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ONLINE ISSN : 1880-7577

PRINT ISSN : 0021-4795

Mokuzai Gakkaishi

Vol. 51 (2005) , No. 4 p.234-242



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Deformation Behavior of Wood by Roller Pressing

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(Received November 2, 2004)

(Accepted January 31, 2005)

Abstract: We investigated the deformation behavior of wood being pressed perpendicular to the grain and the bending properties of the wood after pressing. Sugi (*Cryptomeria japonica* D. Don) flat-sawn timber prepared with various dimensions and moisture contents was compressed by a roller press or a platen press. The strain distribution and shear flow of the specimen surface under an applied load were measured by an image analysis method. The results showed that a large compressive strain was concentrated in the outer surface layer of the specimen by roller pressing, and shear strain occurred by roller pressing. This trend was intensified when the contact angle between the roller and the specimen was increased, and the trend was weakened in wet conditions. Forward slip was observed on the side of the specimen. The reason this phenomenon occurred only when using roller press was that the surface layer of the specimen was shear-deformed toward the tail end.

The bending properties after roller pressing decreased in inverse relation to the contact angle. On the other hand, the bending properties did not change when the contact angle was small. The specimen retained their bending properties when compressed at the contact angle that is lower than the point at the intersection of the lower limit of the 95% confidence interval for uncompressed specimens with the approximated line for all compressed specimens.

Keywords: wood, roller press, compression, deformation behavior, bending property



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To cite this article:

Koji ADACHI, Masafumi INOUE and Shuichi KAWAI: Mokuzai Gakkaishi Vol. 51, No. 4, 234-242 (2005) .

doi:10.2488/jwrs.51.234

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