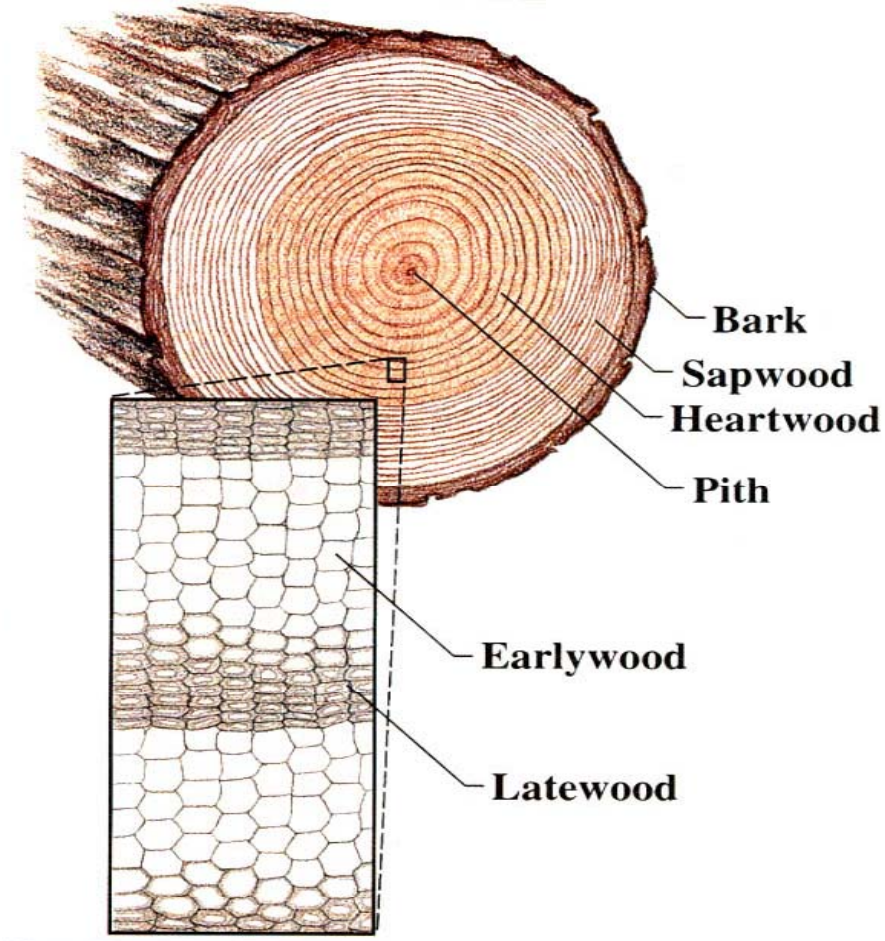
Ralph Swan – Sherwin Williams

Niagara Falls – The Ultimate Test

- 2008 Thompson's WaterSeal TV commercial

Wood: Cross Section Showing Different Attributes

- Pith is the oldest part of a tree.
- New growth is added at the vascular cambium just inside the bark.
- Earlywood is formed early in the growing season.
- Latewood is formed later in the growing season.
- Sapwood is transformed into heartwood as tree matures



Adapted from Wood Decks: Materials, Construction, and Finishing; FPS, 1996

Thompson's WaterSeal

Wood: Cell Wall

- Chemical components
  - Cellulose - approx. 50% wt. of wood, hydrophilic, gives cell tensile strength, dimensional instability
  - Lignin - provides toughness, cell wall rigidity
  - Hemicellulose - helps bind cellulose molecular strands
  - Extractives - impart color, odor, decay resistance, etc.

