

Abhijit A. Kulkarni, Instrumentation for ultrasonic testing of nonhomogeneous materials, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 1993.

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**Abstract** – This project was aimed at the design and fabrication of the instrumentation necessary for nondestructive testing of nonhomogeneous materials using ultrasound techniques. As a first application, an instrument for testing of concrete using ultrasonic pulse velocity technique was developed. This is a proven technique and can be used for estimating the concrete strength, uniformity, etc. at actual sites. Also detection of cracks and estimation of damages are possible using this instrument. Further, a technique for ultrasonic pulse attenuation measurement in concrete was investigated in this project. The necessary instrumentation for implementing this technique was developed and laboratory tests were conducted on specially cast concrete specimen. The validity of the results was studied by crosschecking attenuation variations with velocity variations in different specimen.

The combined measurement of ultrasonic pulse velocity and pulse attenuation on concrete structures can improve the reliability of nondestructive test results by a great amount.

Using similar instrumentation testing may be conducted on other nonhomogeneous materials like timber, F.R.P., ceramics, etc.