عنوان مقاله:

Finite element analysis of an adhesively bonded AlCFRP square section under axial & oblique loading

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خلاصه مقاله:

The utilization of adhesively bonded square sections (ABSS) serves to enhance energy absorption and specific energy absorption (SEA) when subjected to oblique loading. Finite element models utilizing LS-DYNA were constructed in order to examine the deformation mode and load-displacement characteristics of ABSS and hybrid aluminum/carbon fiber reinforced polymer models. Subsequently, an evaluation was conducted on the general parameter pertaining to crashworthiness and the capacity for absorption of energy. The results reveal that an increase in the quantity of Carbon Fiber Reinforced Polymer (CFRP) layers within the stacking sequence of [۰,۹۰] affords enhanced potential for energy absorption. Conversely, the stacking sequence of [۹۰] exhibits an incongruity with this trend, and achieves superior energy absorption capacity with a count of ۴ CFRP layers rather than ۸. The present study indicates that carbon fiber reinforced polymer (CFRP) possessing a stacking sequence of [۹۰] exhibits superior energy absorption capacity under both axial and oblique loading conditions at an inclination angle of ۱۰ degrees. In contrast, the use of eight layers of CFRP with a stacking sequence of [۰, ۹۰] is found to yield better performance in achieving both axial and oblique loading up to ۱۰ degrees.

کلمات کلیدی:

Carbon fiber reinforced plastic (CFRP), Thin-walled structures, Specific energy absorption (SEA), Crashworthiness, Oblique loading

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