

Self-bonding of veneers with heat and pressure – a full scale test

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Making boards from veneers does not have to involve glue; high temperature and high pressure together can suffice to produce a self-laminated board with excellent mechanical properties. In earlier studies, small boards of beech veneers were shown to self-bond in a small laboratory press (Cristescu, 2006). In this study, the self-bonding capacity of full-size beech veneers of dimensions 1200x1200x2 mm were tested.

Two electrically heated plates were mounted in a conventional 100 ton hydraulic, see Figure 1. Each panel consisted of five peeled veneers overlaid in a parallel grain direction. The veneers were taken from the regular production and conditioned to an equilibrium moisture content of 7% before being subjected to a pressure of 5 MPa and a plate temperature of 220°C for 5 minutes. The evolution of temperature in two of the bond-lines was recorded by thermocouples, see Figure 1. A total of 10 panels were produced. After pressing, the boards were allowed to cool in a vertical position. Dry and wet shear strength tests were run to check the bonding quality.

The pressing procedure was a success and proved that bonding solely with heat and pressure is a method that can be applied to veneers with large surfaces areas. The temperature recordings as well as the shear strength tests showed that the heat was not evenly distributed within the plates. The samples therefore exhibited different bonding properties although they were taken from the same board. The heating devices should be improved to achieve a uniform heat distribution in the laminate during pressing. A well-defined cooling procedure should also be introduced to avoid boards warping after pressing.

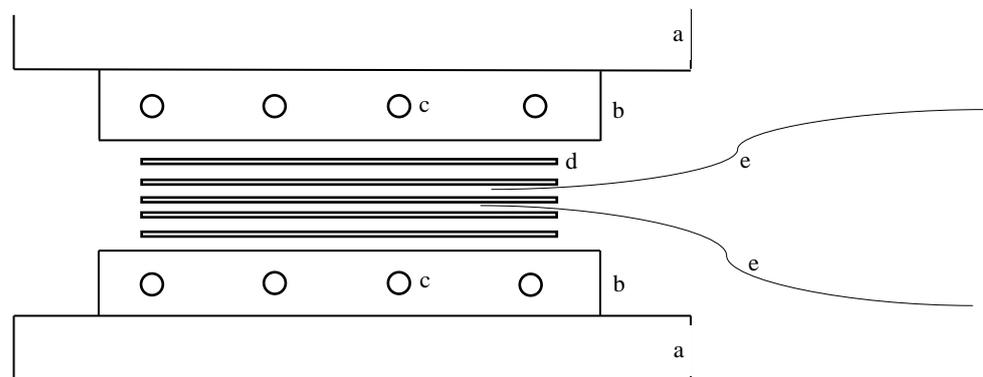


Figure 1. Schematic representation of the press, including five veneers and thermocouples in two of the bond-lines: (a) press plate, (b) electrically heated plates, (c) heating elements, (d) veneers, (e) thermocouples.

References:

C, Cristescu, In: Proceedings of the 2nd international conference on environmentally-compatible forest products "Ecowood" Porto, Portugal, pp. 339-348. 2006

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