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عنوان مقاله:

A Novel Analytical Solution of the Energy Absorption of Fiber Bridging Zone of Unidirectional Composites under Mixed Mode I/II loading

محل انتشار:

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خلاصه مقاله:

In unidirectional composites, delamination cracks parallel to the reinforcement axis are commonly bridged by fibers. The fiber bridging as a toughening mechanism has an important effect on the behavior of the fracture process zone. Many researchers have qualitatively investigated the fiber bridging effects on the delamination failure phenomenon of unidirectional composites under mixed mode I/II loading. However, due to the complexity, these effects are rarely studied quantitatively. In the present research, an analytical solution is presented which accounts for breakdown of the micro-mechanisms responsible for the load transfer across the bridged delamination cracks. Firstly, different failure micro-mechanisms involved during the fiber bridging phenomenon were identified. Then, suitable boundary and different loading conditions on the bridged fiber were applied. Then, the absorbed energy of each of these failure micro-mechanisms was calculated. Finally, the energy absorbed by the fiber bridging zone was obtained from a summation of these energy terms. The present work deals with arbitrary values of the mode mixities

کلمات کلیدی:

Delamination, Laminated composites, Fiber bridging, Fracture process zone, Mixed mode I/II

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