

Introduction

The field of acoustic emission has grown tremendously in the past decade, as evidenced by the many new areas of application, the increasing number of workers, and the expanding literature on acoustic emission. To date, the literature has been scattered among many journals and reports. No comprehensive survey has existed. Many of the papers have presupposed advance knowledge of the technology and past developments, which works a hardship on newcomers to the field.

To remedy this situation and gather the relevant information in one place, ASTM has commissioned this Special Technical Publication, derived from the Symposium on Acoustic Emission at the ASTM Committee Meeting of December 7-8, 1971, in Bal Harbour, Florida. The papers cover a wide range of topics, from general reviews of the field to specific reports on research findings, technological advances, and applications in different industries. Their collective references, cited in the papers, include most of the published material on acoustic emission technology.

The first section is primarily introductory. It is intended for those who seek a general understanding of acoustic emission. Included here are the historical background and discussions of the relevant aspects of dislocation dynamics, microcracking processes, rock mechanics, materials studies, and structural evaluation studies.

The remaining sections comprise a state-of-the-art review of specific research and application areas. Much of this material is previously unpublished and at the forefront of present technology. Described here are applications in various industries and the results of research intended to advance the capabilities of acoustic emission. Experimental considerations and instrumentation are emphasized in several of the papers, ranging from direct application of commercial equipment to research efforts pushing the limits of instrument capabilities.

We hope this publication will prove interesting to a wide spectrum of readers,

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to those who want a basic introduction to the field as well as research workers exploring the future directions for acoustic emission technology.

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