Static and dynamic properties of sisal fiber polyester composites – effect of interlaminar fiber orientation

ABSTRACT

The effect of fiber orientation was studied relative to the static and dynamic properties of sisal/polyester composites. Different composites were developed using the compression moulding technique with the aid of a specially designed mould. Composite laminates were formulated by stacking a number of fiber lamina with different orientations such as 90º/0º /90º, 0º /90º /0º, 90º /0º /0º /90º, 0º /45º /0º, 0º /90º /45º /45º /90º /0º, and 0º /45º /90º /90º /45º /0º. In general, the performance of static and dynamic characteristics was found to be significantly influenced by the effect of interlaminar fiber orientation. Experimental results exhibited a higher flexural strength of 68 MPa and an impact strength of 320 J/m in the case of 0º /90º /45º /45º /90º /0º oriented composites. Dynamic characteristics such as natural frequency and damping were found to be higher in the case of 0º /45º /0º and 0º /90º /0º, respectively. Morphological analysis was performed for understanding the interlaminar orientation and failure mechanisms between the fiber and the matrix.

Keyword: Fiber orientation; Sisal; Flexural; Impact; Free vibration; Compression moulding technique