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3D-Printed Spherical-Roof Contoured-Core (SRCC) composite sandwich structures for aerospace applications

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ABSTRACT

This paper studies the compressive properties of the 3D printed spherical-roof contoured-core (SRCC) sandwich panels under quasi-static loading. The novel core structure was used photosensitive resin as a thermoset polymer, which was fabricated through the stereolithography (SLA) process. This paper was focused on investigating the novel SRCC sandwich panels with spherical-roof contoured-core and its diamond-shaped notch core design. The effects of core wall thickness, core design, and boundary condition on the 3D printed sandwich panel were carried out under axial quasi-static loading tests. The results were highlighted that the compressive performance of the 3D printed sandwich panels increased rapidly with increasing the core wall thickness. The core structure was bonded with two skins that provided higher compressive modulus, compressive strength, F_{peak}, energy absorption (*EA*), and specific energy absorption (*SEA*). Moreover, the failure behaviour of these 3D printed novel composite sandwich panels was also studied.

KEYWORDS

Sandwich structure; SLA; SRCC core; Spherical-roof; 3D printed contoured-core; Quasi-static loading

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