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# Carbone/Epoxy Interface Debond Growth using the Contour Integral/Cohesive Zone method.

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**Abstract**

Cohesive zone models (CZM) are widely used for modeling the damages interfacial. In this study, a three-dimensional finite element (FE) model is developed to study numerically the energy release rate (ERR) by the J integral method. The simulation of a tensile test (in the direction of fiber) on a fibrous composite is performed using the damage model. The results obtained from the Integral Contour/Cohesive zone model are compared with those obtained previously and the results show a good agreement with the reference one obtained (J-integral and VCCT method). These analyses are studied according to several parameters such as: the debonding angles, the fiber volume fraction which is studied by varying distance between the broken fiber and the neighboring fibers, comparing two different representative volume elementary (RVE) (square and hexagonal motives). This study goes into the context and allows the analysis of the fiber / matrix interfacial crack behavior in a fiber micro-composite. The obtained results have demonstrated that the ERR and the intensity of the mechanical stresses depend not only on the level of the mechanical loading applied, but also on the angle of the debonding at the fiber/matrix interface

**Keywords:** Carbon /epoxy; Debonding; Cohesive; J-integral; interface; Finite element analysis (FEA).

## 1. Introduction

The composite materials, polymer-ceramic types, are most often used for their excellent stiffness thanks to the reinforcing materials. The interfacial cracks are responsible of the Fiber/Matrix interface debonding which developed various damage processes. Several research studies have been devoted to the