

## Accepted Manuscript

### A Cohesive Zone Model Taking Account Of The Effect Of Through-Thickness Compression

Zhenmin Zou, Hao Lee

PII: S1359-835X(17)30119-7  
DOI: <http://dx.doi.org/10.1016/j.compositesa.2017.03.015>  
Reference: JCOMA 4605

To appear in: *Composites: Part A*

Received Date: 8 January 2017  
Revised Date: 7 March 2017  
Accepted Date: 17 March 2017



Please cite this article as: Zou, Z., Lee, H., A Cohesive Zone Model Taking Account Of The Effect Of Through-Thickness Compression, *Composites: Part A* (2017), doi: <http://dx.doi.org/10.1016/j.compositesa.2017.03.015>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## **A Cohesive Zone Model Taking Account Of The Effect Of Through-Thickness Compression**

Zhenmin Zou\*, Hao Lee

School of Mechanical, Aerospace and Civil Engineering, The University of Manchester,  
Manchester M13 9PL, UK

Experiments in the literature show that through-thickness compressive stress significantly enhances interfacial fracture resistance. Most existing cohesive zone and interface element models which consider the enhancement only introduce friction in the model. In this paper, a new method is proposed to include both friction and enhanced interfacial shear strength in a cohesive zone model. Contact and friction at micro/macro crack closure is added to the cohesive constitutive law. A traction-based failure function and an energy-based failure function are employed and combined to construct a damage surface. An enhancement of interfacial shear strength due to through-thickness compressive stress is introduced into the traction-based function which governs the damage initiation, while the energy-based function controls the damage growth. The damage surface shrinks in the traction space as damage develops and leads to a softening cohesive constitutive law. The model is employed to simulate shear failure of symmetric double notch specimens and delamination failure in specimens with cut- and dropped-ply. Numerical predictions are in good agreement with available experimental data in the literature. Parametric studies show that both the friction at crack closure and enhancement of the interfacial shear strength play an important role in enhancing fracture resistance.

**KEY WORDS:** Cohesive zone model; interface element; friction; damage; through-thickness compression.

\* Corresponding author. Email: z.zou@manchester.ac.uk

متن کامل مقاله

دریافت فوری ←

**ISIArticles**

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلید کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات