A novel study on the stacking sequence and mechanical properties of Jute-Kevlar-Epoxy composites

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Abstract

This research paper focuses on the utilization of jute, and kevlar fiber, as reinforcements in vinyl epoxy based composites. Fiber-reinforced polymer (FRP) composites are widely used because they are cost-effective to produce, can be easily fabricated, and possess superior strength compared to pure polymer resins. Either synthetic fiber (SF: like glass, carbon, kevlar) or natural fiber (NF) can be used in the polymers. Due to easy accessibility, lightweight, economical cost of production and adequate properties, jute fiber is the most commonly used NF. This study involved the production of epoxy composites reinforced with kevlar and jute fibers and an experimental study was conducted to investigate the influence of stacking sequence on the mechanical properties

of the composites. Composites of different stacking sequences of jute and kevlar were fabricated using the hand lay-up method. Mechanical tests like tensile, inter laminar shear, flexural, impact strengths, and hardness were carried out. Scanning electron microscopic analysis was conducted to study the failure mechanism. It was observed that KKKK (four layers of Kevlar fiber) stacking sequence showed good inter laminar shear strength and excellent strength under tension, bending, and impact loading conditions followed by KJKJ (Kevlar-jute-kevlar-jute) sequence.

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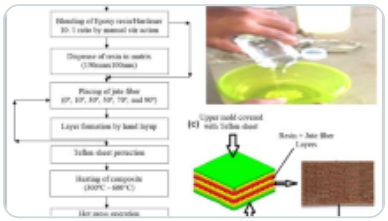

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Data availability

No datasets were generated or analysed during the current study.

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Ethics declarations

Ethics approval

Not applicable.

Consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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