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COMPRESSION FAILURE MECHANISMS IN SANDWICH PANELS WITH CORRUGATED
CHANNEL CORES**Abstract**

Corrugated channel cored sandwich panels (3CSPs) have great potential as a kind of bi-functional lightweight structure used in the integral thermal protection system (ITPS) of a high-speed aircraft. Compression failure mechanisms of 3CSPs were revealed through combined experimental, theoretical and numerical approaches. Various deformation modes were captured by experiments and finite element (FE) simulations. The analytical results showed that there are four possible failure modes of 3CSPs under out-of-plane compression, including local elastic buckling, local ultimate buckling, local plastic buckling, and global elastic buckling. The thin shell stability theory was employed to define the failure criterions. Failure mode maps of the 3CSP were constructed based upon these failure criterions. The theoretical predictions of load capacities have been validated by selected FE calculations and experiments.