Thermomechanical Fatigue Behavior of Materials

Huseyin Sehitoglu, editor

ASTM Publication Code Number (PCN)
04-011860-30
Foreword

This publication, *Thermomechanical Fatigue Behavior of Materials*, contains the papers presented at the symposium of the same name held in San Diego, CA on 14-16 Oct. 1991. The symposium was sponsored by ASTM Committee E-9 on Fatigue. Huseyin Sehitoglu, University of Illinois, Urbana, IL, served as chairman of the symposium and is editor of the publication.
Contents

Overview

Fatigue Life Prediction Under Thermal-Mechanical Loading in a Nickel-Base
Superalloy—L. Rémy, H. Bernard, J. L. Malpertu, and F. Rezai-Aria 3

Modeling of Thermomechanical Fatigue Damage in Coated Alloys—
Yavuz Kadioglu and Huseyin Sehitoglu 17

Discussion

A Life Prediction Model for Thermomechanical Fatigue Based on Microcrack
Propagation—M. P. Miller, D. L. McDowell, R. L. T. Oehmke, and
S. D. Antolovich 35

Analysis of Thermomechanical Cyclic Behavior of Unidirectional Metal Matrix
Composites—Demirkan Coker, Noel E. Ashbaugh, and
Theodore Nicholas 50

Thermomechanical Fatigue of the Austenitic Stainless Steel AISI 304L—
R. Zauter, F. Petry, H.-J. Christ, and H. Mughrabi 70

Modeling of the Thermomechanical Fatigue of 63Sn-37Pb Alloy—
Peter L. Hacke, Arnold F. Sprecher, and Hans Conrad 91

Thermomechanical Deformation Behavior of a Dynamic Strain Aging Alloy,
Hastelloy X®—Michael G. Castelli, Rovert V. Miner, and
David N. Robinson 106

Damage Mechanisms in Bithermal and Thermomechanical Fatigue of Haynes
188—Sreeramesh Kalluri and Gary R. Halford 126

Cumulative Damage Concepts in Thermomechanical Fatigue—
Michael A. McGaw 144

Thermomechanical Fatigue of Turbo-Engine Blade Superalloys—
Jean-Yves Guedou and Yves Honnorat 157

Proposed Framework for Thermomechanical Fatigue (TMF) Life Prediction of
Metal Matrix Composites (MMCs)—Gary R. Halford,
Bradley A. Lerch, James F. Saltsman, and Vinod K. Arya 176
Improved Techniques for Thermomechanical Testing in Support of Deformation Modeling—MICHAEL G. CASTELLI AND JOHN R. ELLIS

Prediction of Thermal-Mechanical Fatigue Life for Gas Turbine Blades in Electric Power Generation—HENRY L. BERNSTEIN, TIMOTHY S. GRANT, R. CRAIG McCLUNG, AND JAMES M. ALLEN

Residual Life Assessment of Pump Casing Considering Thermal Fatigue Crack Propagation—TOSHIRO SAKON, MASAHARU FUJIHARA, AND TETSUO SADA