LECTURE SERIES ON TOPICS IN ULTRASOUND

NONDESTRUCTIVE TESTING USING ULTRASONIC METHODS

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Author of Acoustical Imaging: Techniques & Applications for Engineers,

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This e-book forms part of the lecture series on topics in ultrasound , containing up to date R & D results, suitable as textbook for undergraduates and graduate students of mechanical engineering and reference book for researchers and practicing engineers and scientists. Ultrasonic methods is an upcoming technology in nondestructive testing with increasing market share. In this e-book, the author gives both the fundamental principles and applications of ultrasound in nondestructive testing.

The key features of the book are: nonlinear acoustical imaging used in nondestructive testing, acoustic microscopy, time reversal acoustics applied to nondestructive testing, quantitative nondestructive testing with measurements of the residual stresses and Young's modulus in composites,dry contact or noncontact transducers, V(z) curve technique in the characterisation of kissing bonds.

The contents of the book:

1. Defects Characterisation
2. Automatic Ultrasonic Testing
   2.1 Introduction
   2.2 Testing Procedures
   2.3 Example of a AUT System
   2.4 Signal Processing and Automatic Defects & Features Classification in AUT
3. Guided Waves used in Acoustical Imaging for NDT
4. Ultrasonic Techniques for Stress Measurement & Material Studies
   4.1 Introduction
   4.2 Internal Stress Measurements
   4.3 V(z) curve Technique in the Characterisation of Kissing Bond
5. Dry Contact or Noncontact Transducers
   5.1 Pitch/Catch Swept Method
   5.2 Pitch/Catch Impulse Method
   5.3 MIA Test Method
6. Phased Array Transducers
   6.1 Introduction
   6.2 Meaning of Phased Array
   6.3 Principles of Phased Array Ultrasonic Technology
   6.4 Focal Laws
   6.5 Basic Scanning & Imaging
   6.6 Advantages of Phased Array Imaging as compared with Conventional UT
7. Non-classical Nonlinear Acoustical Imaging

7.1 Introduction

7.2 Mechanisms of Harmonic Generation via CAN

7.3 Nonlinear Resonance Mode

7.4 Experimental Results on Non-Classical CAN Spectra

7.5 CAN Application for Nonlinear Acoustical Imaging & NDE

7.6 Conclusions

8. Modulation Method of Nonlinear Acoustical Imaging

8.1 Introduction

8.2 Principles of Modulation Acoustic Method

8.3 The Modulation Mode Method of Crack Location

8.4 Experimental Procedure of the Modulation Method for NDT

8.5 Experimental Procedures for the Modulation Mode Method

8.6 Conclusions

9. Harmonic Imaging

10. Application of Time Reversal Acoustics to Ultrasonic Nondestructive Testing

10.1 Theory of Time Reversal Acoustics for Liquid-Solid Interface

10.2 Experimental Implementation of the TRM for Nondestructive Testing Works

10.3 Incoherent Summation

10.4 Time Record of Signals coming from a Speckle Noise Zone

10.5 The Iterative Technique

References

Nondestructive Testing using Ultrasonic Methods is a comprehensive reference on nondestructive testing and forms a valuable resource for engineers, researchers, senior undergraduates and graduate students.

/63 pages/

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