Applications of Continuum Damage Mechanics to Fatigue and Fracture

David L. McDowell, editor

ASTM Publication Code Number (PCN):
04-013150-30
Foreword

The Symposium on Applications of Continuum Damage Mechanics to Fatigue and Fracture was held in Orlando, Florida, on 21 May 1996. The symposium was sponsored by ASTM Committee E8 on Fatigue and Fracture. David L. McDowell, Georgia Institute of Technology, presided as symposium chairman and is editor of this publication.
Contents

Overview

DAMAGE MECHANICS OF COMPOSITES

Creep Damage and Creep-Fatigue Damage Interaction Model for Unidirectional Metal-Matrix Composites—S. KRUCH AND S. M. ARNOLD

A Model for Predicting the Effect of Environmental Degradation on Damage Evolution in Metal-Matrix Composites—D. H. ALLEN, J. W. FOULK, K. L. E. HELMS, AND D. C. LAGOUDAS

In Situ Damage Progression in General Layup Composites—J. FAN

A Coupled/Uncoupled Computational Scheme for Deformation and Fatigue Damage Analysis of Unidirectional Metal-Matrix Composites—T. E. WILT, S. M. ARNOLD, AND A. F. SALEEB

Damage, Fatigue, and Failure of Ceramic-Matrix Composites—A. BURR, F. HILD, AND F. A. LECKIE

A Micromechanical Fatigue Damage Model for Unidirectional Metal-Matrix Composites—G. Z. VOYIADJIS AND R. ECHLE

DISTRIBUTION EFFECTS AND HOMOGENIZATION

Microscopic and Mesoscopic Damage Localization—H. Y. AGHA, F. HILD, AND R. BILLARDON

Effects of Damage Distribution on Evolution—T. E. LACY, R. TALREJA, AND D. L. McDOWELL

A Statistical Evolution Equation of Microdamage and Its Application—Y. BAI, W. HAN, AND J. BAI

LOCAL APPROACHES TO FATIGUE AND FRACTURE

A Unified Approach to Metal Fatigue Based on the Theory of Damage Mechanics—C. L. CHOW AND L. G. YU
Solid Mechanics Modeling of Erosion Damage—P. J. Woytowitz and R. H. Richman 186

Assessment of a Semielliptical Crack in the Interface Between Ferritic and Austenitic Material on the Basis of the Gurson Model—D.-Z. Sun and W. Schmitt 200

Stress History Dependent Localization and Failure Using Continuum Damage Mechanics Concepts—M. F. Horstemeyer and V. Revelli 216