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Comparison of Low Velocity Impact Test on Coir Fiber Reinforced Polyester Composites

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Abstract : The most common controlled method to obtain impact strength of composites materials is performing a Charpy Impact Test which consists of a pendulum with calibrated mass and length released from a known height. In fact, composites components experience impact events in normal operations such as when a tool drops or a foreign object strikes it. These events are categorized into low velocity impact (LVI) which typically occurs at velocities below 10m/s. In this study, the major aim was to calculate the absorbed energy during the impact. Tests were performed on three types of composite panels: fiberglass laminated panels, coir fiber reinforced polyester and coir fiber reinforced polyester subjected to water immersion for 48 hours. Coir fibers were obtained in local plantations of the Caribbean coast of Colombia. They were alkali treated in 5% aqueous NaOH solution for 2h periods. Three type of shape impactors were used on drop-weight impact test including hemispherical, ogive and pointed. Failure mechanisms and failure modes of specimens were examined using an optical microscope. Results demonstrate a reduction in absorbed energy correlated with the increment of water absorption of the panels. For each level of absorbed energy, it was possible to associate a different fracture state. This study compares results of energy absorbed obtained from two impact test methods.

Keywords : coir fiber, polyester composites, low velocity impact, Charpy impact test, drop-weight impact test
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