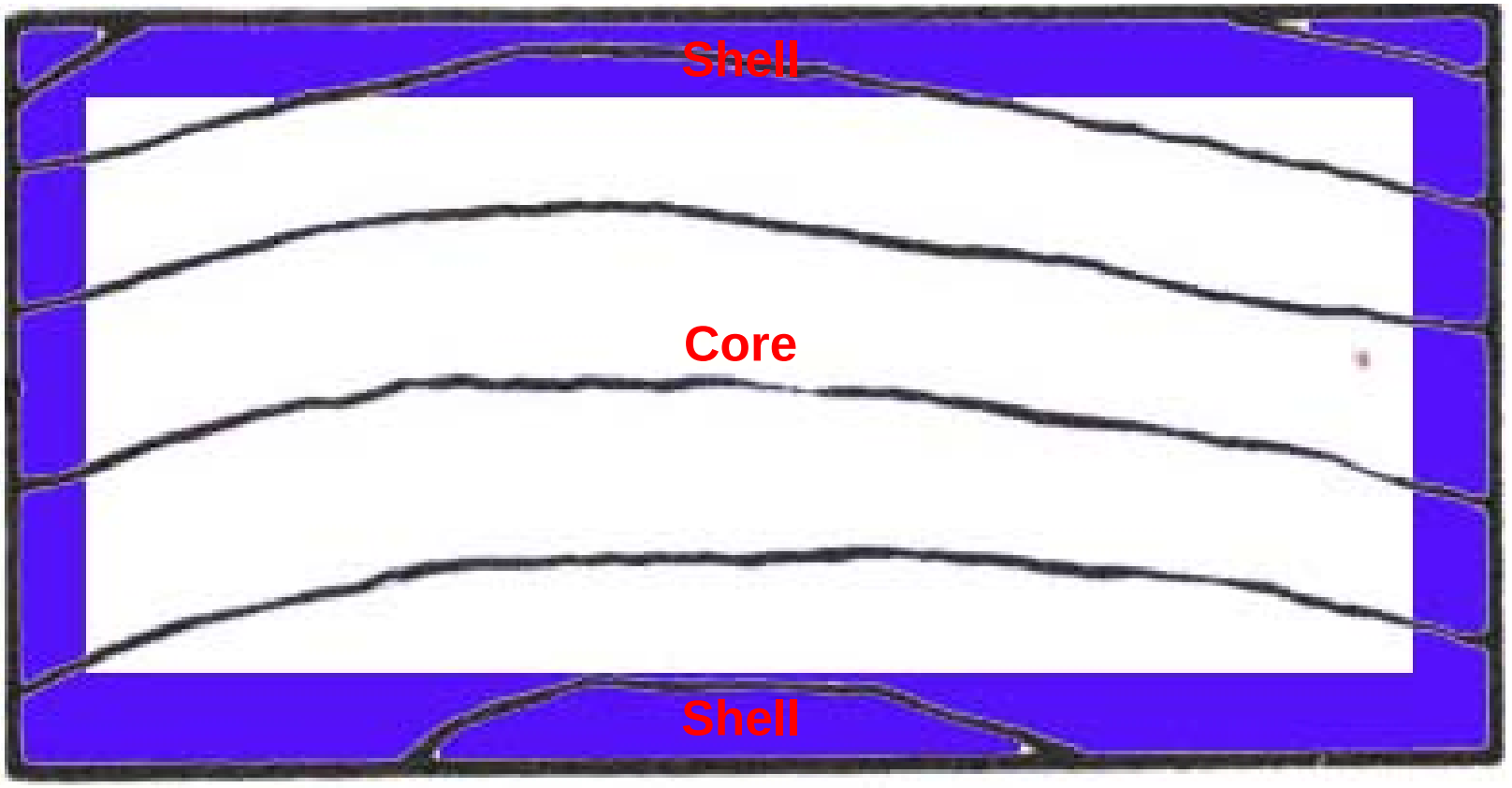
Wood: Environmental Degradation

- Two methods of environmental degradation
  - Weathering
  - Biological attack
- 5 types of weathering mechanisms
  - Moisture
  - Light
  - Temperature
  - Mechanical erosion
  - Chemical degradation

Wood: Weathering Mechanisms

- Moisture
  - Most influential and damaging mechanism
  - Absorption and desorption of water causes stress
    - Shell / core stress differences
    - Surface checks, cracks, and warping
    - Loss in surface strength
  - Provides environment for mold, mildew, and decay growth
  - Leaches water soluble extractives
    - Color change

Wood: Moisture, Core-Shell



- Shell wants to swell as it gains moisture core restrains swelling, stresses develop ↑ cycling results in surface checks, cracks

