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Strength Properties of Aged Wood III.

Static and impact bending strength properties of aged keyaki and akamatsu woods

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Abstract: Mechanical properties, namely modulus of rupture (MOR), modulus of elasticity in bending (MOE) and impact bending strength, were measured with small clear test specimens of new and aged wood. The test specimens of keyaki (*Zelkova serrata* MAKINO) aged 255 years and akamatsu (*Pinus densiflora* SIEBOLD et ZUCCARINI) aged 115, 270 and 290 years were made of the same wood described in the previous report of this work. A Monte Carlo simulation was done to adjust the distribution shape of density of new wood to that of aged wood. Comparison of mechanical properties of aged and simulated new wood are summarized as follows : MOR and MOE decreased 16.3% and 14.8%, respectively, in aged keyaki wood, and increased 17.3%, and 10.8%, respectively in akamatsu wood aged 270 years, and 42.1%, and 26.8%, respectively, in akamatsu wood aged 290 years. In akamatsu wood aged 115 years the difference between new and aged wood was not significant. The impact bending strength decreased in both keyaki and akamatsu aged wood. The rates of decrease were 15.2% in keyaki wood, and 27.1% and 22.1%, respectively, in akamatsu wood aged 270 and 290 years. The ratio of the stress at proportional limit to the ultimate stress increased 14.1-31.9% in akamatsu aged wood. Judging from the results of the series of these studies, including the previous reports, it is seen that the aged akamatsu wood developed a tendency

toward brittleness with the lapse of time though the aged wood showed higher values of strength (compression, static bending and shear) than new wood. This tendency led to a decrease of the length of the failure surface (tension), an increase in the proportional limit (compression and static bending) and a decrease in strength (tension and impact bending).

Keywords: aged wood, strength properties, bending test, impact bending test



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