Technical Session 6:
New and Emerging Wood Treatments and Coatings

Stabilized Copper Ethanolamine Solutions with Improved Penetration and Anti-Leaching Capabilities

Min Chen
Arxada
Florham Park, New Jersey

ABSTRACT

Copper ethanolamine preservatives are one of the most important solutions for wood preservation. The copper ethanolamine complex is typically produced commercially by the dissolution of copper or copper salts with alkanolamines such as monoethanolamine (MEA) in the presence of air and carbon dioxide. It is also known from literature that aqueous ammonia and ammonia carbonate can be used to dissolve copper or copper salts with oxygen from air as the oxidant. However, the carbonation or gas sparging adds complexity to the production process and increases the costs for production. This research identified a new method of producing copper ethanolamine solutions without the step of sparging or bubbling carbon dioxide or air. The formulation copper ethanolamine solutions showed effective antimicrobial activity as well as improved penetration and anti-leaching capabilities.

Keywords: copper ethanolamine, carbonation, penetration, anti-leaching

Surface Treatments, an Overview

Geoff Webb
National Hardwood Lumber Association
Memphis, Tennessee

ABSTRACT

Preservative surface treatments have been used extensively to control the discoloration (e.g., sapstain) of lumber from fungal attack and provide durable protection in above-ground, non-structural applications (millwork, doors, trim, etc.). An overview of treating methods, this paper defines surface treatments and offers an overview of the historical uses, application methods, and current standards in use.

Keywords: surface treatment, sapstain, millwork

The Rechargeable Pole Wrap - Update

William Abbott
Copper Care Wood Preservatives
Columbus, Nebraska

Michael Powell
Biotica EC
Queensland, Australia

ABSTRACT

The rechargeable pole wrap has been developed in response to an expressed need by utilities for a way to retreat the external surface of a utility pole below groundline without excavating or re-excavating below the groundline area of embedded pole foundations. When the wrap is charged with copper naphthenate it can protect wood poles from decay and termite attack. When the wrap is charged with petrolatum-borne zinc naphthenate it can inhibit corrosion in steel poles. The pandemic has delayed testing of the rechargeable pole wrap system. Field trials are ongoing.

Performance of DCOI Against Decay Fungi in Three Different Solvent Systems: AWPA E10 Soil Bottle Decay Test

Gerald Presley
Matthew Konkler
Jed Cappellazzi
Oregon State University
Corvallis, Oregon

ABSTRACT

Pentachlorophenol (penta) is no longer going to be available as a wood pole preservative which has caused utilities to change their pole specifications to include different preservative treatments. Several other oilborne treatment options exist to fill the gap, and one of these that is gaining a lot of the demand from pentachlorophenol is 4,5-dichloro-2-n-octyl-4-isothiazolin-3-one (DCOI). However, current solvent systems available are chemically different than those that were available ~30 years ago when previous solvent tests were done using this system. This work sought to compare the performance of DCOI delivered to southern pine or Douglas-fir wood using one of three different solvent systems against decay fungi according to the American Wood Protection Association (AWPA) E10 standard. Wood Blocks (19 mm) were treated to three different retention levels, AWPA UC4B retentions, 0.5 kg/m3 and 0.25 kg/m3 using three different solvent systems. Solvent systems used were RHT-70, a P9 oil not meeting penta cosolvency requirement, HBB-30, a P9 oil with a biodiesel additive for penta solvency, and #2 diesel oil. Blocks were subjected to an accelerated weathering protocol prior to exposure to two brown rot and one white rot fungus for 12 and 16 weeks, respectively. Performance was assessed by mass loss at the end of the incubation period. All solvent systems performed well against decay fungi when treated to UC4B retentions. No obvious patterns in performance were seen among the different solvent systems at the lower retentions.

Durability Improvement of Wood Strand-Based Products

Mostafa Mohammadabadi, PhD
Kevin Ragon, PhD
Rubin Shmulsky, PhD
Mississippi State University
Starkville, Mississippi

Hunter Rayner
Ultimate Linings
Houston, Texas

ABSTRACT

Advancements in communications technology have resulted in the shrinkage of the pulp and paper industry. Seventeen pulp mills were closed from 2000 to 2011 just in the southern region of the United States. Since this industry is an important destination for small diameter trees and underutilized materials, demand for low value wood has significantly reduced and consequently forest management practices have been negatively impacted. To improve the health and resilience of U.S. forests it is important to create a new market, and expand the market, for wood-based products manufactured from low-value wood. However, natural hydrophilicity of wood and wood-based products is one of the greatest barriers to market expansion especially for exterior applications. In this study, a novel coating which is currently used in the automotive industry was applied to improve water absorption of a wood strand-based product. Water absorption test results were promising and suggest strand-based products treated with this coating could be used for exterior applications. Since wood strands can be used for development of structural products, this coating can help us to convert low-value wood to structural products with exterior applications.

Field Performance of Thermally Modified Wood in a Severe Test Site

Grant Kirker
USDA Forest Products Laboratory
Madison, Wisconsin

Mark Mankowski
USDA Forest Products Laboratory
Starkville, Mississippi

Matt Aro
UMD Natural Resources Research Institute
Duluth, Minnesota

ABSTRACT

Thermally modified wood (TMW) is a growing trend in North America in areas of low decay and insect pressure. Thermal modification improves dimensional stability, decreases moisture uptake, and results in a darkened color that resembles tropical hardwoods, but more testing is needed in severe decay

situations and in areas of high termite pressure to fully understand the boundaries of its material performance. In AWPA, the P-9 subcommittee (non-biocidal wood protectants) has been working to develop test methodologies and appropriate use category designations for these materials. The Forest Products Laboratory has been conducting field tests at our severe decay hazard site (Saucier, MS) since 2013 to evaluate the performance of several wood species with varying degrees of thermal modification and additional coatings aimed to increase product longevity. FPL has conducted both laboratory and field tests subjecting TMW samples to extreme fungal rot and insect pressure. Results to date show that in instances of close to ground proximity, almost all of the thermally modified samples have failed unless they were subject to a supplementary coating or treatment. These coatings ranged from extractives in combination with a penetrating oil to brush on copper remedial treatments. In accelerated field testing of these materials, it has been observed that sample size has shown to be an important parameter and careful attention needs to be paid when preparing future field tests to properly evaluate TMW. Five- and ten-year results of separate ongoing field tests will be reported along with preliminary discussion of our findings and steps forward.