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Free vibration behaviors of carbon fiber reinforced lattice-core sandwich cylinder

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Abstract: To study mechanical behaviors of advanced carbon fiber reinforced composite (CFRC) sandwich cylinder with lattice cores, uni-axial compression and free vibration experiments were carried out. Load carrying capacity and local failure modes of the lattice sandwich cylinder (LSC) were revealed. Natural frequencies and vibration modes of CFRC LSC were revealed by experiments for the first time. For usual LSC in astronautic engineering, the first order vibration is in the plane of the cross section, turning from a circle to an oval. An equivalent method was proposed to predict the primary frequency and mode shape of the LSC, which is in excellent accordance with the experiment. Compared with grid stiffened cylinder (GSC), LSC

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