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A novel carbon fiber reinforced lattice truss sandwich cylinder:

Fabrication and experiments

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Abstract: To get a strong, stiff and weight efficient cylindrical shell, a novel carbon fiber reinforced corrugated lattice truss-core sandwich cylinder (LTSC) was designed and fabricated. The core is made up of orthogonal corrugated trusses and manufactured by mould pressing method. The LTSC is fabricated by filament winding and co-curing method. The face sheets have layups of $[0^0/30^0/-30^0/-30^0/30^0/0^0]$ to improve the fundamental frequency as it is controlled by the circumferential stiffness. In end-free vibration the fundamental frequency of the LTSC is 112.18 Hz, higher than the referenced quasi-isotropic Isogrid-core sandwich cylinder. Determined by the skin fracture, the compression strength of the LTSC is 328.03 kN, stronger than the referenced Isogrid-core sandwich cylinder failed at rib buckling and the post-failure deformation is ductile. According to the optimization scheme jointly constrained by the

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