

Correlation Between Literature and Experimental Findings - A Comparative Analysis of Mechanical Properties in Bamboo

S.A.S. Madhushan^{1*}, H.A.D.S. Buddika¹, N.M.S.H. Bandara¹, N. Abey Suriya²

¹ Department of Civil Engineering, University of Peradeniya, Peradeniya 20400, Sri Lanka

² NCD consultants (pvt) ltd, Nugegoda, 10250, Sri Lanka
*sumeeramadhushan96@eng.pdn.ac.lk

This study gives a detailed comparative investigation of bamboo's mechanical properties, analyzing the relationship between information acquired from the literature and experimental data. Bamboo, known for its ecological sustainability and mechanical adaptability, has acquired widespread acceptance in a variety of technical applications. The goal of this research is to analyze the coherence of existing literature data and contribute to a better understanding of the mechanical behavior of bamboo. A detailed literature review addresses the tensile strength, compressive strength, shear strength, flexural strength, and modulus of elasticity of bamboo. The study goes on to examine at how characteristics like species, age, and moisture content affect bamboo's mechanical performance, identifying potential causes of variation under different situations. Empirical tests involve carefully testing *dendrocalamus giganteus* bamboo samples, which is found from Peradeniya university premises, using a Universal Testing Machine (UTM) for compressive, shear, and flexural tests. Moisture content is measured for each specimen, ensuring precise findings. Statistical analysis connects experimental results to literature data, revealing similarities and differences in diverse contexts. Analyzing the test results average density 796.67[576-1 100] kgm⁻³, compressive strength 49.875[29.33-108.2] MPa, flexural strength 60.01[40.05-99.74] MPa, and shear strength 9.53[7.39-29.12] MPa were calculated and compared with the literature (Literature results are shown inside the brackets). The findings of the study shed light on the veracity of current literature data on bamboo's mechanical properties and improve understanding of bamboo's mechanical behavior. This study supports in making informed decisions about using bamboo in engineering applications, while also supporting sustainable and ecologically sensitive practices. The combination of scientific findings and empirical assessments leads to a full understanding of bamboo's mechanical properties, providing useful insights for future research and application.

Keywords: Bamboo, Mechanical properties, Comparative analysis, Experimental findings, Sustainable engineering.

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