

Delamination Damage Propagation Behavior of Composite Laminate Plate Under Low-Velocity Impact Using a New Adhesive Layer Model

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Abstract: Based on interface adhesive theory and delamination damage mechanism, a new adhesive layer model is proposed to analyze the intra-layer delamination damage process of composite laminated plate subjected to low velocity impact. The influences of through-thickness tensile stresses, inter-laminar shear stresses and matrix cracking on delamination damage are taken into consideration in this model. Compared with traditional strength failure criterion model or fracture mechanics energy release rate model, analytical results of this model are in good agreement with experimental data. The damage extension characteristics and the various influence factors on delamination damage are discussed. The results of this research can be applied in composite structure design and life prediction.

Keywords: composite laminated plate; delamination damage; adhesive layer model; damage extension characteristics