

Experimental Investigation on Flexural Properties of Bamboo Fibres Polypropylene Composites

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Abstract : Abstract: The current investigation aims to measure the longitudinal and transversal three-point bending tests of bamboo fibres polypropylene composites (BFPPCs) for the application of the automobile industry. Research has not been done on the properties of Ethiopian bamboo fibres for the utilization of composite development. The samples of bamboo plants have been harvested in 3-groups of age, 2-harvesting seasons, and 3-regions of bamboo species. Roll milling machine used for the extraction of bamboo fibres which has been developed by the authors. Chemical constituents measured using gravimetric methods. Unidirectional bamboo fibres prepreg has been produced using PP and hot press machine, then BFPPCs were produced using 6 layers of prepreps at automatic hot press machine. Age, harvesting month, and bamboo species have a statistically significant effect on the longitudinal and transverse flexural strength (FS), modulus of elasticity (MOE), and failure strain at $\alpha = 0.05$ as evaluated by one-way ANOVA. 2-yrs old of BFPPCs have the highest FS and MOE, whereas November has the highest value of flexural properties. The highest to the lowest FS and MOE of BFPPCs has measured in Injibara, Mekaneselem, and Kombolcha, respectively. The transverse 3-point bending test has a lower FS and MOE compared to the longitudinal direction. The chemical constituents of Injibara, Mekaneselem, and Kombolcha have the highest to the lowest, respectively. 2-years old of bamboo fibres has the highest chemical constituent. The chemical constituents improved the flexural properties. Bamboo fibres in Ethiopia can be relevant for composite development, which has been applied in the area of requiring higher flexural properties.

Keywords : age, bamboo species, flexural properties, harvesting season, polypropylene

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