

Effect of filler loading on mechanical properties of pultruded kenaf fibre reinforced vinyl ester composites

ABSTRACT

Pultrusion is one of the polymer composite fabrication processes employing a combination of pulling and extrusion processes. The composite profiles are obtained by pulling resin-impregnated fibres through a series of heated dies. The ability of the pultrusion technique to support a high volume of fibre fraction produces the high stiffness of the composite profile. There are many parameters such as filler loading, mould temperature and pulling speed to be considered and controlled during the pultrusion process. In this paper, an investigation of the effect of the filler loading on the tensile and flexural properties of the pultruded kenaf reinforced vinyl ester composites is presented. As the filler loadings were increased to a significant amount, the mechanical properties started to drop, which was attributed to the increase of viscosity in the matrix and in turn the increase in porosity and decrease in the wettability of the composites. Hence, increasing the amount of filler loading increased the tensile and flexural properties of the pultruded composites in terms of strength and stiffness. The tensile properties of the composites had increased by up to 50% of fibre loading. The maximum flexural strength and modulus were obtained at 30 and 50% of filler loadings respectively. The maximum compressive strength was observed to take place at 40% of filler loading.

Keyword: Pultrusion; Filler loading; Vinyl ester; Natural fibre composites; Mechanical properties