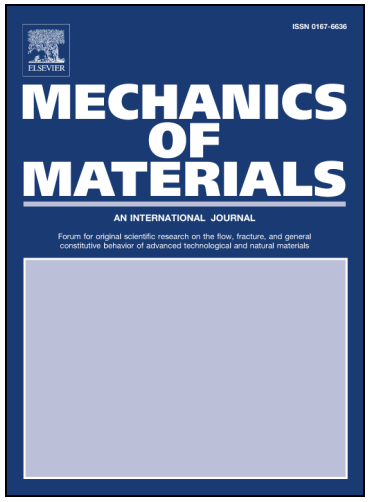
Accepted Manuscript



Mixed Mode Cohesive Law with Interface Dilatation

Bent F. Sørensen, Stergios Goutianos

PII: S0167-6636(13)00236-6
DOI: http://dx.doi.org/10.1016/j.mechmat.2013.11.006
Reference: MECMAT 2215

To appear in: *Mechanics of Materials*

Received Date: 26 July 2013
Revised Date: 19 November 2013

Please cite this article as: Sørensen, B.F., Goutianos, S., Mixed Mode Cohesive Law with Interface Dilatation, *Mechanics of Materials* (2013), doi: http://dx.doi.org/10.1016/j.mechmat.2013.11.006

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.

ACCEPTED MANUSCRIPT

Mixed Mode Cohesive Law with Interface Dilatation

Bent F. Sørensen and Stergios Goutianos

Department of Wind Energy, Technical University of Denmark, Risø Campus, Building 228, Frederiksborgvej 399, DK-4000 Roskilde, Denmark

Corresponding author: Bent F. Sørensen (e-mail: bsqr@dtu.dk, tel: +45 46775806)

Abstract

Experimental investigations of adhesive joints and fibre composites have shown that under Mode II cracking, the fracture process induces a displacement normal to the fracture plane. This effect can be attributed e.g. to roughness of the fracture surface under dominating tangential crack face displacements. As the crack faces displace relatively to each other, the roughness asperities ride on top of each other and result in an opening (dilatation) in the normal direction. Furthermore, the interaction of the crack surfaces in the contact zone gives rise to compressive normal stresses and frictional shear stresses opposing the crack face displacements. A phenomenological Mixed Mode cohesive zone law, derived from a potential function, is developed to describe the above mentioned fracture behaviour under monotonic opening. The interface dilatation introduces two new lengths. The cohesive law is implemented in the commercial finite element program Abaqus. The model is validated and tested against experimental results under various mode mixities.

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/7178708

Download Persian Version:

https://daneshyari.com/article/7178708

Daneshyari.com