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Mechanical Characterization of Polyurethane Foam and Hybrid Natural Fibre Based Sandwich Composite

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Abstract

The attention towards sandwich composites due to its enhanced strength and high stiffness to weight ratio is giving a new face to the era of modern engineering materials. Further, environmental issues have intended researchers to interchange synthetic fibres with natural fibres in the fabrication of polymer composites. This work makes an effort to synthesize and characterize the behavior of polyurethane foam core based sandwich composite. The specimens generated in this work to evaluate the properties are made to vary in terms of their core densities and skin configurations. The polyurethane foam based core has a uniform thickness and varying densities whereas the skin is varied by three different combinations which are completely natural using jute fibre, completely synthetic using glass fibre and a hybrid combination of natural and synthetic fibres. The mechanical characterization of the specimens involve tensile test, compression test and three - point bending test according to ASTM standards. The results from the investigation revealed that the strength of natural fibre could be enhanced by partially combining it with synthetic fibres and the mechanical properties of sandwich structures increases with increase in the polyurethane foam density.

Keywords:

Polyurethane foam, Jute fibre, Glass fibre, Epoxy resin, Sandwich composites

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