Treated Wood: Do You Know What You're Using?

by Andrea Johnson
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Chromated copper arsenate (CCA) treated-wood, commonly known as pressurized or Wolmanized wood, is used extensively in outdoor construction: for playgrounds and picnic tables, for planters and garden furniture, for fences, decks, porches and walkways, and for docks and wharves. This greenish coloured wood is popular because it resists rot and can last up to thirty years. And perhaps because of its prolific use, its safety is rarely questioned.

Three years ago, when we needed a new front porch, my husband and I chose CCA-treated wood because of its claims to longevity and safety. As a person with a history of chemical sensitivities, I wish I had checked more carefully. Before the porch was completed, I began to experience burning in the palms of my hand when I touched the railing, and in the soles of my feet when I walked on the porch. By the time it was completed, a mere touch of my hand on the wood caused my arm to go numb.

I began to suffer nausea and weakness. Alarmed, I contacted an environmental building consultant who told me that I was likely picking up arsenic dust from the surface of the wood. Tests showed that I was suffering from arsenic and chromium poisoning. We decided to remove the porch and replace it with one built of untreated spruce.

This experience led me to read widely about the subject. I discovered that there are a number of safety concerns. First, there is a lack of research in North America on the effects of CCA-treated wood on human health. This is in part due to a lack of clarity in regulatory responsibility, in part to postponements in government reviews of the process. Second, there is considerable debate over the amount of chromium, copper and arsenic that leach out of CCA-treated wood. Third, there is no safe means of disposal of CCA-treated wood once it has exceeded its useful life.

CCA is registered as a pesticide with Health Canada's Pest Management Regulatory Agency (PMRA). The chromium is toxic to certain fungi and helps fix the preservative to the wood fibre. Copper is toxic to a wider range of fungi, arsenic is toxic to wood-destroying insects. But chromium and arsenic are also toxic to humans:above trace concentrations, chromium is carcinogenic (causes cancer) and mutagenic (alters genetic material) and arsenic is carcinogenic, mutagenic and teratogenic (produces birth defects). Copper in concentrations from .02 milligrams/litre to over 10mg/l is acutely lethal to certain species of fish, algae and invertebrates.

The CCA wood industry, represented in Canada by the Canadian Institute for Treated-wood (CITW), claims that the process of pressure-treating "fixes" or seals in the pesticides, thereby eliminating risk to humans. Raw lumber is sealed inside a pressure cylinder, where a vacuum sucks out air and water from the wood. The cylinder is then filled with a mix of water and pesticides and the pressure increased, forcing the mixture into the wood.

The CITW denies there is any health risk to humans if the wood is handled and used properly. CITW and Health Canada handling precautions recommend the use of plasticized gloves plus, if one is sawing and machining the wood, goggles and a dust mask. After working with the wood, wash exposed skin thoroughly before eating, drinking or smoking, and wash your work clothes separately from other clothing, before re-wearing. Although the precautions warn that CCA-treated wood should not be used where it

may come in contact with drinking water, animal feed or food, there is no warning against its use for picnic tables -- one of numerous contradictions of regulatory policy.

GOVERNMENT REGULATIONS

In Canada, production of CCA-treated wood is licensed provincially. In Nova Scotia, where there are currently four companies producing CCA-treated wood, the licensing agency is the Nova Scotia Dept. of the Environment. The labeling and use of wood-preserving chemicals is regulated at the federal level by the Pest Control Products Act, administered by the PMRA.

All heavy-duty wood preservatives have been under re-evaluation since 1992. In 1995, this re-evaluation became a co-operative effort of the PMRA, the US Environmental Protection Agency (EPA), and the Cal EPA under the NAFTA Technical Working Group on Pesticides. The re-evaluation should be to be completed by fall 1999.

The length of this process is not unusual. In 1996, the PMRA had performed more than basic testing on only 3.5% of all chemical pesticides in Canada. The United States Congress ordered the EPA in 1972 to retest and reregister 600 active chemical ingredients, yet by 1985 the EPA had retested and reregistered only 16 of them. The American example is important because Canada follows the EPA in many cases. The co-operative review under NAFTA further erodes the possibilities for Canadian independence in pesticide regulation. Jennifer Reynolds in If Food Counted, described the EPA as a "bureaucratic organization that has a horrible track record for succumbing to corporate pressure." The American treated-wood industry has already exerted enough pressure to obtain a hazardous waste exemption for CCA-treated wood.

