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Shock wave impact behavior of flax fiber reinforced polymer composites

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Abstract

Natural fibre based composites are garnering attention owing to their optimal trade-off between mechanical properties and environmental sustainability properties. It has been proposed that they could potentially replace synthetic and mineral fibre composites due to their minimized impact on human health and the natural environment. Though several studies have been dedicated to understanding certain mechanical properties like strength and fatigue life, fewer reported studies have focused on their response to impact or shock loads. In the present work, we have performed shock tests using a shock tube on flax/epoxy and flax/polypropylene unidirectional and cross-ply laminated composites. The objectives are, to compare the blast-resistance of polypropylene against epoxy in their use as matrix in flax-reinforced composites, and, secondly to assess the performance of cross-ply over unidirectional fiber orientation. The present results showed that the cross-ply samples retained their structural integrity at peak pressures that were sufficient to break

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