

Study and analysis of mechanical and viscoelastic behavior in flexure of laminated composites

Rafik HALIMI, Boudjema Bezzazi, Ali BADIDI BOUDA, M'hamed Djelloul Abbou, Oussama Mimouni

Abstract: In the present paper, seven laminated composites were the subject of an experimental study to determine their mechanical and viscoelastic properties by means of dynamic mechanical analysis in a bending configuration. The influence of the frequency, fiber type and fiber orientation on dynamic mechanical properties of different system composites were investigated. Carbon/epoxy laminates exhibit a great stiffness when fibers are oriented along the axis of the clamps, and the maximum modulus was reported for unidirectional carbon/epoxy laminate [08 plies] with 56.4 GPa. The glass transition temperature was found to decrease with the incorporation of fibers and increase with increased frequency. For the Kevlar/epoxy laminate, an increase of 12.5 °C in glass transition temperature was observed. This is related to a better interfacial adhesion between epoxy matrix and Kevlar fibers.

Keywords : Composite laminate; Dynamic mechanical analysis; Fiber/matrix interface; Glass transition temperature