

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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STRENGTH AND DIMENSION STABILITY OF COMPOSITE SANDWICH SKINS

**Abstract**

Composite sandwich skins are used in aerospace structures, and accurate prediction of the mechanical properties of composite sandwich skin is important in the design of aerospace structures, for example a payload fairing or a fuselage. We reviewed the stiffness and the strength of the composite sandwich skin in room temperature or in cryogenic environments. The specific bending stiffness of the composite sandwich specimen with an aluminum honeycomb core was approximately 1.7 to 2.0 times higher than that of a composite sandwich skin with a glass/phenolic honeycomb core. Predictions of the stiffness were in good agreement with those from experiments. Subsequently, the compressive and bonding strengths of composite sandwich specimens at cryogenic temperatures were also investigated in order to examine the effect of cryogenic environments on the mechanical properties of the composite sandwich skin. We applied the composite sandwich material to the payload fairing design. We analyzed the spring-back deformation of the half-shell composite sandwich skin for the payload fairing application. The stiffness and the strength of the payload fairing skin were analyzed in a full-scale payload fairing structural test. Finally, ground tests of the composite payload fairing designed considering the mechanical strength and the manufacturing deformation of the half-shell composite sandwich skin were performed successfully without damage