PRESERVATION

THE NEED TO TREAT WITH PRESERVATIVES

As with most softwoods, New Zealand pine is not a naturally durable species and its use in New Zealand for structural purposes has gone hand-in-hand with the development of an efficient wood preservation industry.

Unlike many traditional softwoods of commerce such as spruce, hemlock, and Douglas fir, the sapwood of New Zealand pine is very permeable to wood preservatives, particularly in the radial direction. Complete penetration of the sapwood is always achievable, resulting in very extensive service lives for such commodities as small electric power or telecommunications transmission poles. Such total penetration of preservatives is rarely achieved with other softwood species.

New Zealand pine has unique properties among softwood species, in that total treatment of sapwood is always achievable. It is very amenable to manipulation of preservative treatment processes, which are environmentally acceptable, and still give a reliable standard of treatment.

Preservation Processes

Chemicals For Preservative Treatment

To a large degree, in-service exposure conditions dictate the types of preservative one can use to treat New Zealand pine.

Boron salts

Boron compounds are used in situations where the main hazard is insect attack (e.g. Lyctus and Anobium spp.) and where exposure conditions will not result in leaching the chemical out of the wood. Boron salts are also toxic to termites, although they are rarely used for treating lumber against termite attack.

Copper-chrome-arsenate (CCA)

CCA has universally been found to be a very effective wood preservative. It is very suitable for treatment of New Zealand pine which will be used in moderate or high decay hazard environments. Although solutions of CCA are highly toxic, once the solution is in the wood, complex chemical reactions occur which firmly bind CCA to the wood, making it exceedingly resistant to washing out.

Processes have been developed to accelerate this fixation process to minimise or even eliminate the possibility of environmental contamination associated with the use of CCA.

However, where environmental or health legislation has forced restrictions on lumber treated with CCA, there are alternative formulations which are ideally suited for treatment of New Zealand pine. These include amoniacal copper quaternaries (ACQ), copper azoles, copper HDO and copper dimethyldiocarbonate (DMDC).

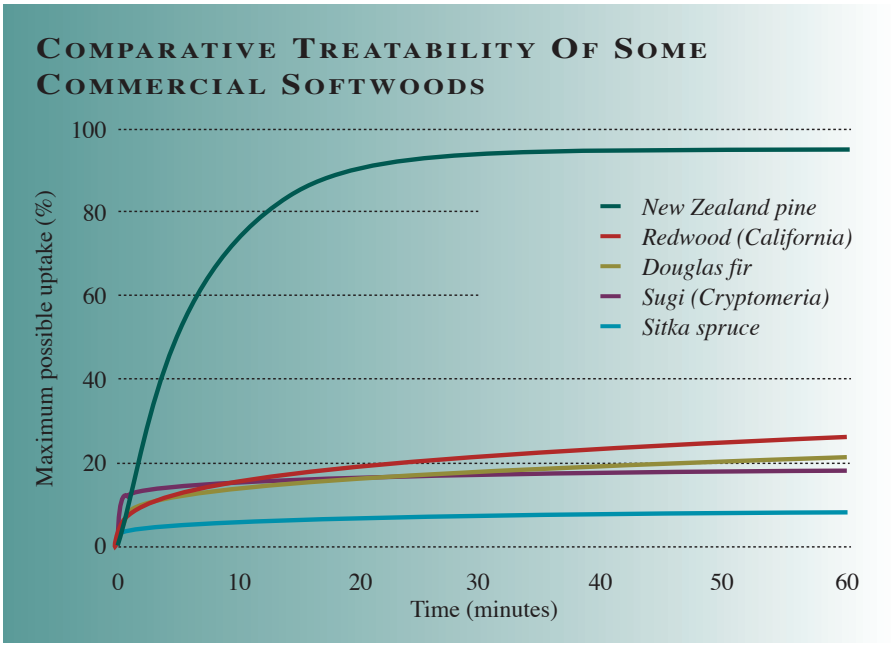
Creosote

Creosote is used for treating railway cross-ties and electric power transmission poles. Creosote treatment of sawn New Zealand pine is particularly effective because deep penetration of the heartwood can be achieved.

