



## Advances In Utilization Of Southern Pine Beetle-Killed Timber

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The southern pine beetle is one of the most destructive pests to pine forests in the southeastern U.S. Forest landowners and managers in this region most recently dealt with a SPB outbreak during the late 1990's., which cost the region over \$1 billion in lost revenue. Frighteningly, there was probably a lower volume of timber at risk relative to today, largely due to changes in forest land ownership patterns and management strategies.

Southern pine beetle populations have been low in recent years, however their population phases are cyclic. Historically, southern pine beetle outbreaks have occurred on average every 6-9 years, and can last between 3-5 years depending on the severity of the outbreak. Although we are chronologically overdue for an outbreak, no signs of rising beetle populations have been detected. This may be a false sense of security, however, given the high

standing wood volume and number of susceptible stands which remain throughout the region.

Although the volume of pine wood grown locally has held steady or increased throughout the region over the last several decades, the infrastructure to handle this resource has declined in recent years. Competition from Canadian softwood producers and a slump in wood prices, due to a worldwide economic recession, have forced many lumber mills to shutter and others to run at lowered production levels. During past outbreaks of southern pine beetle, a large percentage of affected pine timber was processed into lumber. If an outbreak were to occur in the coming years, our lumber processing infrastructure would likely struggle to handle the large volume of affected timber, and economic losses may be substantially larger than those experienced during the late 1990's. It is vital to the economy of this region to develop new uses for southern pine beetle-killed

timber before another outbreak occurs.

The primary concern with marketing southern pine beetle-killed timber is the presence of a symbiotic blue-stain fungus and the resultant stain it imparts to the wood. Blue-stain fungi do not cause any strength loss to occur in wood; however the lumber that contains this resultant stain has a lowered economic value. This decrease in value is solely due to the wood's lack of aesthetic appeal to consumers. Some retailers have attempted to increase the value and appeal of blue-stained lumber to consumers by labeling it a "green" product or marketing it as designer "denim wood", often to little avail. The development of a value-added wood product from blue-stain timber would greatly enhance its economic value.

Despite the obvious need, wood composite products manufactured from southern pine beetle-killed timber have received limited attention, especially in recent decades. However,

recent research indicates that blue-stained wood may be a superior furnish for wood composite products (unpublished data). Blue-stain fungi degrade some of the non-structural components of wood (i.e. not cellulose or lignin), and in turn make the wood more porous. This increase in porosity and surface area means that adhesives and waxes (water repellants) are more able to penetrate the wood's surface and form a strong bond. Any further increase in surface area of the wood due to manufacturing procedures, such as chipping, flaking, or milling the wood into smaller particles, may compound these benefits.

Although it may not be apparent, many composite products such as oriented strand board (OSB) have layers, which are oriented perpendicular to each other to increase strength and stability within a panel. In the case of OSB, pine timber (in the South) is processed into various sized wood pieces called flakes. The flaking process increases the surface area of the wood, which may allow better adhesive penetration and bond. Due to their increased porosity, if blue-stained chips are used during the manufacturing

process, they are likely impart some increases in strength and durability to the finished OSB products. In addition, since OSB has layers, it is possible to orchestrate the placement of blue-stained wood in the middle layers of a panel. Therefore, blue-stained timber may enhance the quality of certain wood composite products, while avoiding consumer-driven issues with aesthetics of the finished products.

Although we are overdue for a southern pine beetle outbreak, another one will likely occur. When it does, we, as an industry, need to be prepared. If promptly salvaged, southern pine beetle-killed timber values may be enhanced if we can educate others in our industry and the public about the positive characteristics of using blue-stained wood to produce composites. Wood composite products may provide a much needed additional outlet for southern pine beetle-killed timber. With further research, the superior composite characteristics of blue-stained wood may result in an increased market for southern pine beetle-killed timber, ultimately improving its value for all.

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