WESTERN WOOD PRESERVERS INSTITUTE
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PRESERVETECH

Guidance for properly specifying and using preserved wood products

Preserved wood decks not an environmental threat

New research completed at Oregon State Univeristy (OSU) provides reassurance for outdoor living enthusiasts concerned that their preserved wood decks might be harming the environment. The study confirms that copper azole (CA-C), the formulation used to treat today's residential-use preserved wood, does not leave pressure-treated wood and wash away in the rain to potentially contaminate the soil, groundwater and nearby waterways.

Wood decks have been a mainstay of outdoor living in the U.S. ever since the 1960s when decks replaced patios as the preferred gathering spot for that family barbecue or summer celebration. Today, an estimated 30 million wood decks adorn nearly 40% of all single-family homes.

Each year, between 5 million and 6 million new or replacement decks are installed, a large majority of those featuring wood decking. Virtually all of those wood decks utilize preserved wood for the deck structure, the decking or both.

Any concerns about preservatives contaminating the surrounding environment can be put to rest. New research from Oregon State University demonstrates that preservatives used in modern wood treating formulations do not migrate from the wood and into soil or rainwater runoff, not even in the wet weather of Oregon's mid-Willamette Valley.

Addressing concerns

Preservative formulations, along with Industry practices, have evolved over the years. Copper azole contains copper as well as common biocides to protect the wood from insects and decay fungi. Treating plants today are equipped with sophisticated technology to ensure the proper preservative penetration and retention levels are achieved, providing the necessary protection to help decks, fences and other residential outdoor structures last for decades without risking preservative migration due to oversaturation.

Despite such improvements, the old concerns persist and are amplified by the internet. So OSU's researchers decided to see what the science has to say. It was conclusive: there is no reason for concern that the preservatives from preserved wood decks or other outdoor structures will harm the surrounding environment.

The study

The OSU researchers designed a three-year study of a wood deck built in 2021 at OSU's Peavy Lodge, located near Corvallis, Ore. Rainfall in the region averages 40 to 60 inches per year. The deck was constructed with 2x6 and 2x10 lumber treated with copper azole, the same preserved wood products one would find at the local hardware store or home center.

Rainwater runoff collection basins were placed under the deck in three locations. At each location, two basin were placed -- one directly under a deck joist and the other under the decking between joists. Water was collected from the basins for analysis after each significant rain event.

Two years after the deck was built, soil samples were collected from four locations, two under the deck and two downslope from the structure. These samples were prepared for analysis following EPA method 3052, a laboratory procedure used to digest solid samples for analysis of trace metal content.

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Testing for copper

Because copper is the primary active ingredient in copper azole, all samples were analyzed for their copper concentrations.

Copper is a common element found in hundreds of everyday items, including cookware, fabrics, dental fillings and, of course, pennies. It occurs naturally in scores of foods, including shellfish, many nuts and seeds, several fruits and vegetables, and chocolate. A naturally-occurring common metal, copper is found in varying concentrations in soils virtually everywhere.

While common, copper in unnaturally high concentrations can cause health problems. The researchers' goal was to learn if and how much copper might be added to the environment as a result of using preserved wood.

Rainwater runoff collected from under the deck was analyzed for copper concentrations. After initial dispersion of residual preservative from the wood's surface, the samples showed copper levels well below 1 ppm. Copper concentrations in soil samples taken beneath and downslope from the deck were indistinguishable from upslope samples and well within the normal range for the area.

What the researchers found

The data showed a predictable pattern: copper concentrations were highest in the first few sample collections. This was expected as rain washed off residual preservative that had dried on the surface of the wood after it was treated. These early higher concentrations were quite low, however, averaging just over one part per million (ppm). Within a few months copper concentrations in runoff samples consistently measured well below 0.5 parts per million and by year three of the study the copper levels were nearly too low to measure.

Had copper migrating from the wood been overly high, researchers expected evidence of that would be found in soil samples collected from below the deck and downslope from the deck. The evidence did not appear.

Two years into the study, copper concentrations in soil samples from under the deck were indistinguishable from samples taken downslope and even upslope from the deck. The copper levels in these samples ranged from 50.3 ppm to 54.4 ppm, well within the normal range for background copper levels in Oregon's Willamette Valley. According to the Oregon Department of Environmental Quality, copper concentrations in soil are not considered elevated for the region until they exceed 140 ppm.

Conclusions

The research results are conclusive: homeowners can rest assured their decks and other outdoor structures built with preserved wood cause no additional harm to the environment. The preservatives from wood treated with copper azole do not migrate from the wood and raise copper levels in rainwater runoff or surrounding soils to any significant degree.

Instead, the vast majority of the preservative used to treat the wood remains in the wood, protecting it from decay and insect damage, and providing decades of outdoor living enjoyment.

A white paper detailing the deck study is available from WWPI at wwpi.info/IRG-OSU-DeckStudy.