Failure mode maps of natural and synthetic fiber reinforced composite sandwich panels

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Abstract

In the present work, mechanical properties and failure modes of natural and synthetic fiber reinforced composite sandwich panels under three point bending were studied. Analytical models were developed in order to predict the mechanical response of all the specimens with different facesheet – core combinations. The modes studied include core shear, core crushing, face wrinkling, face yielding, and facesheet debonding.

Natural fiber reinforced honeycomb and commercial PVC foam were used as cores. Jute reinforced polyester and glass fiber reinforced polyester were used as skins. Fiber reinforced honeycomb cores were obtained by Vacuum Assisted Resin Transfer Molding (VARTM).

Failure mechanism maps were constructed in order to predict the failure of composite sandwich panels. The response of the sandwich panels under three point bending was measured up to failure, and the results were compared with the analytical predictions. A good agreement between the predicted and observed modes was found.

Keywords: A. Sandwich structures; A. Natural fibers; D. Failure; A. Honeycomb