

## Flexural Response of Glass Fiber Reinforced Polymer Sandwich Panels with 3D Woven Honeycomb Core

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**Abstract :** The use of textile preform in the advanced fields including aerospace, automotive and marine has exponentially grown in recent years. These preforms offer excellent advantages such as being lightweight and low-cost, and also, their suitability for creating different fiber architectures with different materials whilst improved mechanical properties in certain aspects. In this study, a novel honeycomb core is developed by a 3D weaving process. The assembly of the layers is achieved thanks to innovative weaving design. Polyester yarn is selected for the 3D woven honeycomb core (3DWHC). The core is used to manufacture a sandwich panel with 2x2 twill glass fiber composite face sheets. These 3DWHC sandwich panels will be tested in three-point bending. The in-plane and out-of-plane (through-the-thickness) mechanical response of the core will be examined as a function of cell size in addition to the flexural response of the sandwich panel. The failure mechanisms of the core and the sandwich skins will be reported in addition to flexural strength and stiffness. Possible engineering applications will be identified.

**Keywords :** 3D woven, assembly, failure modes, honeycomb sandwich panel

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