

Development and Characterization of Sandwich Bio-Composites Based on Short Alfa Fiber and Jute Fabric

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Abstract : Composite materials are taking center stage in different fields thanks to their mechanical characteristics and their ease of preparation. Environmental constraints have led to the development of composite with natural reinforcements. The sandwich structure has the advantage to have good flexural proprieties for low density, which is why it was chosen in this work. The development of these materials is related to an energy saving strategy and environmental protection. The present work refers to the study of the development and characterization of sandwiches composites based on hybrids laminates with natural reinforcements (Alfa and Jute), a metal fabric was introduced into composite in order to have a compromise between weight and properties. We use different configurations of reinforcements (jute, metallic fabric) to develop laminates in order to use them as thin facings for sandwiches materials. While the core was an epoxy matrix reinforced with Alfa short fibers, a chemical treatment sodium hydroxide was cared to improve the adhesion of the Alfa fibers. The mechanical characterization of our materials was made by the tensile and bending test, to highlight the influence of jute and Alfa. After testing, the fracture surfaces are observed by scanning electron microscopy (SEM). Optical microscopy allowed us to calculate the degree of porosity and to observe the morphology of the individual layers. Laminates based on jute fabric have shown better results in tensile test as well as to bending, compared to those of the metallic fabric (100%, 65%). Sandwich Panels were also characterized in terms of bending test. Results we had provide, shows that this composite has sufficient properties for possible replacing conventional composite materials by considering the environmental factors.

Keywords : bending test, bio-composites, sandwiches, tensile test

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