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PII: S1359-835X(18)30187-8
DOI: https://doi.org/10.1016/j.compositesa.2018.05.008
Reference: JCOMA 5033

To appear in: *Composites: Part A*

Received Date: 1 September 2017
Revised Date: 8 April 2018
Accepted Date: 8 May 2018

Please cite this article as: Hashemi, F., Brancheriau, L., Tahir, P., Hybridization and yarns configuration effects on flexural dynamic and static properties of pultruded hybrid kenaf/glass fiber composites, *Composites: Part A* (2018), doi: https://doi.org/10.1016/j.compositesa.2018.05.008

Hybridization and yarns configuration effects on flexural dynamic and static properties of pultruded hybrid kenaf/glass fiber composites

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Abstract

Six different hybrid composites with various hybrid fiber mixing ratio were fabricated using the pultrusion technique. The effect of fibers hybridization and fibers configuration with respect to the loading axis were studied on flexural dynamic and static properties. In low fiber mixing ratio of about 0.09, the radial configuration of kenaf yarns in the core region had no significant effect on dynamic flexural modulus. The radial configuration of the kenaf yarns in the core of the composites and bilateral configuration of the glass yarns in the shell region showed a considerable effect on damping factor. The bilateral configuration of glass yarns in the shell region showed a noticeable effect on the static flexural modulus, strength and the strain at break. The regression analysis showed a significant relationship between the static and dynamic modulus, and the dynamic flexural modulus explains 98% of the variability of the static flexural modulus.

Keywords: A. Hybrid; A. Natural fibers; B. Mechanical properties; E. Pultrusion.

1. Introduction

It is established that natural plant fibers are suitable reinforcements to replace the synthetically produced fibers such as glass fibers. Due to the low density and relatively highest possible stiffness and strength of plant fibers, natural fibers are comparable with