

Determination of Alkali Treatment Conditions Effects That Influence the Variability of Kenaf Fiber Mean Cross-Sectional Area

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Abstract : Fiber cross-sectional area value is a crucial factor in determining the strength properties of natural fiber. Furthermore, unlike synthetic fiber, a diameter and cross-sectional area of natural fiber has a large variation along and between the fibers. This study aims to determine the main and interaction effects of alkali treatment conditions that influence kenaf bast fiber mean cross-sectional area. Three alkali treatment conditions at two different levels were selected. The conditions setting were alkali concentrations at two and ten w/v %; fiber immersed temperature at room temperature and 1000C; and fiber immersed duration for 30 and 480 minute. Untreated kenaf fiber was used as a control unit. Kenaf bast fiber bundle mounting tab was prepared according to ASTM C1557-03. The cross-sectional area was measured using a Leica video analyzer. The study result showed that kenaf fiber bundle mean cross-sectional area was reduced 6.77% to 29.88% after alkali treatment. From the analysis of variance, it shows that the interaction of alkali concentration and immersed time has a higher magnitude at 0.1619 compared to alkali concentration and immersed temperature interaction that was 0.0896. For the main effect, alkali concentration factor contributes to the higher magnitude at 0.1372 which indicated the decrease pattern of variability when the level changed from lower to the higher level. Then, it was followed by immersed temperature at 0.1261 and immersed time at 0.0696 magnitudes.

Keywords : natural fiber, kenaf bast fiber bundles, alkali treatment, cross-sectional area

Conference Title : ICMEAM 2014 : International Conference on Mechanical Engineering and Applied Mechanics

Conference Location : Istanbul, Türkiye

Conference Dates : December 05-06, 2014