Presented at NDE2002, to predict. assure. improve. www.nde2002.org
National Seminar of ISNT, the Indian Society for Non Destructive Testing
Hotel Taj Connemara and Raja Muthiah Hall, Chennai, 05. – 07. 12. 2002

Critically Refracted Longitudinal Waves for Defect Detection and Materials Characterisation

P. Suresh, S. Sudhakar, B. N. Sankar, and Krishnan Balasubramanian*

Department of Physics, Anna University, Chennai 600 025, India
*Centre for NDE, Indian Institute of Technology, Chennai 600 036, India

Abstract

Critically refracted longitudinal ultrasonic waves (L_{CR}) have been recently employed by Bray and Junghans for a variety of applications in the field of materials science and non- destructive testing of materials. These L_{CR} waves can travel just below the surface of the material and have both the properties of surface waves (guided nature) and bulk waves (velocity). It is also feasible to generate them on the incident surface (primary wave) as well as along the surface on the other side (secondary wave). They are more sensitive to stress fields in a finite thickness of test pieces. In the present work the L_{CR} waves have been utilized for material characterization by way of making measurements of velocity and attenuation of these waves in three different materials (Aluminium, Brass and Mild steel) and the value of Young's modulus is also estimated and compared with the standard values. In addition the potential of L_{CR} waves for detection of artificially induced defects of different sizes in Steel and Aluminum plates is established.