

Numerical Simulation of Dynamic Characteristics of Square Honeycomb Sandwich Panels Under Composite Projectile Impact: Postprint

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Abstract

To investigate the dynamic response process and deformation/failure modes of square honeycomb sandwich panels under combined explosive blast wave and high-velocity fragment loading, a novel method involving the launch of composite projectiles composed of aluminum foam projectiles and fragment simulating projectiles was adopted to simulate combined loading. Numerical simulations of the dynamic response of 304 stainless steel square honeycomb sandwich panels under composite projectile impact loading were conducted using the finite element analysis software ABAQUS/Explicit. The reliability of the finite element model was validated against experimental results from existing literature. The five stages of the dynamic response process of square honeycomb sandwich panels following composite projectile impact were elaborated, and the dynamic response under various impact loading conditions was discussed. The results demonstrate that: under different scenarios, the overall trend of the dynamic response of sandwich panels subjected to different impact loads remains similar; regardless of variations in impact loading, among the various components of this structure, the honeycomb core contributes most significantly to the protective performance, followed by the back face sheet, with the front face sheet contributing the least; when the initial velocity is held constant, a smaller embedded depth of the fragment simulating projectile leads to increased susceptibility to tearing failure in the back face sheet of the sandwich panel, yet conversely enhances the protective capability against the fragment simulating projectile.

Full Text

Preamble

The original text contains extensive encoding corruption and cannot be meaningfully translated. Only the section heading is recoverable.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv — Machine translation. Verify with original.