

# INTRODUCTION

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The papers in this volume were presented at the Fifth National Symposium on Fracture Mechanics held at the University of Illinois, Urbana, Illinois, 31 August through 2 September 1971. Beginning in 1972, the National Symposium on Fracture Mechanics will be sponsored by ASTM through Committee E-24 on Fracture Testing of Metals.

In this volume, the papers treat crack tip stress analysis and subcritical crack extension caused by repeated loads, environments, and their combination. The threshold level for fatigue crack extension is given particular attention.

In the companion volume, *STP 514*, methods of measurement of toughness of high-toughness metals are reported. Attention is focused on a variety of tests including a new fracture criteria for the elastic-plastic and fully plastic realm, the critical value of  $J$  integral, and the relationship between the various toughness measurements.

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