Introduction

Fracture mechanics has become one of the preeminent disciplines utilized in the evaluation of structural integrity during the past 20 years. This growth has been spearheaded in part by the efforts of ASTM Committee E24 on Fracture Testing of Metals. One aspect of this involvement by Committee E24 has been the development of a significant body of technical literature related to fracture mechanics. This literature generally represents the proceedings of specialist conferences dealing with fracture mechanics as well as the National Symposium on Fracture Mechanics. For the most part, these proceedings take the form of an ASTM *Special Technical Publication (STP).* The papers in this *STP* were presented at the 13th National Fracture Mechanics Symposium held June 16 through 18, 1980 at ASTM headquarters in Philadelphia, Pa.

The paper selection process for the national symposium has varied over the years. The procedure adopted for the 13th National Symposium on Fracture Mechanics was to have a general solicitation for technical papers in all areas related to fracture mechanics and structural integrity. Thus there was not a specific theme for the 13th National Symposium. It is interesting to note from the foreign contributors to the 13th National Symposium on Fracture Mechanics as well as the previous symposiums on fracture mechanics that the National Symposium on Fracture Mechanics truly represents an international event.

The papers contributed to the 13th Symposium fell into four broad categories. The first category was fatigue of engineering materials with principal applications to metals. Two conference sessions were devoted to this. The second indentifiable category at the conference was the calculation of stress-intensity factors. This represented a single session in the conference. The third subject area was elastic-plastic fracture mechanics as represented by the calculation of J_{Ic} and the tearing modulus T. Lastly, the fourth category represented a general potpourri of subjects dealing with fracture mechanics and structural integrities, with such topics as composites, R-curves, fracture mechanics applications, Charpy V-notch correlations, creep crack growth rate, and metallurgical effects finding coverage in these sessions. It is clear

when reviewing previous proceedings that the distribution of subjects represented in the 13th Symposium is very similar to those presented at the previous symposiums.

This volume should provide a valuable source of information to all those interested in fracture mechanics. The assistance of the organizing committee, particularly Professor Jerry Swedlow; the authors and reviewers; J. J. Palmer, J. B. Wheeler, and Kathy Greene of ASTM and their staff along with all those who participated in the conference are gratefully acknowledged. Particular thanks go to Professor R. W. Hertzberg, Dr. R. Bucci, Professor C. W. Smith, Dr. W. R. Andrews, Mr. J. C. Lewis, Professor G. H. Sines, Dr. G. Clarke, and Dr. W. G. Clark for their assistance with the various technical sessions. A particular thanks is extended to Dr. John Barsom of the United States Steel Corp., Dr. R. Bucci of the Aluminum Corporation of America, and Mr. Ed Wessel of Westinghouse for their continued support to the National Symposium on Fracture Mechanics through their individual effort as well as the efforts and support of their industrial organizations. Without their support and encouragement, the 13th National Symposium could not have been as productive and valuable. It is also noted with great pleasure the award of the Geo. Irwin Medal to Dr. Steve Novak of the Applied Research Laboratory of the United States Steel Corp. Lastly, the support of the Materials Research Center at Lehigh University for my time is gratefully acknowledged along with the help of our girl Friday, Jone Svirzofsky.

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