There are several shortcomings in the testing procedures that the government employs for CCA and other pesticides. First, industry supplies the scientific studies and trials. This shifts the burden and cost of proof to the producer, but it also builds in a bias because the studies are not coming from independent researchers. Second, tests for pesticides are performed on animals, not humans. But animals and humans do not always manifest the same reactions. Third, human tolerance levels for pesticides are set for adult males, not women and children; children are especially vulnerable to pesticides due to their small size and less mature detoxifying systems. Finally, tests look at only short-term, single pesticide exposure, not long-term, cumulative or multiple exposure. People are already exposed to naturally occurring arsenic in food and drinking water; e.g. arsenic levels are particularly high in some parts of Nova Scotia.

Because of the number of pesticides and other toxic chemicals to which humans are regularly exposed, the effects of CCA exposure are difficult to analyze. David McCray, a lawyer in Indiana who has won three claims involving injuries from CCA-treated wood, states, "The effects of CCA exposure can be insidious and can range from hair loss, to itching skin, bleeding, nerve damage. Chemical exposure health problems are difficult to pinpoint and can mimic many things."

Workers in CCA wood-treatment plants and carpenters who work frequently with CCA-treated wood have even higher levels of exposure than the general public, another issue ignored by Canadian and American governments.

The treated-wood industry argues that CCA is fixed in the wood and therefore is not readily available for absorption by skin contact and respiratory inhalation. Despite industry's claims, however, there is widespread evidence for leaching of the pesticides; production of safe CCA-treated wood involves

complex chemical reactions that can be compromised in commercial production, resulting in less than complete chemical "fixing" and subsequent leaching.

In a "fixing" study conducted by Environment Canada, soil and sediment samples collected from four wood-preservation sites in New Brunswick and Nova Scotia contained arsenic, copper and chromium concentrations which exceeded the Canadian Council of the Ministers of the Environment (CCME) interim remediation criteria for contaminated sites. The CCME criteria for commercial/industrial soils were exceeded in 95%, 50% and 36% of the soil samples for arsenic, copper and chromium respectively.
"Building Materials for the Environmentally Hypersensitive," advises that "some of the chemicals may not be fixed and can leach out. A white surface residue indicates that CCA precipitated out of the solution. The environmentally hypersensitive should not use this material."

A study performed in 1991 for Health and Welfare Canada found that the soil under playground equipment made from treated-wood had arsenic concentrations up to 24 times higher than areas just 10 metres away. Using a cloth, they wiped ten of the structures and got measurable amounts of arsenic each time. Chromium and copper showed up, too.

In the U.S., Judith and Peddrick Weis have conducted a number of studies of the effects of leaching from CCA-treated wood in marine environments. They found that in areas adjacent to the wood, there was a significant reduction in species richness, total number of organisms, and diversity.

J. Warner and K. Solomon of the University of Guelph, published a study in l990 in Environmental Toxicology and Chemistry that examined the effect of pH on leaching from CCA-treated wood . Copper, chromium and arsenic leaching from new and weathered wood were found at all pH levels, with higher metal concentrations in acidic conditions. At pH 5.5, for instance, 92% of the copper, 12% of the chromium and 32% of the arsenic leached out. This raises concern for the amount of leaching caused by acid rainfall along eastern areas of Canada and the U.S. It also means that the rate of leaching is accelerated in acid environments such as bogs, silage and compost.

David E. Stilwell, an analytic chemist at the Connecticut Agricultural Experiment Station of New Haven, Conn., measured copper, chromium and arsenic concentrations in soils collected under seven decks built with CCA-treated wood . The decks ranged in age from 4 months to 15 years old. In all cases, the samples collected beneath the decks had significantly higher levels of the chemicals than did soil collected 5 m away from the decks.
Stilwell is now working on a playground exposure study. Thus far it indicates that the use of CCA-treated wood should be avoided wherever possible in the playground, especially on surfaces children touch regularly.

Robin Barrett is an environmental building consultant who runs Healthy Homes Consulting in Sackville, N.S. Sometimes he sees CCA-treated wood that is not properly dried or has a white powder residue on it. This concerns him, because it means the chemicals are not bound to the wood.
When considering CCA-treated wood for outdoor projects, Robin says, "We do not know the real risks, so why not play it safe. It's easier to prevent a problem than to fix it. If I have a choice, I'll go for the safer material." If CCA-treated wood is already in place, and a client is concerned about potential safety risks, then Mr. Barrett works with his client to decide the best solution, which may include removing the wood or sealing it.

People can indirectly absorb leached arsenic if they eat vegetables grown in soil contained by CCA-treated wood. A British study of contaminated soil at a site where treated-wood was made found that

carrots grown in soil which contained 200 parts per million (ppm) of arsenic produced crops containing nearly twice the current recommended limit for arsenic in food. Arsenic can be toxic to plants, at levels as low as 1ppm soluble arsenic. In a series of articles on treated-wood, Organic Gardening warns readers to avoid using CCA-treated wood for compost bins and for raised beds containing vegetables, and to avoid using sawdust from the wood in compost or in the garden.

