# Global regulatory changes restrict the use of CCA

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## Introduction

Copper chrome arsenic (CCA) wood preservatives have been used in New Zealand for more than 50 years. No other wood preservative has had such a long history of excellent performance nor been so cost effective. The adoption of alternative preservative treatments has been with reluctance unless driven by regulatory change or by market demand.

Health and safety concerns have outweighed the benefits of CCA mainly because the inorganic arsenic and hexavalent chromium components in the CCA are human carcinogens. The presence of arsenic alone has been sufficient for interest groups to highlight the potential public health or perceived environmental risks from contact with the chemical or possible leachate from treated timber.

## Deregulation of CCA starts in Europe

Germany was the first country to regulate against the use of arsenic in preservatives. Formulations such as copper chrome boron (CCB) and copper chrome (CC) were introduced. The development of new generation copper formulations resulted in bis-N-cyclohexyldiazoniumdioxy) copper (CuHDO) being introduced.

From 1991, no arsenic was permitted in formulations in Denmark and from January 1997 this restriction extended to chromium. In the meantime, Sweden had implemented regulations in January 1994 to restrict CCA to only the treatment of in-ground timbers or critical above-ground applications. Finland followed with a requirement for chrome-free formulations from January 1998.

These regulatory restrictions changed the preservation market and as a consequence also created opportunities for the development and introduction of new generation copper-based formulations. In Europe and Scandinavia today, about half of the treated timber is CuHDO, about 40% copper azole (CuAz) and about 10% ammoniacal copper quaternary (ACQ). Not surprisingly researchers have explored other durability options such as heat-treated wood. This alternative material has been introduced in the Netherlands, France and Finland. Alternative materials such as plastic/wood composites have also been developed as substitute materials.

Japan moved relatively quickly to the adoption of copper-based alternatives and metal-free formulations. The disposal of CCA-treated waste was the initial problem as there was limited capacity for landfill. While recycling and incineration could have been practicable options and the volumes of CCA-treated timber would be small, the view was taken that the use of alternative preservatives would be desirable. However it was not until environmental controls impacted on discharges from industrial sites, that the majority of the treatment industry finally moved away from CCA. Now about 60% of the Japanese market uses copper-based preservatives such as CuAz and ACQ, while 20% uses metal-free formulations.

The USA market is the largest user of wood preservatives and for a long time there has been a reluctance to consider alternatives to CCA. Nevertheless ammoniacal copper quaternary types A & B (ACQ) were approved by the American Wood Preservers Association (AWPA) in 1992. Other CCA alternatives were approved soon after; copper bis-(dimethyldithiocarbamate) in 1994, copper azole type A in 1995, ACQ type D in 1995 and ammoniacal copper citrate in 1998. It was perhaps just a matter of time before the changes in Europe would reach the U.S. and the need for alternatives to CCA would be triggered by consumer demand or regulatory change.

By the late 1990s, some individual states were also starting to scrutinise the risks and uses of CCA-treated timber and some local restrictions were being implemented. Then there was an application in Florida to have a class action certified where CCA-treated wood was described as being "defective and unsafe". Attention from the media grew. An increasing number of consumers were starting to blame their health problems on CCA.

In February 2002, the United States Environmental Protection Agency (EPA) announced that there would be a voluntary transition from CCA-treated timber to non-CCA treatments for most residential end-uses, effective after 31 December 2003. With this announcement was an assurance that the CCA treated timber already in service posed no unreasonable threat to consumers and some recommendations were made as to how that timber could be maintained and safely used.

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The U.S. treatment industry is now undergoing a significant transition. About a third of the CCA alternatives market is expected to use copper azole, the remainder ACQ, which reflects the relative market positions of the three major timber preservative companies.

Also in February 2002, the European Union (EU) announced the intention to introduce a Marketing Directive that would restrict CCA-treated timber to just a few nominated industrial uses. It is expected the EU will ratify the draft with implementation of restrictions sometime after 2003. Furthermore the changes do not stop there. The Netherlands is also expected to legislate to only allow metal-free preservatives from 2004.

The EPA announcement and the expected EU Directive have already stimulated discussion and debate by the local industry. While there seems no immediate regulatory move to review and restrict CCA, companies are having to consider their future position with the alternative preservative treatments. At present there are less than 30 treatment plants in Australasia using ACQ or CuAz formulations. Companies appear to have made changes based on technical grounds such as no sludge when treating green-off-saw hardwoods or being able to burn treated off cuts, or for marketing reasons such as supplying export markets.

**Implications for New Zealand**

New Zealand already has approved alternative or substitute preservative treatments for CCA. The two alternative water-based preservative systems, ammoniacal or alkaline copper quaternary (ACQ) and copper azole (CuAz) formulations were approved for use in 1999. The formulation approved in the New Zealand preservative standard is the ACQ Type B, with a composition of a 2:1 ratio of copper oxide to DDAC in an ammoniacal solution. The CuAz formulation contains copper (on elemental basis) and tebuconazole in a ratio of 25:1 in amine. The third option, but limited to some above-ground applications, is to use tin-based fungicides with or without a synthetic pyrethroid insecticide applied as a solvent based treatment (LOSP).

The selection of any alternative preservative raises questions about the expected service life of the treated timber. The New Zealand Building Code (NZBC) B2 Durability requirements are important when considering the service life of timber products for use in buildings, for example. Minimum service life categories of 5, 15 and 50 years are given and this needs to be taken into account in testing methodology and approvals. Although several formulations may be all approved for a specific hazard class as is the present situation, the selection of the most appropriate preservative for wood for any particular application will depend on a number of factors: the expected environment, potential for biological attack and type of degrade, the design or use criteria including the presence or absence of protective coatings and maintenance, and most importantly the required durability or minimum service life for the timber.

The New Zealand treatment industry already has available alternative preservative options for many residential and agricultural uses. However as seen in overseas markets, CCA will remain the preservative of preference until such time as regulatory changes impose restrictions.

As well as there being uncertainty over the long-term durability of some commodities, the alternative treatments will increase the cost of treated timber. Exactly how much the cost increase will be depends on the formulation, chemical loading in the timber and the type and size of timber product but figures of 10 – 20% have been mentioned.

**Can we live without CCA?**

Regulatory changes will continue to restrict the use of CCA globally and this will have flow-on effects in New Zealand over the next few years. Typically changes away from CCA are regulatory driven or perhaps where there is a threat of potential litigation. As observed in the U.S. market, public perception of risk is a powerful motivation for change.

Preservative formulations that can be used as substitutes to CCA for many timber products are already available and approved in New Zealand. However the alternative formulations are not necessarily without their own limitations. The long-term performance of the alternatives to CCA is still an unknown for some service life conditions. For example, preservative treatments to match a 50-year service life for CCA treated house piles or poles will be challenging. What can be anticipated is that future use of treated timber will become a combination of more specialised niche markets to meet the demands of both domestic and export markets.

Alternative technologies for protection of timber either through design or changes in physical properties, such as by novel heat treatment technology, will change the industry. Timber products are already under pressure from alternative materials such as steel, concrete, plastic and composite materials and this is not expected to let up. In the U.S. for example, where CCA-treated utility poles will still be allowed in 2004, the alternative materials are already being promoted as less expensive and more durable than CCA-treated poles. In New Zealand, for some years, we have also seen the promotion of steel framing as a rot-resistant cost-effective alternative to timber.

So the question is not whether we can live without CCA, but rather when it will happen.