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# INVESTIGATION ON ENERGY ABSORPTION OF NATURAL AND HYBRID FIBER UNDER AXIAL STATIC CRUSHING

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**Abstract:** Using metallic materials in vehicles structures increases cost and fuel consumption, therefore, the trends start to use cheaper and lite materials. Fibers are used in composites in automotive applications because they are lightweight, stiff, and stronger than bulk material, as well as achieve comparable energy absorption to metallic materials. The aim of this research is to investigate the potential of natural fiber in the applications of crash energy absorption. An experimental procedure (hand layup) was applied to investigate the effect of using jute fiber on crash worthiness parameter of composite material with other types of fibers such as Kevlar and glass fiber reinforced epoxy composite. The work involved fabrication the tubes using three layers, two geometries (circular and square) with three different heights at constant crush speed 1.5 mm/sec. The results show that the tubes of jute fiber were ineffective and failed directly, but, replacing one layer of jute fiber by one layer of other types of fibers lead to an enhancement in crash worthiness parameters especially, failure type and crash worthiness parameters. The better results are achieved when using hybrid jute and kevlar, where the energy absorption is enhanced by 17.75 % and the specific energy absorption is enhanced by 25.122% in case of circular tube with diameter 50 mm. In case of square tube with length 50 mm, the results are enhanced by 62.764 % for energy absorption and 58.942% for specific energy absorption.

*Keywords* – hand layup; energy absorption; jute fiber; crash worthiness parameters; crushing

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