

Experimental Investigation on the mechanical properties of a sandwich structure made of flax/glass hybrid composites facesheet and honeycomb core

ABSTRACT

This research is aimed at developing the sandwich structure with a hybrid composite facesheet and investigate its mechanical properties (tensile, edgewise compression, and flexural). The combination of renewable and synthetic materials appears to reduce the weight, cost, and environmental impact compared to pure synthetic materials. The hybrid composite facesheets were fabricated with different ratios and stacking sequence of flax and glass fibers. The nonhybrid flax and glass composite facesheet sandwich structures were fabricated for comparison. The overall mechanical performance of the sandwich structures was improved by increasing the glass fiber ratio in the hybrid composites. The experimental tensile properties of the hybrid facesheet and the edgewise compression strength and ultimate flexural facing stress of the hybrid composites sandwich structures were achieved higher when the results were normalized to the same fiber volume fraction of glass composite. The hybrid composite sandwich structure showed improved compression and flexural facing stress up to 68% and 75%, respectively, compared to nonhybrid flax composites. The hybrid composite using glass in the outer layer achieved the similar flexural stiffness of the nonhybrid glass composite with only a 6% higher thickness than the glass composite sandwich structure.