

Study Properties of Bamboo Composite after Treatment Surface by Chemical Method

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Abstract : Natural fibers are readily available raw materials that are widely used as composite materials. The most common problem facing many researchers with composites made from this fiber is the adhesion between the natural fiber contact surface and the matrix material. Part of the problem is due to the hydrophilic properties of natural fibers and the hydrophobic properties of the matrix material. Based on the aforementioned problems, this research selected bamboo fiber, which is a strong natural fiber in the research study. The first step was to study the effect of the mechanical properties of the pure bamboo strip by testing the tensile strength of different measurement lengths. The bamboo strip was modified surface with sodium hydroxide (NaOH) at 6wt% concentrations for different soaking periods. After surface modification, the physical and mechanical properties of the pure bamboo strip fibers were studied. The modified and unmodified bamboo strips were molded into a composite material using epoxy as a matrix to compare the mechanical properties and adhesion between the fiber surface and the material with tensile and bending tests. In addition, the results of these tests were compared with the finite element method (FEM). The results showed that the length of the bamboo strip affects the strength of the fibers, with shorter fibers causing higher tensile stress. Effects of surface modification of bamboo strip with NaOH, this chemical eliminates lignin and hemicellulose, resulting in the smaller dimension of the bamboo strip and increased density. From the pretreatment results above, it was found that the treated bamboo strip and composite material had better Ultimate tensile stress and Young's modulus. Moreover, that results in better adhesion between bamboo fiber and matrix material.

Keywords : bamboo fiber, bamboo strip, composite material, bamboo composite, pure bamboo, surface modification, mechanical properties of bamboo, bamboo finite element method

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