



Name of the Technology: Device to Use Conventional Ultrasonic Flaw Detector as EMAT based Flaw Detector

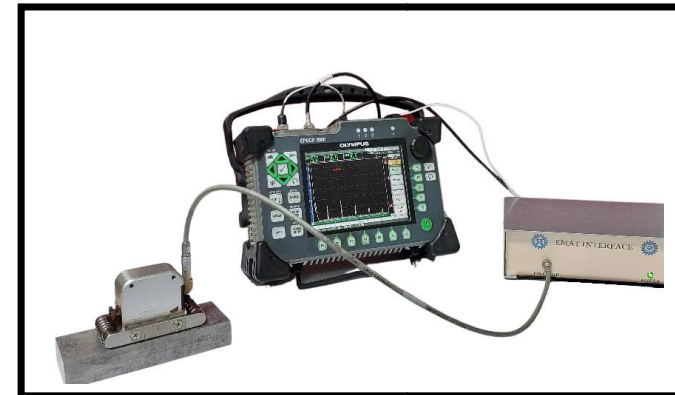
Summary: Ultrasonic Flaw Detectors (UFDs) are extensively used for the detection of flaw, cracks or voids in the field of Non-Destructive Testing (NDT). The material thickness measurement is utilized in various places including industry. It uses piezoelectric based contact transducers generally called as ultrasonic probes and requires suitable couplant to test the material. On the other hand, electromagnetic acoustic transducer (EMAT) is a noncontact method for generation and detection of ultrasonic waves in electrically conducting materials. CSIR- National Physical Laboratory has recently developed a technology by which the conventional UFD can be utilized as EMAT based couplant free UFD. All the inherent powerful data analysis capabilities of the conventional UFD can be utilized with EMAT based testing of electrically conducting metallic structures.

Applications:

- ✓ Thickness measurement in metallic structures
- ✓ Ultrasonic velocity and transit time measurement
- ✓ Flaw and crack detection
- ✓ Material characterization
- ✓ Residual Stress detection metals and rails
- ✓ Various weld inspection in tubes and pipes
- ✓ In-service pipeline inspection
- ✓ Railroad and wheel inspection
- ✓ Detection of inhomogeneous structures

Novelty features of the technology:

- Provision to tune to EMAT frequency
- Broadband excitation approach
- Ability to measure lower thickness
- Ability to synchronize with PRR of UFD
- Wide EMAT frequency range of 3 to 6 MHz





Advantages of the technology:

- Compatible with any UFD
- Compatible with commercial EMATs
- No contact between material and EMAT
- Can be used for testing at elevated temperatures
- Surface preparation not required
- Couplant not required
- Thickness as low as 1 mm can be measured
- Fast real-time scanning of test surface is possible
- Same test location can be inspected for long time

Readiness level of the Technology:

Idea	Concept Definition	Proof of Concept	Prototype	Lab Validation	Technology Development	Technology Demonstration	Technology Integrated	Market Launch

Related Patents:

Patent No. :US10250979B2, **Country:** US,**Publication Date:**07/06/2018, **Grant Date:**02/04/2019

Patent No. :201611041059, **Country:** India,**Publication Date:**in process, **Grant Date:**in process

Year of Introduction: 2022

Broad Area/Category: Electronics & Instrumentation

User Industries:Ultrasonic Non-Destructive Testing, Testing and Calibration Laboratories