

Experimental investigations on green composite sandwich made of flax and agglomerated cork

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Abstract:

In this work, flax fibre in woven form is used as skin reinforcement and agglomerated cork with three different densities (240, 280, & 340 kg/m³) is used as a core in the green composite sandwich. Along with this, glass and flax/glass skin reinforced composite sandwiches are also manufactured for comparison purpose. The composite sandwiches are manufactured by vacuum bag moulding due to their benefit of getting higher volume fraction of fibre, and improved adhesion between layers compared to hand lay-up method.

The test results revealed that the flax fibre reinforced composite sandwich (FEC) with core density 340 kg/m³ has higher specific flatwise tensile strength, specific flatwise compressive strength, and specific flexural strength than glass fibre reinforced composite sandwich (GEC) with core density 340 kg/m³. Effect of water absorption on the mechanical properties was also determined by exposing the samples in a humid environment. The presence of moisture content in the samples decreases the specific flexural strength of FEC by 27-42 % in contrast to a mild impact in GEC by 14-33 % due to the existence of natural fibre in the FEC. This study recommends that, the green composite sandwich could be an environmentally friendly alternative for automobile and construction applications, where mechanical as well as secondary characteristics like thermal, sound absorption, vibration damping and biodegradability are essential.