

Experimental Investigations on the Mechanical properties of Spiny (Kawayan Tinik) Bamboo Layers

Authors : Ma. Doreen E. Candelaria, Ma. Louise Margaret A. Ramos, Dr. Jaime Y. Hernandez, Jr

Abstract : Bamboo has been introduced as a possible alternative to some construction materials nowadays. Its potential use in the field of engineering, however, is still not widely practiced due to insufficient engineering knowledge on the material's properties and characteristics. Although there are researches and studies proving its advantages, it is still not enough to say that bamboo can sustain and provide the strength and capacity required of common structures. In line with this, a more detailed analysis was made to observe the layered structure of the bamboo, particularly the species of Kawayan Tinik. It is the main intent of this research to provide the necessary experiments to determine the tensile strength of dried bamboo samples. The test includes tensile strength parallel to fibers with samples taken at internodes only. Throughout the experiment, methods suggested by the International Organization for Standardization (ISO) were followed. The specimens were tested using 3366 INSTRON Universal Testing Machine, with a rate of loading set to 0.6 mm/min. It was then observed from the results of these experiments that dried bamboo samples recorded high layered tensile strengths, as high as 600 MPa. Likewise, along the culm's length and across its cross section, higher tensile strength were observed at the top part and at its outer layers. Overall, the top part recorded the highest tensile strength per layer, with its outer layers having tensile strength as high as 600 MPa. The recorded tensile strength of its middle and inner layers, on the other hand, were approximately 450 MPa and 180 MPa, respectively. From this variation in tensile strength across the cross section, it may be concluded that an increase in tensile strength may be observed towards the outer periphery of the bamboo. With these preliminary investigations on the layered tensile strength of bamboo, it is highly recommended to conduct experimental investigations on the layered compressive strength properties as well. It is also suggested to conduct investigations evaluating perpendicular layered tensile strength of the material.

Keywords : bamboo strength, layered strength tests, strength test, tensile test

Conference Title : ICCSEE 2015 : International Conference on Civil, Structural and Earthquake Engineering

Conference Location : Toronto, Canada

Conference Dates : June 15-16, 2015