

Beetle-killed wood tested for use in composite panels

FORESTRY INNOVATION INVESTMENT LTD.

No. MPB 2006-03

MOUNTAIN PINE BEETLE
Updated

An interim research report commissioned by Forestry Innovation Investment Ltd. says lodgepole pine killed by the mountain pine beetle is like a new and different species for makers of composite panel products.

Compared to green lodgepole pine, it has different chemical, wettability and bondability characteristics. By the time this research project is completed, the researchers will know more about how the fibre performs in actual production and use.

The aim of the study is to see if mountain pine beetle-killed wood has potential for use in greater quantities in production of oriented strandboard (OSB), medium density fibreboard (MDF), particleboard and high density fibreboard (HDF). Manufacturers currently use beetle-killed wood with caution in panel products because its unique chemistry and characteristics are not yet well understood. With an increasing supply of beetle-killed wood, there is naturally a desire

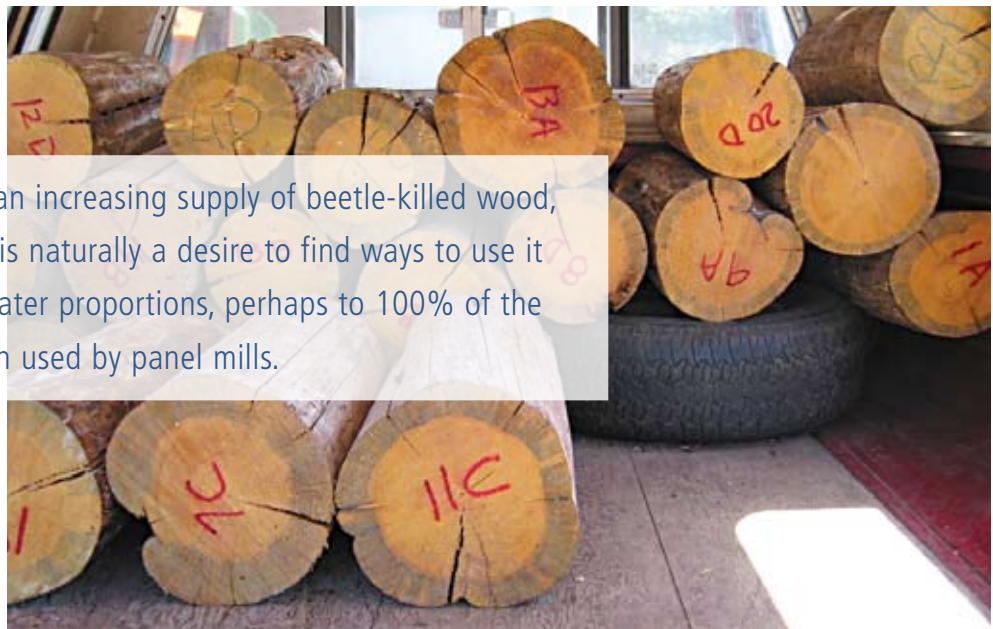
to find ways to use it in greater proportions, perhaps to 100% of the furnish used by panel mills.

Forintek Canada researchers compared beetle-killed logs from the Quesnel area with green pine logs. They mixed fibre with water to create a solution that could be tested for pH levels and buffer levels that determine how resistant the fibre is to being made more acidic or alkaline. Fibre was also tested for water absorption rates and thickness swell. Bondability of the beetle-killed wood using five types of commercial wood adhesives was evaluated using lap-shear tests with an Automatic Bond Evaluation System.

Beetle-killed wood is more acidic than green pine (sapwood has a pH of 4.45 vs. 4.60, and heartwood has a pH of 4.38 vs. 4.95). Buffer capacities are higher than in green wood. Both of these results have implications for the curing of amino adhesives, which are widely used in MDF, HDF and particleboard manufacturing. Acidity



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is less of an issue for adhesives used in OSB.

In water soak tests, researchers noted that beetle-killed sapwood had extremely fast and high water absorption – with moisture content going from less than 10% to more than 80% in half an hour, reaching 120% after 24 hours (compared with 55% in green pine after 24 hours). Higher water temperatures increased water absorption rates. The data have implications for cost control, as chemicals such as water-based adhesives and wood preservatives will also be absorbed at a higher rate than normal. Thickness swell of the beetle-killed sapwood was less than in green wood.

The bonding strength of panels made with beetle-killed wood and a liquid phenolic resin was similar to that of aspen panels when press



the beetle-killed wood may be more suitable for an OSB face layer than a core layer material because the face layers undergo much more densification during panel pressing.

FOR THE FULL REPORT GO TO WWW.BCFII.CA/MPB AND DOWNLOAD REPORT "MPB 2006-03: BONDABILITY OF BEETLE-KILLED LODGEPOLE PINE FOR THE MANUFACTURE OF WOOD COMPOSITE PRODUCTS".

temperatures of 200°C were used. Strength was decreased when the temperature was dropped to 140° C, and also when powdered phenolic resin was used. Liquid urea formaldehyde resin provided comparable strength to aspen at a press temperature of 180°C, and less when a lower temperature of 120° C or a powdered urea formaldehyde resin was used. When polymeric MDI adhesive was used, beetle-killed wood produced lower bonding strength than green pine.

In comparison with aspen, the beetle-killed wood has substantially higher density. This will have a major influence on OSB panel properties and production costs. The Forintek researchers suggest that

Forestry Innovation Investment Ltd. is a British Columbia government corporation investing in initiatives to help market BC forest products, and promote our sustainable forest practices to the world. FII's Mountain Pine Beetle Program supports government's Mountain Pine Beetle Action Plan and its objective to maximize the economic value of mountain pine beetle wood. FII does this through marketing activities and research into new products and manufacturing processes for mountain pine beetle wood.

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