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INVESTIGATION OF EFFECTIVE NON-PRESSURE PRESERVATIVE TREATMENTS FOR LUMBER

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The Canadian wood preservation industry relies heavily on specific wood species for preservative treatment. Increased competition for these species, accompanied by changes in the nature and quality of regenerated forest areas have resulted in both increased prices, and the necessity to import certain commodities (poles and some lumber) for treatment at plants in eastern Canada.

These trends are likely to continue in the future unless greater utilization of local refractory wood species (spruce, fir, etc.) is somehow accomplished. Forecasts for the treated wood industry point to a growing demand in certain product areas such as landscape timbers, decks and patios, highway sound barriers, treated shingles and shakes, marine decks, piers, fence posts and domestic uses. Many of these uses provide excellent opportunities for increasing the dollar value and profit margin for primary wood products.

Large capital investment is necessary for the development of pressure treating facilities, and many producers are faced with the prospects of treating refractory wood species by conventional pressure methods. DeGroot* suggests that non-pressure treatments may offer unique advantages for developing local markets for such species. Forintek's non-pressure thermal diffusion process for both refractory and permeable species may allow processors to expand into these market areas with considerably lower capital investment than that required for pressure treating facilities. At the same time, such a system may complement some existing pressure facilities since identical preservatives can be utilized for both systems.

During 1981, Forintek investigated the feasibility of utilizing ammoniacal wood preservatives for non-pressure thermal diffusion treatments. Progress was made in solving a major technical problem associated with the use of ammoniacal systems in open tank facilities, namely the evolution of NH_3 gas upon heating of the preservative.

It was found that by simply adding an immissible solvent (oil) as a surface sealer, ammoniacal vapors could be controlled sufficiently to allow thermal diffusion treatments to be carried out in open vessels.

Treatments performed on green, white spruce, 2 x 6 x 82 inch, lumber showed favorable results with penetrations of 7 mm or more in heartwood areas (4.1 percent oxides) ACA.

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*DeGroot, R.C. 1982. New opportunities for utilizing chemically treated wood. Wood and Fibre 14(3):211-223.

Further work was carried out in 1982 using increased solution oxide concentration (6.5 percent oxides of ACA/CAA) to enhance diffusion. Test material (2 x 8 in. white spruce lumber) has been obtained from Murry Bros. Lumber, near Algonquin Park, Ontario. An across-the-grain incising process is being investigated as a means of further improving treatments. This process appears to increase penetration significantly.

The charges, run to date, have used heating periods of seven hours at 82°C and cooling periods of 17 to 65 hours. Treating periods of 48 hours have proved to be successful in meeting the penetration requirements of lumber for ground contact use, as outlined in the CSA 080 stadard.

The use of efficient low cost thermal diffusion treatments could dramatically increase the number of wood species, and volume of wood, available for use by the treated wood products industry.

The treating method may ultimately result in lower cost, treated products for the consumer, since it relies on non-imported wood species often locally available and requires less capital investment for equipment.

Lower costs will ensure that wood remains competitive with alternative products in the market place.

The primary processing portion of the industry may increase profits by gaining a share of certain current treated wood markets and expanding future market areas.

The potential for thermal diffusion treatments, as a viable low cost method of treating tropical woods, may be valuable to some developing nations. Timbers or lumber are treated green which solves some problems associated with the seasoning of larger timbers in humid climates. Preservatives utilized in the system can be made more or less toxic, depending on the specific end use requirements, without altering the basic fixation mechanism.

A full report on the work performed during 1981 is available from Forintek Canada Corp.