Image derived from Wood Handbook USDA

Wood: Biological Degradation

- Degradation from organisms
  - Destructive - decay, insect attack
  - Non-destructive - mold, mildew, algae, sapstain
- Destructive organisms cause loss in strength
- Non-destructive organisms typically change aesthetics
- Organisms require
  - Moisture
  - Temperature
  - Nutrition
  - Oxygen

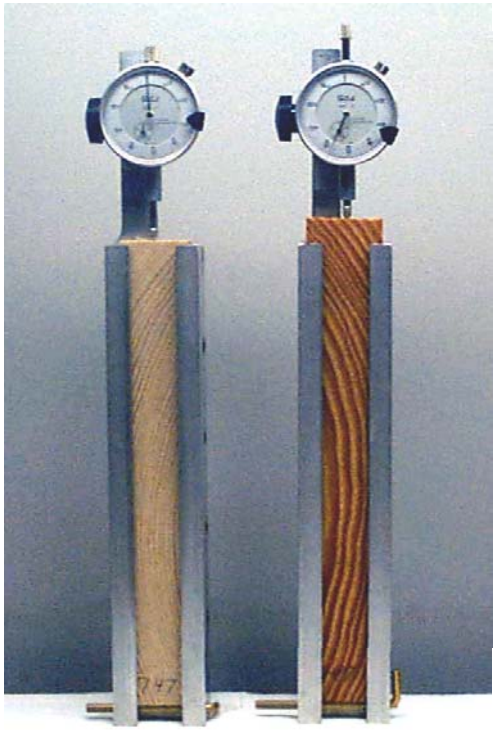
What is a Water Repellent?

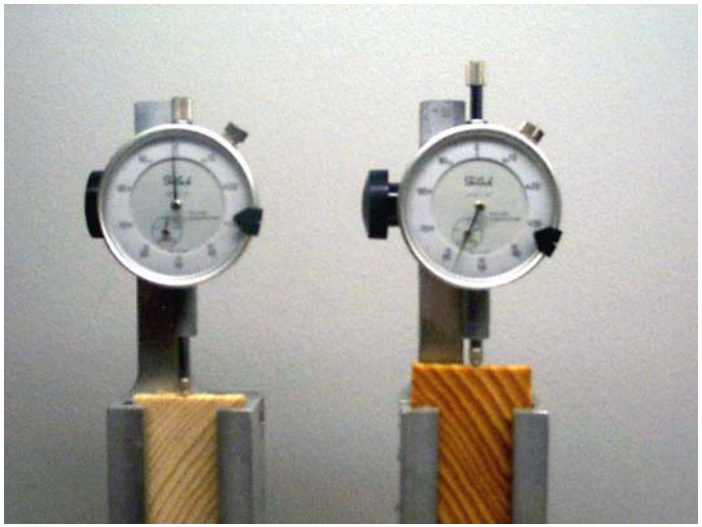
- A transparent coating formulated for the purpose of protecting porous substrates by preventing the penetration of water
- Water repellents do not resist hydrostatic pressure
- Water repellents do not provide a water vapor barrier

Testing Water Repellent Performance

- Dimensional Stability Test (ASTM D4446)
  - Wood Swellometer Test
- Water Weight Gain Test (ASTM D5401)
  - Wood Absorption Test
- Decklet Test
  - Testing on materials of common construction

ASTM D4446: Wood Swellometer Test





- Micrometer gauge measures swelling of wood in inches after immersion in water for 30 minutes.
- ***Wood must score at least 60% WRE to pass the test.***

Decklet Test Summary

1. Apply product at recommended use rate
2. Let dry and weight decklet
3. Expose to water sprinkler for 30 min
4. Reweigh and calculate % Water Repellent Efficiency (WRE)
5. Retest after exterior exposure over time compared to controls

Patented Water-based Water Repellent Technology

- Uses hydrophobically-modified acrylic acid polymers as emulsifier
- Originally designed for use in cosmetics
- Useful for emulsifying many oil-soluble hydrophobes
- Additional specialized processing increases performance
- Delivers unsurpassed water repellency

Sherwin Williams — Patented Water-Based Technology

- Clear waterproofer for wood
- Suitable for multi-surface use
- Surfactantless emulsion, water-based formulation
- Soap and water cleanup
- Applies milky, dries clear
- Allows wood to gray naturally
- Pigmented versions now in test
- Apply by brush, roller, spray
- For use on new or weathered wood
- Provides water repellent protection with 1 coat

