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Lightweight hemp/bio-epoxy grid structure manufactured by a new continuous process

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Abstract

This paper investigates the mechanical properties in terms of tensile, flexural, compression, and Charpy impact strength of a new lightweight grid structure in bio-composite material based on woven hemp fabric and bio-epoxy resin. The main intent was the manufacturing of bio-composite with high specific mechanical properties produced through a new process that can be easily implemented in industrial production, and that can produce low density composites in a continuous way with a good level of repeatability. This was done by using two hemp fabric types, that mainly differ in the fabric mesh size. Several hemp/bio-epoxy resin grid structures with different density (in the range of 0.47 - 0.80 g/cm³) and thickness (in the range of 4.3 - 12.3 mm) were obtained and their properties were widely investigated. The results showed interesting mechanical properties possessed by the bio-composites so manufactured, highlighting their possible use as core for sandwich composite structures.

Keywords: Hemp; bio-epoxy; lightweight grid structure; core bio-composite.

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