TENTATIVE AGENDA
Pre-Conference Workshop
on
Materials Characterisation through Ultrasound
Dec 2-4, 2002

Dec 2nd Monday 08.30 –09.00 REGISTRATION

Dec 2nd Monday 09.00 –09.15 INAUGURATION OF THE WORKSHOP

Dec 2nd Monday 09.15 –10:15 Fundamentals of Ultrasound (1 hour): : Generation, Propagation, Attenuation, Reflection, Refraction, Mode Conversion, Scattering, Effects of Temperature, Pressure, ….

Dec 2nd Monday 10.45 –12.30 Theory and Models for Ultrasonic NDE (1.45 hours): Wave Equation, Christofel Equation, Numerical Modeling Methods, Ray Tracing, Beam models, Phase& Group Velocity Concepts, Scattering Concepts, Applications of modeling.

Dec 2nd Monday 13.30 –15.30 Generation Mechanism for ultrasonic NDT (2 hours)- Traditional Methods: Peizo-Electric and Electro Magnetic Methods, Transducer Design, Tools for Transducer Design, Impedance Matching, EMAT, Laser Ultrasound, Air-Coupled Ultrasound, Phased Array Ultrasound, ……..

Dec 2nd Monday 16.00 –18.00 Instrumentation & Data Processing (2 hour): Digital Data Acquisition, Recent Motion Control Hardware, Contour Following, Time, Frequency, Time-Frequency systems, Filtering, Data Reduction, SNR Enhancement, Image Processing, ……..

Dec 3rd Tuesday 8.30 –9.30 Inverse Methods in NDE(1 hour) Heuristic Methods (Neural Networks), Modeling based Methods, Tomographic Reconstruction Methods,

Dec 3rd Tuesday 9.30 –12.30 Guided Waves and Applications (2.5 hours)- Raleigh Wave, Lamb Waves, Cylindrical Waves, interface waves, creeping waves (sub-surface waves),……

Dec 3rd Tuesday 13.30 –14.30 Non-Linear Acoustics and Acoustic Microscopy: (1 hours) basics and applications in materials characterization, fatigue damage characterization, other damage characterisation

Dec 3rd Tuesday 14.30 –17.00 Measurements in Metals using Ultrasound: (2 hours) Elastic Constants, Grain Characteristics, porosity, strength, toughness, …., ….

Dec 3rd Tuesday 17.00 –18.00 Ultrasonic Characterisation of Composites: (1 hour) Introduction to composites, Material characterization needs, Measurement of fiber volume fraction, resin content, porosity, elastic properties, fiber-matrix interface strength, moisture absorption, anisotropy, etc.

Dec 4th Wednesday 8.30 –10.00 Ultrasonic Characterisation of Interfaces and adhesive bonds (1.5 hours) Introduction to bonding, interface characterization needs, Measurement of bond quality, bond strength, interface stiffness, adhesive versus cohesive properties, normal, oblique and guided wave methods

Dec 4th Wednesday 10.30 –11.30 Stress Measurement: (1 hour) Acoustic bi-refringence, sub-surface waves, surface waves, …..

Dec 4th Wednesday 11.30 –12.30 Surface Acoustic Wave Devices and Measurements (1 hour) Design and properties of SAW, Design and fabrication of SAW, Measurement of Chemical, Physical, and Mechanical Properties.

Dec 4th Wednesday 13.30 –14.30 Process Parameter Measurement using ultrasound (1 hour): Viscosity, temperature, density, flow, level, …..

Dec 4th Wednesday 14.30 –15.30 Material Property Measurements at High and Low Temperatures using Ultrasound (1 hour): Velocity and attenuation measurements, Correlation with Material Properties,. …..

Dec 4th Wednesday 16.00 –18.00 Ultrasonic Monitoring of Manufacturing Process (2 hours): Measuring of product properties, Plastics, Composites, Glass, Welding, Forging, Machining, Concrete, electronic materials, ….

CONCLUSION OF THE WORKSHOP