

Parameter Studies on Cohesive Zone Model for Delamination of Multidirectional Laminates

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Three kinds of multidirectional laminates are designed and both DCB and MMB experiments have been conducted to investigate the cohesive zone model parameters for delamination of multidirectional laminates. Actions of modeling parameters about material, interfacial and computational aspects of cohesive elements with a bilinear constitutive law and reviews on their determination guidelines are depicted. Based on the numerical interface-parameter-effect studies on unidirectional DCB specimens, a basic choose of the interfacial stiffness, element size and viscosity coefficient is presented and validated by the existed experiments. Moreover, a variable fracture toughness model is proposed to reflect the fiber bridging in the multidirectional laminates and numerical tests on the interfacial strength are preformed. The delamination predictions of the multidirectional laminates in both DCB and MMB tests have been conducted by the presented model and their comparison with the experimental outcomes show good agreements, which indicates the effectiveness of the proposed parameter model.

Keywords: Multidirectional laminates, Cohesive zone model, Delamination, Interfacial behaviors