Effect of Surface Scratch on the Impulse Impact Energy of Recycled Natural Jute Fiber Mat Reinforced Polymer Matrix Composites

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Abstract:

This research work intended to study the effect of the scratch with different scratch loads (20, 40, and 60 N) on the drop weight (impulse) impact energy of recycled needle punched natural jute fiber mats reinforced unsaturated polyester composites with 25 Vol.% fiber volume content. The fracture behavior of the above-mentioned composites was also investigated for each case. The results showed that the impact energy of scratched composites was decreased 40% by scratch load 20 N compared to that of virgin specimen and by increasing the scratch load to 40 N the loss in the total impact energy of the composites was decreased to 2% compared to that of the virgin specimen. On the other hand, the total impact energy of the composite was improved to around 10% by increasing the scratch load to 60 N compared to that of the virgin specimen. Moreover, the fracture behavior showed that the radial matrix cracks and more extensive delamination was observed in scratched specimen at a scratch load of 60 N compared to those of the virgin specimen and this leads to dissipate most of the impact energy and so the impact energy of the composites was improved at a scratch load of 60 N compared to that of the virgin specimen.

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