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A novel strengthening method for carbon fiber composite lattice truss structures

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Abstract

The composite pyramidal lattice truss core sandwich panel, in which the lattice core is strengthened by end frames between various nodes and the struts are reinforced with unidirectional fibers, is fabricated by the hot-press molding technique and interlocking method. Because all of the continuous fibers are aligned in the rod direction, the fiber's intrinsic strength can be fully exploited; thus, the lattice truss core has the maximum load-carrying capacity. Furthermore, the composite lattice truss core (strengthened by the top and bottom aluminum connectors) has the ability to collaboratively deform under compressive and shear loading. Compressive and shear experiments were conducted to investigate the mechanical properties and failure mechanism of this new composite pyramidal lattice structure. The experimental results show that the present composite pyramidal lattice structure has some significant advantages compared with other existing composite pyramidal lattice structures.

Keywords: composite; lattice structure; sandwich structures; interlocking; mechanical property.

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