HAZARDOUS WASTE?

Imperfect commercial production and acidic conditions can both cause leaching of CCA. In either case, leaching exposes people, animals and plants to chromium and arsenic toxicity, and marine life to chromium, copper and arsenic toxicity. The chemicals that do not leach out are also a problem. CCA-treated wood does rot eventually and must be disposed of. Every year, producers in the United States are manufacturing more than 5 billion board feet of CCA-treated wood, and the amount is increasing. CCA-treated wood from the early 1970's is now finding its way into landfills. Researchers at the Forest Products Laboratory in Wisconsin estimate that 2.5 billion board ft. per year of treated-wood products are currently entering the solid-waste stream. That level will rise to 8 billion board ft. per year by the year 2020. This will place a huge burden on declining landfill space. Unlined landfills may not adequately protect area groundwater from contaminants in CCA-treated wood. Landfills in Minnesota have already stopped taking CCA-treated wood scraps because of concerns about chemical leaching and water contamination.

CCA-treated wood should be classified as a hazardous waste, but it is not. The EPA's Toxic Characteristic Leaching Procedure (TCLP) sets threshold levels for toxicity of 39 different chemicals, including chromium and arsenic. If measured leaching from a waste product exceeds the TCLP limits, it is considered "hazardous waste" and regulated accordingly. CCA-treated wood does not have to pass the TCLP rule, because it has a special exemption, likely the result of strong lobbying pressure. Results of one test obtained by Environmental Building News show that CCA-treated wood actually fails the test for arsenic and only barely passes it for chromium.

The ash from treated-wood that has been burned does not have an exemption and fails the TCLP rule. Incineration of CCA-treated wood is unacceptable from either a human-health or an environmental standpoint, even in state-of-the-art municipal incinerators: chromium and copper become concentrated in the ash, while arsenic becomes a vapor that either escapes into the air or is trapped in pollution control equipment. There have been at least two reported incidents of people who used treated-wood for fuel, and developed neurological problems, numbness in the arms and legs, loss of hair, skin rashes and gastrointestinal upsets.

Because of concern over the disposal issue, Environmental Building News and the American Institute of Architects both recommended in 1997 that production of CCA-treated wood be phased out.

Some European countries, including Germany, banned CCA-treated wood in the 1970's. The three major American producers of CCA have developed their own copper-based alternatives to CCA, eliminating the most toxic components of arsenic and chromium, but these alternative products are not available in Canada. Neither are there any financial or government incentives to make the production switch from CCA: the copper-based alternatives are more expensive to produce, and Canadian and American governments continue to extend the end date for their review of CCA. If there is to be a phase-out of CCA, it may have to be consumer-driven. By demanding and purchasing safer substitutes, consumers and building contractors can initiate change.

ALTERNATIVES

What can be safely used instead of CCA-treated wood? If wood must be used in locations where rot or insect infestation is likely, naturally rot-resistant species such as cedar can be an option. Tamarack (larch) is an under-priced softwood that is plentiful in Nova Scotia and is harder and more durable than spruce; hemlock is also a viable substitute but tends to splinter. Untreated softwood can be finished with an environmentally friendly sealant to increase longevity. Borate preservatives are much less toxic than CCA, but they will leach out of wood in wet conditions. They are effective for treatment against termites when wood will not be exposed to weather. Finally, recycled plastic lumber and concrete are alternatives for some applications.

Marcel Comeau, a resident of Meteghan River, N.S., who is chemically-sensitive to CCA-treated wood. learned that the city of Hamilton, Ontario, has spent $1 million since 1988 removing CCA-treated wood from civic playgrounds and replacing it with untreated-wood and plastisol (nine-gauge steel covered with plastic). Mr. Comeau began his own campaign in Digby and Yarmouth counties. He championed the construction of a 400-ft long wharf in Belliveau Cove using untreated tamarack and hemlock. He worked with the Lion's Club in Meteghan, Digby County, to build a playground from untreated spruce, and to seal it with an environmentally safe paint to increase its longevity. Mr. Comeau also persuaded the village council of Pubnico to use a safe alternative to CCA-treated wood in its Acadian village project.

Contrary to what the treated-wood industry would have us believe, CCA-treated wood is not an environmentally safe, non-toxic building material. It leaches poisonous chemicals both during its use in outdoor structures and after disposal. The industry claims to be helping the environment by saving trees, but surely the toxicity of treated-wood outweighs this benefit. The treated-wood industry and the wood products sector should be actively pursuing and promoting alternative, safer ways to prolong the useful life of our outdoor structures. We should be encouraging
them to do so.

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