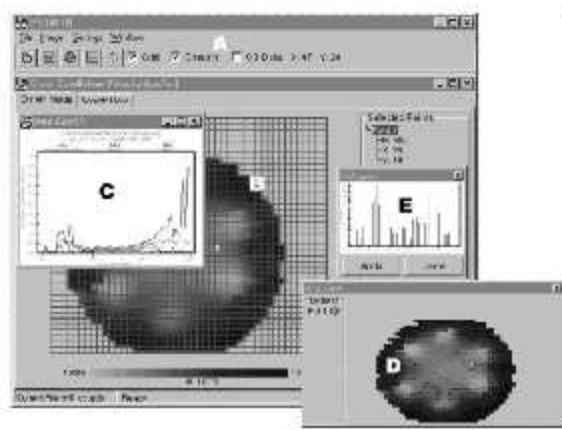


Ultrasonic Data Display and Analysis System Developed (Including Fuzzy Logic Analysis) for the Windows-Based PC



Ultrasonic data display and analysis screen elements.

Post-Scan Interactive Data Display (PSIDD) III is a user-oriented Windows-based system that facilitates the display and comparison of ultrasonic contact measurement data obtained at NASA Glenn Research Center's Ultrasonic Nondestructive Evaluation measurement facility. The system is optimized to compare ultrasonic measurements made at different locations within a material or at different stages of material degradation. PSIDD III provides complete analysis of the primary waveforms in the time and frequency domains along with the calculation of several frequency-dependent properties including phase velocity and attenuation coefficient and several frequency-independent properties, like the cross correlation velocity. The system allows image generation on all the frequency-dependent properties at any available frequency (limited by the bandwidth used in the scans) and on any of the frequency-independent properties. From ultrasonic contact scans, areas of interest on an image can be studied with regard to underlying raw waveforms and derived ultrasonic properties by simply selecting the point on the image. The system offers various modes of indepth comparison between scan points. Up to five scan points can be selected for comparative analysis at once. The system was developed with Borland Delphi software (Visual Pascal) and is based on an SQL data base. It is ideal for the classification of material properties or the location of microstructure variations in materials. Along with the ultrasonic contact measurement software that it is partnered with, this system is technology ready and can be transferred to users worldwide.

This software culminates over 10 years of work from inception to finish. The original implementation was on a VAX computer system custom to Glenn's nondestructive evaluation laboratory, and it did not include fuzzy logic analysis capability. In 1997, we decided to port the entire system to Windows running on an IBM-compatible personal computer (PC). As such, PSIDD III would enjoy the benefits of a graphically oriented

environment. This would allow information to be seamlessly passed between PSIDD and other systems for reporting or presentation use. Also, the interface would be much simpler for the end user by replacing the original cursor control unit with a mouse. PSIDD III was developed jointly by Glenn and the University of Toledo.

Bibliography

Lovelace, Jeffrey J., et al.: PSIDD3: Post-Scan Ultrasonic Data Display System for the Windows-Based PC Including Fuzzy Logic Analysis. NASA/TM--2000-210065, 2000.
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