

Accepted Manuscript

Microplanes and Microstructure: Connecting Abstractions and Reality

Eric N. Landis

PII: S0013-7944(18)30185-1

DOI: <https://doi.org/10.1016/j.engfracmech.2018.07.015>

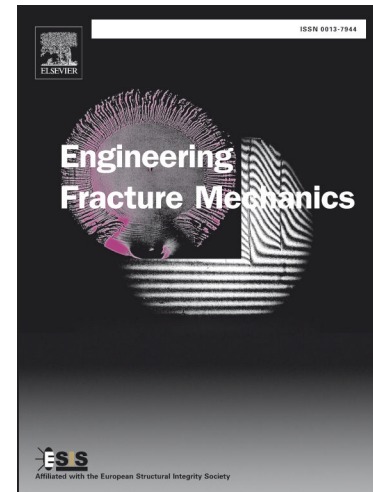
Reference: EFM 6081

To appear in: *Engineering Fracture Mechanics*

Received Date: 16 February 2018

Revised Date: 14 June 2018

Accepted Date: 6 July 2018



Please cite this article as: Landis, E.N., Microplanes and Microstructure: Connecting Abstractions and Reality, *Engineering Fracture Mechanics* (2018), doi: <https://doi.org/10.1016/j.engfracmech.2018.07.015>

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.

Microplanes and Microstructure: Connecting Abstractions and Reality

Eric N. Landis^{a,*}

^a*University of Maine, Orono Maine USA*

Abstract

The practical problem of predicting the structural performance of concrete has led to an array of innovative models and modeling approaches, spawned primarily due to limitations of traditional fracture mechanics to properly capture quasi-brittle behavior. The different approaches, ranging from modified continua to discrete elements to hybrid schemes must all, by necessity, balance the incorporation of material features that dictate behavior with the computational tractability that allow one to solve practical problems. Regardless if one uses a continuum or a discrete representation, the key to success is an appropriate abstraction of physical microstructure (e.g. heterogeneities and microcracks) and micromechanical phenomena. The case is made here that while we need to employ the abstract representations of continuum-based models to solve practical problems, we will be better served by moving our simulation tools towards material representations that are better tied to the physical microstructure and the micromechanical phenomena that produce quasi-brittle behavior. Some experimental examinations of these micromechanical phenomena are presented in the context of how they may be incorporated into computational tools.

Keywords: Concrete microstructure, Acoustic emission, X-ray computed tomography, Lattice model

*Corresponding author

Email address: landis@maine.edu (Eric N. Landis)

Download English Version:

<https://daneshyari.com/en/article/7168586>

Download Persian Version:

<https://daneshyari.com/article/7168586>

[Daneshyari.com](https://daneshyari.com)