

## Improving the Dimensional Stability of Bamboo Woven Strand Board

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**Abstract :** Bamboo Woven Strand Board (WSB) products are manufactured from Ethiopia highland bamboo (*Yushania alpina*) as a multiple layer mat structure for enhanced mechanical performance. Hence, it shows similar mechanical properties as tropical hardwood products. WSB, therefore, constitutes a sustainable alternative to tropical hardwood products. The resin and wax ratio had a great influence on the determinants properties of the product quality such as internal bonding, water absorption, thickness swelling, bending and stiffness properties. Among these properties, because of the hygroscopic nature of the bamboo, thickness swelling and water absorption are important performances of WSB for using in construction and outdoor facilities. When WSB is exposed to water or moist environment, they tend to swell and absorb water in all directions. The degree of swelling and water absorption depends on the type of resin used, resin formulation, resin ratio, wax type and ratio. The objective of this research is investigating effects of phenol formaldehyde and wax on thickness swelling and water absorption behavior on bamboo WSB for construction and outdoor facilities. The experiments were conducted to measure the effects of wax and phenol-formaldehyde resin content on WSB thickness swelling and water absorption which leads to investigate its effect on dimension stability and mechanical properties. Both experiments were performed with 2-hour and 24-hour water immersion test and a significant set of data regarding the influence of such method parameters is also presented. The addition of up to 2% wax with 10% of phenol formaldehyde significantly reduced thickness swelling and water absorption of WSB which resulted in making it more hydrophobic and less susceptible to the influences of moisture in high humidity conditions compared to the panels without wax.

**Keywords :** woven strand board (WSB), water absorption, thickness swelling, phenol formaldehyde resin

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