Technical Session 7:
Preservative Performance

Effect of Biodiesel Containing Solvents on the Performance of Copper Naphthenate and Pentachlorophenol: E7 Stake Test 88-Month Assessment

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ABSTRACT

History shows that an effective oilborne wood preservatives for wood poles can be made ineffective by an incompatible solvent system. It is therefore important that preservative/solvent combinations be tested for efficacy in smaller scale studies before they are put to use on a commercial scale. One solvent/preservative combination that has shown some potential negative interaction in terms of efficacy is copper naphthenate in combination with biodiesel. An AWPA E7 stake test was installed in 2015 to compare the performance of copper naphthenate in biodiesel-containing and other solvents to pentachlorophenol in the same solvent combinations. Douglas-fir sapwood stakes were treated to four different preservative retentions, ranging from 0-1.66 kg/m3 (0-0.1 pcf) for copper naphthenate and 0-9.6 kg/m3 (0-0.6 pcf) for pentachlorophenol using one of nine different solvent systems. Solvent systems included five diesel/biodiesel mixtures ranging from 0-100% biodiesel for copper naphthenate. The 88-month assessment showed that for copper naphthenate solvents with a biodiesel content of 50% and higher, stake performance trended lower than 100% diesel (average rating 5.2-5.6 versus 7.3) but only the 100% biodiesel treatment was statistically different ($p<0.05$, Tukey's HSD test). This difference was only seen at the highest retention level for stakes exposed at a wetter site and statistical differences were not seen at the drier site or at lower retention levels. A similar trend to lower performance in high biodiesel solvents was not seen in pentachlorophenol treated stakes except for the 50% biodiesel treatment which had average ratings of 5.8 versus 6.8 for 100%, but this difference was not statistically different. This study continues to be assessed.

Durability of Boron Treated Test Structures in Mississippi Part 1: Termite Resistance and Boron Retention

WITHDRAWN

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ABSTRACT

Boron used as a preservative is an established method to protect wood products from biodegradation. It has not always been an accepted preservative due to its leachability. However, research indicates that if used correctly boron can provide protection against weathering, insects, and other biodegrading factors. In 1989, boron-treated test houses at Mississippi State University's Dorman Lake test site in Starkville were built to investigate the effectiveness of boron treatments with exposure to natural weathering. After being undisturbed for more than 20 years, samples were taken to re-investigate the test houses. No-choice termite tests were run to evaluate resistance to attack of the exposed wood. Southern Yellow Pine (*Pinus* spp.) samples were treated with a commercially available boron treatment and compared to exposed samples. The objective of the current study is to determine the long-term effectiveness of boron as a preservative to provide the wood products industry with exposure data and an understanding of boron's long-term effectiveness as a wood preservative.

Keywords: diffusible preservative, boron, termite resistance, boron retention

Development of Artificial Intelligence to Monitor Water Ingress into Wood Treated with Coatings and Preservatives: A Focus on Creosote

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ABSTRACT

Water is essential to wood deterioration and understanding its interaction with coatings or preservatives on the wood surface is an important indicator in its role for protection of wood. This paper identifies affordable methods to measure this surface interaction as compared to expensive and cost prohibitive lab models. Using these affordable techniques, a simple staged cellphone camera and software are used to accurately measure water ingress as time and weathering occurs. Freshly treated creosote ties were exposed to accelerated weathering for 30-days comparing initial and final wetting angle and change in color of the surface of the same creosote sections. This data will be used as a baseline for comparing other creosote formulations, reduced retention creosote treatments, and dual-treated creosote treatments performance when exposed to accelerated weathering tests.

Dual Boron Rod/Creosote Treatment: Boron Distribution After Prolonged Field Exposure

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ABSTRACT

Fused borate rods were installed at equal distances along the lengths of unseasoned white or red oak bridge timbers and crossties. The members were subsequently treated with creosote and placed in the field in Saucier, MS where they were monitored periodically. Moisture content and boron levels were examined at several time periods for the first 2.5 years of the study. Moisture content for this test period for both wood species remained high (above 50%). This is well above the 30% moisture content needed for boron diffusion. At all monitoring points, boron loadings in both hardwood species were higher in the longitudinal direction from rod installation points compared to tangentially located sampling points. After 4.5 years a subset of the crossties and timbers were crosscut at the farthest point between boron rod holes and stained with a boron indicator. High levels of boron remained in the sampled wood after almost five years. Soil collected from beneath the crossties and timbers was analyzed for boron content as well. Adequate boron diffusion was observed for white oak, suggesting treatment of low permeability hardwoods may be possible using this form of passive diffusion coupled with creosote overtreatment.