

Effect of double impact positions on the low velocity impact behaviors and damage interference mechanism for composite laminates

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ABSTRACT

Composite structures are susceptible to repeated low velocity impact usually occurring at different positions, which is very common but lacks of in-depth exploration. In this paper, two impact positions with the same distance from the center of the $[0_2/90_2]_{4S}$ composite laminates were impacted sequentially. The impact responses for four impact distances between the double positions were compared. The mechanical curves such as the impact force-time/central displacement curves and the delamination damage projected area were recorded during the tests. Experimental results demonstrated that the interference status for mechanical curves directly corresponded to the impact-induced damage modes at different impact energy. By comparison, the maximum central displacement could characterize the interference degree of double impact positions. In addition, at high impact energy with impact-induced fiber breakage, the dominant energy dissipation mode for the second impact changed from fiber damage to delamination damage with the increase of impact distance.

KEYWORDS

Composite laminates; Damage interference; Impact responses; Double impact positions

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