

# Introduction

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This publication on Fatigue of Composite Materials is the first to focus on the critical problem of fatigue failure in composite materials. There is a discussion of fatigue, in all kinds of heterogeneous materials, promoting a better understanding of how to achieve improved fatigue resistance in composite materials and producing a broadly based contemporary reference on current and future problems.

Because of the presence of interfaces and the anisotropy and heterogeneity inherent in composite materials, the mechanisms of fatigue fracture in these materials are extremely complex and are not fully understood. It is these complexities which offer exciting and unprecedented opportunities to design more fatigue-resistant materials.

The publication focuses on phenomena rather than on the type of material in order to bring an interdisciplinary perspective to the fatigue problem in heterogeneous materials. Implicit in this approach is the belief that fatigue problems are not fundamentally different in the various materials and that unifying concepts of fatigue behavior would be useful.

The publication is divided into four sections: (1) Fatigue Crack Growth and Interfaces, (2) Fatigue Deformation and Damage, (3) Fatigue Fracture Mechanisms and Environmental Effects, and (4) Prediction, Reliability, and Design.

ASTM Committee E-9 on Fatigue sponsored the symposium on which this publication is based, in cooperation with the Institute of Metals Division Composites Committee of the American Institute of Mining, Metallurgical, and Petroleum Engineers.