Light Organic Solvent Preservatives (LOSP)

LOSP are used for the treatment of fully machined componentry and fabricated commodities. Their main advantage is that, unlike water-borne preservatives, they cause no swelling of the wood during treatment and require no secondary air or kiln drying after treatment.

Comparative Treatability Of Some Commercial Softwoods



PRESERVATIVE TREATMENT PROCESSES

An important feature of New Zealand pine is that it can be treated easily. In New Zealand and around the world the Bethell (full cell or vacuum/pressure) process is the most widely used. This process involves applying a vacuum of -85 kPa to the wood, flooding with preservative solution at this vacuum, and then pumping solution into the wood at 1400 kPa. The treatment is complete only when the wood absorbs no more solution.

Not only is the sapwood of New Zealand pine easy to treat, but the relatively small amount of heartwood present can be treated as well. Research has shown that penetration of preservative into heartwood is improved by high-temperature drying or by steam-conditioning before treatment. In fact, complete preservative penetration in New Zealand pine sapwood and heartwood can be achieved consistently. New Zealand pine may be unique in this respect.

Because New Zealand pine is so permeable to wood preservatives, treating processes can be readily developed in response to environmental and economic pressures associated with traditional processes. These include processes to treat partially seasoned wood, to accelerate CCA fixation, to reduce post-treatment drying costs and to promote rapid throughput.

Virtually all pressure treatment is done with CCA preservative. However, the future international importance of boron as a wood preservative, and the processes used to apply it, cannot be ignored. As well as giving insecticidal protection, boron treatment imparts some decay resistance to the treated wood.

COMMODITIES & ASSIGNED HAZARD CLASSES

Commodities	Australia/ New Zealand	America	Africa	Europe	Japan
Framing & flooring lumber	H1/H2	H1	H1	1	K1/K2
Sillplates or bottom plates	H2/H3	H3	H2	2	K2/K3
Windows, barge /fascia boards	H3	H2	H3	3	K3
Decking, fence boards	H3	H3	H3	3	K3
Fence posts, garden edging & landscaping	H4	H4	H4	4	K4
Wood foundations, transmission poles	H5	H5	H5	4	K5
Marine piles, breakwaters	H6	H6	H6	5	–

PRESERVATIVE TREATMENT FOR SPECIFIC END-USE CONDITIONS

There are a number of ways of writing standards or specifications for preservative treatment. Most common are Commodity Standards (e.g. USA), Process Specifications (UK), and Hazard Class Specifications (New Zealand, Australia).

With hazard class specifications, the nature of the biodegradation risk (decay, wood-boring insects or termites) is first determined from the wood exposure conditions (e.g. indoors, protected from the weather, outdoors, in ground contact) and the preservative retention and penetration into the wood are varied to reduce the risk of biodegradation to an acceptable level

In New Zealand, roundwood (posts and poles), sawn lumber, and plywood are treated to the following six hazard class levels. Preservative treatment requirements are generally equivalent to or exceed those of other countries which have formal wood preservation standards.

H1 – Sawn lumber used in situations continuously protected from the weather. The purpose of preservative treatment is to protect against attack by wood-boring insects. Boron is the main preservative used and treatment would comply with all relevant standards for insect protection.

H2 – Sawn lumber and plywood used in interior situations where there is a slight risk of decay and a risk of termite attack. CCA and LOSP are the main preservatives used. Treatment to this hazard class is solely for lumber and plywood which will be exported to Australia.

H3 – Sawn lumber and plywood which will be used in exposed exterior situations but not in contact with the ground. CCA and LOSP are the main preservatives used.

H4 – Sawn lumber, roundwood and plywood used in ground contact in non-critical situations. CCA and creosote are used in New Zealand for wood in this category.

H5 – Sawn lumber, roundwood and plywood used in ground contact with extreme decay hazard or critical end-use requires greater protection - mainly for house foundation piles and transmission poles. CCA and creosote are approved for this use. Preservative retentions are 33% higher than those of Hazard Class H4.

H6 – Sawn lumber and roundwood used in a marine environment. Only CCA is used and the main New Zealand pine commodity treated is marine piles.