

## The Background



Earlier this year, the United States and Canadian wood preservation industries in conjunction with the US Environmental Protection Agency and the Canadian Pest Management Regulatory Agency (PMRA) agreed on a voluntary transition away from CCA treated timber products for non-industrial usage. The transition, which takes effect from January 2004, followed a sustained period of examination of the safety of CCA-treated products

over a number of years. Studies commissioned by various environmental groups focused on the arsenic content of the product and its possible effects on consumers and the environment. The fact that some of these studies have detected arsenic on the surface of treated product and in soil below CCA-treated structures has given rise to some concern by consumers. It should be emphasised however that the North American regulatory agencies have advised that products already in use pose no significant threat to health. Indeed CCA will continue to be used in North America in a wide variety of commercial and industrial applications such as poles, piling, retaining structures and many others.

Australia's timber industry, including the Timber Preservers Association of Australia, the Plantation Timber Association of Australia, the Timber Merchants Association, the Timber Development Association, the Forest Industry Federation, and the Timber Research and Development Advisory Council, has held meetings in Sydney, Brisbane, Melbourne and Perth to consider the transition in North America and its implications for Australia. The industry believed it had a responsibility to ensure that all stakeholders were aware of the issues surrounding the transition, and to listen to expert opinion regarding safety in particular. As an outcome of the meetings, the following information is provided so that all interested groups understand what CCA is, how it works, and the safety issues associated with its use.

## Copper Chrome Arsenic (CCA) wood preservative

CCA is a well-established water-borne preservative used to protect timber in service from all major biodeteriogens, including decay fungi, wood boring insects, termites, and marine borers. The CCA concept was invented by an Indian engineer in 1933 and is used in all countries around the world where wood preservation plays an important part in building and associated infrastructure. Overall, Australians rank number three in the world on the basis of per capita consumption of treated timber, behind New Zealand and the USA.

In Australia CCA preservative must conform to the Australian Standard AS1604.1 - 2000 Specification for preservative treatment. Part 1: Sawn and round timber, with the following specifications for the ratios of the active components:

Copper

Chromium

Arsenic

23 - 25%

38 - 45%

30 - 37%

When the elements copper (Cu), chromium (Cr), and arsenic (As) are introduced into the timber in combination with water, the formulation is so designed that they react with each other and with the wood structure to become fixed as insoluble compounds. The fixation mechanism is dependent upon such factors as temperature, relative humidity, time, pH and the actual formulation of CCA used. No timber should leave the treatment plant until these factors have been taken into account and the chemicals have been fully reacted. In other words, there should be no unfixed chemicals in or on the surface of treated timber, and, therefore, very little leaching of elements into the environment from the timber when it enters service. This characteristic of CCA preservative is critical to its acceptance as it ensures that none of the individual elements pose a risk through loss to air, soil, or water when properly applied to timber. Today, most CCA-treated timber is produced by processes that accelerate the fixation mechanism, leaving the timber surfaces clean and relatively dry.

Treatment plants use CCA in accordance with Australian Standards and the Australian and New Zealand Environment and Conservation Council guidelines. In addition, good practices are set down in WorkSafe Australia documents. The CCA formulations themselves and associated health and safety data are described in Material Safety Data Sheets issued by the manufacturers.

Most of the health and safety related concerns about using CCA focus on the arsenic and, to a lesser extent, the chromium. Both elements are viewed in their own right as potentially harmful to human health, either as poisonous substances or as carcinogenic chemicals. However, the hazards to health of these elements in CCA-treated timber are low. Furthermore, it has been found that the amount of arsenic, for example, present in some common foodstuffs can be at levels higher than those detected by analysing the washings from scrubbed surfaces of CCA-treated timber. Also, it has been shown that both animals and humans can detoxify arsenic following ingestion. CCA-treated wood fed, in relatively large doses, to sheep, pigs, cattle, and dogs has not proved to be toxic.

CCA-treated timber (as opposed to the liquid CCA preservative) contains chemical forms of both Cr and As that are considered much less toxic to humans than those elements found in other industries, e.g. smelting, tanning, chrome plating.

A potential hazard to people working with CCA-treated timber may arise if treated sawdust or treated wood splinters enter the body and the local cellular environment releases the fixed chemicals. To avoid this it is recommended that simple precautions be taken, such as the wearing of dust masks, gloves, and eye protection.

(Even if the timber were untreated it would be wise to avoid breathing in sawdust or wood particles generated by any work). CCA-treated timber wastes should not be used as fuel in open fires, or for barbecues; it should be disposed of at approved landfill sites or by controlled incineration.



Although some leaching may occur from various CCA-treated timber products over various time periods under specific conditions, the quantities leaching are mostly insignificant in terms of health issues and in terms of typical background levels.

Studies in the USA have indicated that health effects from direct exposure to CCA-treated timber surfaces in decks or playgrounds are unlikely. When wood samples from major USA playground equipment manufacturers were tested for dislodgeable arsenic, most of the samples had levels below the detection limit. Other wipe studies of dislodgeable arsenic from old playgrounds, municipal playground surfaces and support poles, have confirmed this observation.

An independent panel of medical experts in Florida, USA has extensively reviewed the literature on arsenic, its natural occurrence and bioavailability, and its impacts on people and the environment. The medical experts concluded that the available data do not show any clinical disease associated with arsenic exposure from CCA-treated timber. The panel also concluded that the levels of arsenic in and around CCA-treated timber was insufficient to adversely affect the health of children or adults.

## The Future



The Australian treated timber industry supports the statements of North American agencies that CCA-treated timber poses no unreasonable risks when used in accordance with normal handling procedures. The National Registration Authority (NRA), that is responsible for registering chemicals such as wood preservatives, has also indicated its support for the continued use of CCA in Australia. In arriving at this position the NRA has taken advice from the Therapeutic

Goods Administration, the National Occupational Health and Safety Commission and Environment Australia. Such advice pointed out that there is no evidence of significant health concerns from exposure to CCA-treated decks, fences, playground equipment, etc.

We live in a society that accepts the minimal risks posed by the use of chemicals in almost everything we touch, eat and live-in when we take into account the benefits gained by their responsible use. The treated timber industry respects the rights of users and consumers of treated products to question and be adequately informed about issues that affect their health and safety. Users of treated timber products are encouraged to ensure that products are clearly labelled with the preservative type and producer information, and that safe usage practices are used at all times.

The industry has for some years offered alternative chemicals to CCA for the treatment of many commodities. These alternative preservatives contain no arsenic or chromium, are registered and approved for use, and are already incorporated in Australian Standards. The alternatives are effective, and somewhat

more expensive, but they may be used instead of CCA in many applications if the consumer so desires. They include ACQ and Copper Azole. CCA continues to be the most widely used preservative treatment because it is most familiar to specifiers and users, is cost competitive and has a proven track record of safe usage.

The Australian timber and preservation industries will continue to monitor local and international developments in the usage and safety of treated timber.

This article was written by Dr Harry Greaves, Wood Products Consultant and Chairman of the Technical Committee of the TPAA.