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Nota di contenuto	Advanced Ultrasonic Methods for Material and Structure Inspection; Table of Contents; Preface; Chapter 1. An Introduction to Failure Mechanisms and Ultrasonic Inspection; 1.1. Introduction; 1.2. Issues in connecting failure mechanism, NDE and SHM; 1.3. Physics of failure of metals; 1.3.1. High level classification; 1.3.1.1. Deformation; 1.3.1.2. Fracture; 1.3.1.3. Dynamic fatigue; 1.3.1.4. Material loss; 1.3.2. Second level classification; 1.3.2.1. Deformation due to yield; 1.3.2.2. Creep deformation and rupture; 1.3.2.3. Static fracture; 1.3.2.4. Fatigue; 1.3.2.5. Corrosion 1.3.2.6. Oxidation1.4. Physics of failure of ceramic matrix composites; 1.4.1. Fracture; 1.4.1.1. Mechanical loads and fatigue; 1.4.1.2. Thermal gradients; 1.4.1.3. Microstructural degradation; 1.4.2. Material loss; 1.5. Physics of failure and NDE; 1.6. Elastic waves for NDE and SHM; 1.6.1. Ultrasonic waves used for SHM; 1.6.1.1. Bulk waves: longitudinal and shear waves; 1.6.1.2. Guided waves: Rayleigh and Lamb waves, bar, plate and cylindrical guided waves; 1.6.2. Active and passive ultrasonic inspection techniques; 1.6.3. Transmitter-receiver arrangements for

ultrasonic inspection

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2.2.1. Lamb waves in thin plates2.2.2. Lamb waves in thick plates; 2.3. Passive ultrasonic monitoring and characterization of low velocity impact damage in composite plates; 2.3.1. Experimental set-up; 2.3.2. Impact-acoustic emission test on a cross-ply composite plate; 2.3.3. Impact test on a stringer stiffened composite panel; 2.4. Autonomous active damage monitoring in composite plates; 2.4.1. The damage index; 2.4.2. Applications of the damage index approach; 2.5. Conclusion; 2.6. Bibliography; Chapter 3. Ultrasonic Measurement of Micro-acoustic Properties of the Biological Soft Materials
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4.2.1. Guided wave inspection with dispersive Lamb-type guided modes

Sommario/riassunto

Ultrasonic signals are increasingly being used for predicting material behavior, both in an engineering context (detecting anomalies in a variety of structures) and a biological context (examining human bones, body parts and unborn fetuses). Featuring contributions from authors who are specialists in their subject area, this book presents new developments in ultrasonic research in both these areas, including ultrasonic NDE and other areas which go beyond traditional imaging techniques of internal defects. As such, both those in the biological and physical science communities will find this an