Fibre and pulp property database could aid pre-sort of beetle-killed wood

FORESTRY INNOVATION INVESTMENT LTD. No.MPB 2006-14

MOUNTAIN PINE BEETLE update

Mountain pine beetles are changing the face of the wood resource in British Columbia, and causing some headaches in the production of lumber and pulp and paper.

Through a series of tests, researchers in the Department of Wood Science at UBC are supplying some insight into the wood properties of three-year-old and five-year-old beetle-killed trees.

A database of strength properties, water absorption, gluing characteristics, and properties of the fibre source and product potential in relation to time-since-tree-death is included in an interim report conducted by these UBC scientists in conjunction with Canfor researchers for Forestry Innovation Investment Ltd.

The data will contribute to the development of mill strategies and an indicator system that could be used to pre-sort logs and/or lumber to get the most value from beetle-killed fibre.

This project has been developed due to the increasing level of older beetle-attacked wood entering the timber supply chain in the north and central interior of B.C., where primary lumber manufacturing is the dominant industry, providing fibre for secondary pulp and paper production.

Strength properties and gluing characteristics are important for structural wood products and value-added products. Similarly, the sack Kraft market requires pulp with high strength, particularly in tear and tensile, so it is important for manufacturers to know how beetle-killed fibre affects those characteristics.

Testing material for the project – two truckloads of three-year and five-year beetle-killed fibre – was delivered to Canfor's Plateau sawmill near Vanderhoof.

More than 50 16-foot bolts were bucked and labelled for the three-year-since-attack stems and 55 16-foot bolts for the five-year material. The bolts were rotated for optimum position for sawing and squared into a large cant in the chip/canter. Chip mixtures of 70% 16 mm round and 30% 7 mm round fractions were prepared for the pulping study and stored in a cooler at 5°C.

For moisture content and extractive analysis, one-inch strips from pith to bark were sampled from disks. For near infrared fibre analysis, one-inch strips from pith to bark and sapwood were sampled.

To investigate the gluing characteristic properties of beetle-killed lodgepole pine, glued wood specimens were prepared and tested for durability and shear strength under two test conditions: PVA adhesive – room temp at 125 psi specific pressure for two hours; PU adhesive – room temp at 125 psi for 45 minutes.

The results from the study deal with key strength properties, gluing characteristics, pulp and fibre quality, log quality, lumber quality and other fundamental properties of beetle-killed wood.

There are no apparent clear trends in glue bond strength between the three-year and five-year material. However, the sapwood from the five-year material tends to possess the lowest glue bond shear strength.

Lumber recovery, in terms of volume, was skewed by the fact that the five-year individual log samples were bigger than the three-year log samples; therefore the results were inconclusive.

Resin acid concentrations tended to rise with time-since-beetle-attack in all wood components. Five-year attack stems had on average 49% and 31% more resin acid in sapwood and heartwood, respectively, compared to those components in three-year attack stems.

It was found that the moisture content of the beetle-killed chips was lower compared to the spruce-pine-fir benchmark sample, by 20%.

Additionally, the beetle-killed wood had a lower proportion of the 16 mm chip fractions in comparison to the benchmark sample. The 7 mm fractions were 18% lower for three-year material and not significantly different in five-year material compared to the benchmark sample. The fines content of the five year attack sample was 80% higher than the reference.

Using some of the results from this study, and the database supporting those results, producers may be able to assess their operations and adjust accordingly to maximize their use of beetle-killed fibre. The next step is to develop a properties indicator

FOR MORE RESULTS FROM THIS STUDY, GO TO **WWW.BCFII.CA/MPB/** AND DOWNLOAD "MPB 2006-14 - DEVELOPMENT OF PROPERTIES INDICATORS AND DATABASE FOR MOUNTAIN PINE BEETLE-INFESTED WOOD IN RELATION TO TIME-SINCE-TREE-DEATH."

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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