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EXPERIMENTAL ANALYSIS OF ENGINEERING PROPERTIES OF SOME SELECTED AFRICAN TIMBER SPECIES FOR SUSTAINABLE BUILDING DEVELOPMENT

S. E. Kelechi-Asumba [(1)] O. A. U. Uche [(2)] I. P. Okokpujie [(3)] M. Udo [(4)]

[(1)] Department Civil Engineering, Bayero University, Kano, Nigeria.
[(2)] Department Civil Engineering, Bayero University, Kano, Nigeria.
[(3)] Department of Mechanical Engineering, College of Engineering, Covenant University, Ota, Nigeria.
[(4)] Department of Mechanical Engineering, College of Engineering, Covenant University, Ota, Nigeria.

Abstract

This research work aims at the experimental analysis of engineering properties of some selected African timber species for sustainable building development. A welldesigned questionnaire distributed to the correspondents was used to select the test samples. using availability and demand of the identified species, Mitragyna ciliata (Abura), Khaya senegalensis (Mahogany) and Terminalia superba (White Afarara) respectively were discovered as the three dorminant higher known species while Funtumia ebrifu (Ire), pterocarpus erinaceus (Madoobiya) and Albizia labbek (Ayinre) the three dorminant lesser known timber species. Samples of these species were obtained from Rijia lemu timber market, Kano Nigeria. Several experimental tests were conducted to determine the engineering properties of the samples in line with EN13183-1, EN408 and ASTM D193, using three- and four-point bending strength test methods. The formulated properties were used to acquire the characteristic values of the engineering properties in corespondant with EN384. The remaining engineering properties were calculated from the empirical formular given in EN338. Mitragyna ciliate was classified to C20, Khaya senegalensis to D35, Terminalia superba C14, Funtumia ebrifu D24, pterocarpus erinaceus D50 and Albizia labbek to class D40. The software EasyFit was used to create Stochastic probability distribution models on the reference properties of the timber species in which Kolmogorov Smirnov test was the supporting distribution, which indicates that most suitable distribution for bending strength, modulus of elasticity and density was weibull, gumbel and lognormal distributions respectively. However, the questionnaire analysis indicates specie popularity as the major factor for the increased demand pressure on the higher known species instead of engineering properties. Therefore, for sustainable building development the use of lesser known timber species with good engineering properties should be encourage so as to reduce the escalating demand pressure on the higher known species to prevent the species from going into extinction.

Author Keywords

Sustainable building development, African timber species, engineering properties, higher Known timber species, lesser known timber species, strength classes, Easy Fit

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