VOC Issues

- What is a VOC?
  - Volatile Organic Compound, like mineral spirits
- Why is it important to reduce VOC?
  - VOC's contribute to poor air quality by reducing the ozone layer in the atmosphere
- The Government of Canada has published it's intent to reduce VOCs in consumer products
  - Awaiting the Gazette Part II publication for the new laws to be implemented
  - It is believe these laws will come into effect in late 2009
  - It is believe the limit of VOC for waterproofers will be 250 parts/gallon
- How does this affect Thompson's Advanced?
  - We are already at this limit – no changes are necessary!

Thompson's WaterSeal Advanced

- A unique new class of water-based water repellents
  - Superior water repellency
  - Excellent water beading characteristics
  - Resistant to fading
  - Pigmented to toner level
  - Colored versions with excellent color retention.
  - Clean and treat in one day

Thompson's Water Seal Advanced: What is it?

- An innovative combination of two patented hydrophobic technologies
  - TWS Ultra
    - "Surfactantless" water repellent
    - Provides hydrophobicity
  - Acrylic resin
    - New class of hydrophobic acrylic resins
    - Forms a film and "locks in" color
    - Very water resistant
  - Iron oxide pigments added
    - Enhanced beauty and added protection
  - UV absorber and mildewcide added
    - Resist fading and discoloration

Water Repellency per ASTM D5401: %WRE

- Advanced Natural Wood Protector Score: 99.3%
- Advanced Tinted Wood Protector Score: 98.6

Thompson's Water Seal Advanced: Advantages

- Unsurpassed waterproofing
  - ASTM D4446 Score 95+; competitive advantage
  - Surpasses solvent based technologies
  - Ultimate protection of investment
- Exceptional, long lasting water beading
- Soft, sheer tones
  - Enhance beauty of surface
  - Added protection from UV damage
  - Excellent color retention
- May be applied to most types of wood
  - Pine, Cedar, Redwood, Fir and treated woods

Thompson's WaterSeal Advanced: Colour Options

- Available in:
  - Clear Multi-Surface
  - Natural
- Sheer colours:
  - Honey Gold
  - Natural Cedar
  - Rustic Red
  - Nutmeg Brown

Thompson's WaterSeal Advanced: Features & Benefits

- Patented water-based water repellent
- Superior waterproofing
- Soap & water clean-up
- Ability to apply to damp surfaces
  - Clean & treat in one day
- Exceptional long-lasting water beading
- Low VOC (<250 g/l)
- One coat coverage

Thompson's WaterSeal Advanced: Application

- Clean substrate with appropriate cleaner
  - Allow at least 2 hours dry time
- Easy to apply
  - Shake well before applying
  - Apply with a brush or a deck pad
  - Only one "thin" coat need be applied
  - Apply to entire length of board
  - Dries quickly (~2 hours)
- Immediate application to new pressure treated wood
  - No need to wait before treating new wood surfaces

Thompson's WaterSeal Advanced: Benefits to Pressure Treated Wood

- Immediate application to new pressure treated wood will prevent warping, splitting, cracking
  - Less warranty claims
  - Less complaints
  - Great looking lumber/decks/fences longer
- PTW and Thompson's Advanced cost less than composite …allowing consumers to have the best of both worlds: Real wood and long lasting

Ram Forest Group Inc.

"Thompson's WaterSeal Advanced should be applied to your pressure treated lumber, immediately after the building is completed. It's a common misconception that pressure treated lumber does not need to be waterproofed, but it does. In fact, waterproofing is critical to keeping the quality and beauty of the wood. Thompson's WaterSeal Advanced adds an extra layer of protection to pressure treated wood that will keep your project looking like new for years to come by sealing out water which can cause cracking, warping and splitting. Protect your investment – use Thompson's WaterSeal Advanced."

- Former CEO, Keith Knowling

Thompson's WaterSeal Advanced: Limitations

- Must wait 48 hours before treatment after cleaning with acidic brighteners
- Over application may lead to tackiness
  - Consumers always tend to think that more is better!
- Cannot be applied with a roller
- Very hydrophobic film
  - Cannot apply a second coat

Questions?