

INDUSTRIAL APPLICATIONS OF ACOUSTIC WAVE PHENOMENA

George A. Alers
Science Center, Rockwell International
Thousand Oaks, California 91360

Abstract

Although high frequency sound waves find applications throughout industrial processing and control, the applications which utilize microwave technology the most are those found in ultrasonic nondestructive testing. In the past, antenna theory and transmission line concepts have been used to describe ultrasonic transducers and their coupling to the parts to be tested. More recently, the more complex problems of mode conversion and dispersion by the medium in which the sound waves travel have received attention. The interaction of both shear and compressional waves with various possible defects is now being attacked rigorously with both experimental and theoretical tools. This paper will review recent advances in sound wave propagation in highly anisotropic media such as composites: the scattering of sound in solid media; the use of the normal modes of vibration of plates and bars for rapid inspection; computer aided acoustic holography; nonlinear effects for detecting internal stress; and dispersion of surface waves to analyze surface layers.