



Effects of the Width and Lay-Up of Sugi Cross-Laminated Timber (CLT) on its Dynamic and Static Elastic Moduli, and Tensile Strength

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Summary:

Cross-laminated timber (CLT) has recently emerged as a new wood product that utilizes a large quantity of domestic lumber. This study aims to analyze the effects of width and lay-ups on the tensile strength of CLT. To this end, the elastic modulus of sugi CLT with different lay-ups was measured by dynamic and static methods. Moreover, tensile tests were conducted for different widths and lay-ups of CLT. Results indicate that the apparent bending Young's modulus, as calculated using the dynamic method, is directly proportional to the measured Young's modulus in static method for each lay-up. Furthermore, there was no significant effect of width on the tensile strength in the range of 150, 300, and 600 mm. However, the variations in lay-ups affected the tensile strength as follows: CLT with larger ratio of the major strength direction lamina along the cross-section and with higher grade of lamina in the major strength direction showed higher tensile strength. The estimated tensile strength of CLT, as calculated using the Young's modulus of the lamina of each layer, and the tensile strength of lamina as simple substance was found to be in good agreement with the measured tensile strength of CLT.

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