

PROCEEDINGS

Progressive Damage Analysis of 3D Woven Composite SENT Test Using a Ternary Model

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ABSTRACT

It is of great significance for improving the in-plane fracture toughness of 3D woven composite (3DWC) to study the failure mechanism of a single edge notch tension (SENT) test. It requires a relatively high computational cost to establish the SENT model based on conformal modeling method. A SENT is established using a proposed ternary model. The matrix cracking, yarn rupture, and debonding at the yarn/matrix interface are involved in the ternary model. Based on the developed SENT model, the progressive damage initiation and evolution of 3DWC SENT are predicted. The load-displacement curves and damage of the SENT agrees well with the test results. The present ternary model is able to predict the debonding failure mode, compared with the Binary Model. It is much more efficient than the conformal modeling method.

KEYWORDS

3D woven composite; single edge notch tension; progressive damage analysis; ternary model; failure mechanism

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