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Manufacturing and quasi-static bending behavior of wood-based sandwich structures.

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Abstract

The quasi-static behavior of innovative wood based sandwich structures with plywood core and skins made either of aluminum or of fiber reinforced polymer (carbon, glass or flax composite skins) was investigated. The wood based sandwich structures were subjected to three point static bending tests to determine their strength and failure mechanisms. Two different manufacturing processes, namely vacuum bag molding and thermo-compression, were used to manufacture the structures. The influence of some aspects of the different manufacturing processes on the flexural behavior of wood based sandwich structures are discussed. It is shown that manufacturing processes influence strongly the static responses. Failure modes and strengths are investigated during quasi-static bending tests. Bending tests showed that the mechanical characteristics were very high compared to those of a reference sandwich that is currently used for civil aircraft floors. This new kind of structure is environmentally friendly and very cheap, and seems promising for the transportation industry in general.

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Keywords

Wood

Failure

Mechanical testing

Sandwich structures

1. Introduction

A sandwich structure is a laminated composite fabricated by attaching two stiff, thin skins to a thick, lightweight core [1]. Their specific properties, such as high stiffness to weight

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