Effect of Degraded Matrix on Tensile Failure Process of Unidirectional Carbon Fiber Reinforced Epoxy

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Summary

This paper presents an analytical approach which combines the modified shear-lag model and Monte Carlo simulation technique to simulate the effect of degraded matrix on tensile failure process of carbon reinforced composite. Degradation of matrix were performed by using accelerated tests at high temperature. In the model, the strength of the fiber elements is randomly allocated by the Monte Carlo method, the elastic properties of the matrix elements and the friction after the interfaces breakage are definitely allocated. Using this model, the deformation, damage and failure process of the composite are simulated on the microscopic level, the tensile stressa?"strain relationship is well predicted. The relationship between mechanical properties of the fiber, matrix and composites were discussed.