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ONLINE ISSN : 1880-7577

PRINT ISSN : 0021-4795

Mokuzai Gakkaishi

Vol. 51 (2005) , No. 3 p.189-195



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## Fracture Morphology and Effect of Compression Volume on Tensile Strength of Compressed Wood

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(Received April 22, 2004)

(Accepted November 12, 2004)

**Abstract:** Tensile strength property of sugi wood (*Cryptomeria japonica* D. Don) compressed to various ratio was examined, and the relationship between the effect of compression volume and the morphological break was investigated for tensile strength. Focusing on the change in wood pore volume by compression, density, elastic modulus and tensile strength of the compressed wood were estimated by the law of mixture. The results showed that the density and elastic modulus obtained in this experiment could almost be estimated by the law of mixture, but this law of mixture could not be applied to tensile strength at the high compression ratio. The tensile strength of the compressed wood was almost the same for compression ratio of more than fifty percent, and did not correspond to the change of elastic modulus in tension, whereas the elastic modulus increased exponentially with the increase in compression volume. Observations of fracture morphological suggested that the lowering of the tensile strength in the cell wall, which was produced at exceeding the compression ratio of fifty percent, was caused by the superposition action of the brittleness with the increase in compressive deformation of earlywood and latewood.

**Keywords:** compressed wood, compression ratio, density, elastic modulus, tensile strength

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To cite this article:

Tadashi OHTANI, Yoshitaka KUBOJIMA and Kiyoshi MATSUSHITA: Mokuzaishi  
Vol. 51, No. 3, 189-195 (2005) .

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doi:10.2488/jwrs.51.189

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