

THE INFLUENCE OF THERMAL MODIFICATION ON VENEER BOND STRENGTH

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ABSTRACT

The purpose of this study was to investigate the effect of thermal modification on birch veneer properties relevant in plywood manufacture. The wood material used in this study was a birch (*Betula pendula* Roth) stem sectioned into small logs nominally 1.2 m in length. The logs were completely immersed in a water tank heated to either 70 °C or 20 °C. The soaked logs were rotary cut on an industrial scale lathe (Model 3HV66; Raute Oyj, Lahti, Finland) into veneer with a nominal thickness of 0.8 mm.

Veneer specimens (150x150 mm²) were cut and thermally modified at 200°C in steam conditions for 2, 4 and 8 h. Mass loss and equilibrium moisture content (EMC) were measured after modification. The bond strength of the veneers was measured with automated bonding evaluation system (ABES- Adhesive Evaluation Systems, Inc., Corvallis, Oregon, USA) using phenol formaldehyde (PF) resin (Prefere 14J021, Prefere Resins Finland Oy, Hamina, Finland). Specimens (20 x 117 mm²), were cut from the conditioned veneer sheets. A liquid PF resin was applied to an area of 5 x 20 mm² at one end of the veneer specimens (approx. spread rate 100 g m⁻²). After adhesive application, the veneer-resin assembly was placed into the ABES and after 180 s of pressing (130 °C and 2.0 MPa) the shear strength of adhesive bond was measured.

As expected from previous studies, the mass loss increased and EMC reduced with longer thermal modification time. No significant difference in mass loss or EMC between log soaking temperatures was recorded in this study. The thermal modification slightly reduced the bond strength; however, longer treatment time did not further reduce the bond strength. Therefore, based on this study, thermally modified veneers could be successfully bonded and used for plywood manufacture. The results are presented in more detail in the poster.

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Key words: birch, bond strength, log soaking, thermal modification, veneers.

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