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Acoustic Emission Non-Destructive Testing of Structures using Source Location Techniques*

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Abstract

The technology of acoustic emission (AE) testing has been advanced and used at Sandia for the past 40 years. AE has been used on structures including pressure vessels, fire bottles, wind turbines, gas wells, nuclear weapons, and solar collectors. This monograph begins with background topics in acoustics and instrumentation and then focuses on current acoustic emission technology. It covers the overall design and system setups for a test, with a wind turbine blade as the object. Test analysis is discussed with an emphasis on source location. Three test examples are presented, two on experimental wind turbine blades and one on aircraft fire extinguisher bottles. Finally, the code for a FORTRAN source location program is given as an example of a working analysis program. Throughout the document, the stress is on actual testing of real structures, not on laboratory experiments.

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