Sandia National Laboratories

Exceptional service in the national interest

Advanced Ultrasonic Device with In-Situ Height Adjustment for Improved Flaw Detection

US Patent #9,121,817, #8,371,173, #8,087,298, #6,234,025

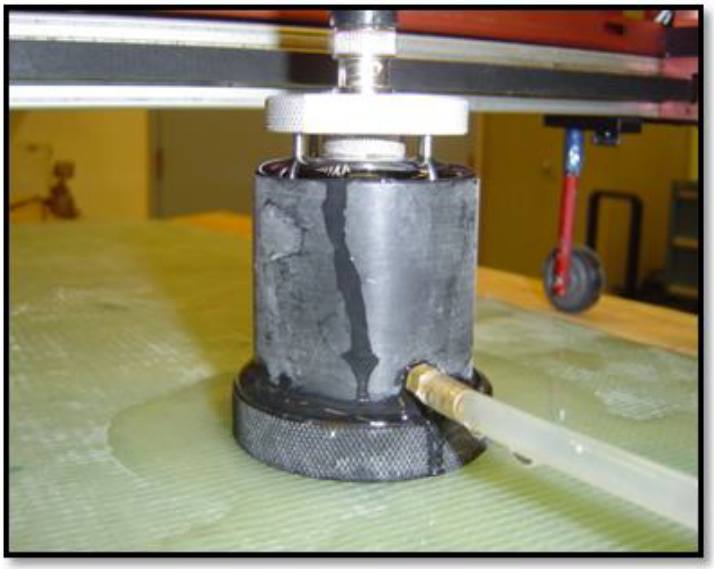
Technology Readiness Level: 8-9

Actual system completed, tested, fully operational

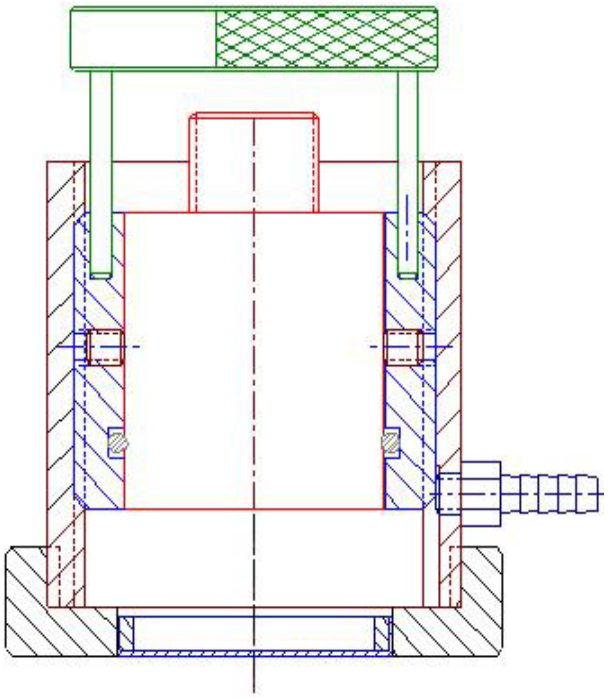
TECHNOLOGY SUMMARY

Ultrasonic testing is a nondestructive inspection (NDI) technique that utilizes ultra-high frequency sound to detect flaws within a part of interest. A fluid (e.g. water or gel) is used to achieve high coupling between the transducer and part under inspection. Typical probe holders (i.e. shoes) hold the ultrasonic probe at a fixed distance from the inspected part, which can lead to signals that are masked by harmonics and undesirable reflections in the part. Researchers at Sandia National Laboratories have developed an adjustable height ultrasonic testing device that overcomes the limitations of fixed-height probes and enables in situ adjustment of coupling fluid height to eliminate the presence of confounding signals and produce improved flaw detection. The device is compatible with a focused ultrasonic transducer developed at Sandia or commercial off-the-shelf transducers.

Traditional probe shoes are open ended, leading to the spillage of large amounts of coupling fluid. The Sandia designed shoes minimize spillage and leakage through the use of a permeable membrane and sealing gasket as well as a vacuum system to remove excess coupling fluid.



New probe holder allows for adjustable water path



U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

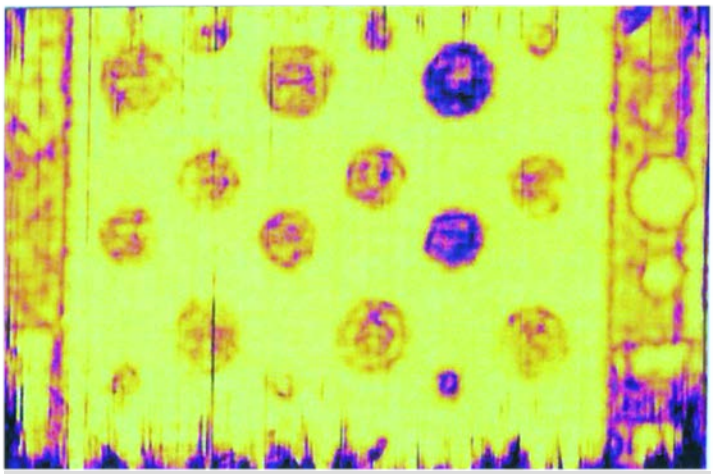
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND No. 2015-9083M

Sandia National Laboratories

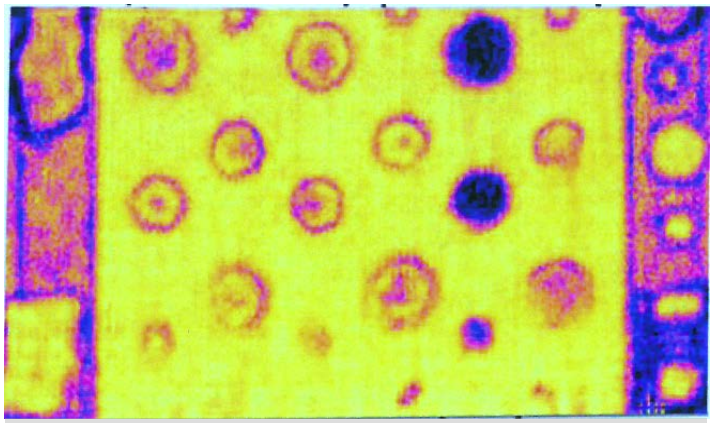
Exceptional service in the national interest

TECHNOLOGICAL BENEFITS

- Adjustable depth of focus for improved flaw detection
- Can be used to detect flaws on structures of varying thickness
- Ideal for use with high attenuation structures and thick or varying thicknesses of laminates
- Minimal coupling fluid spillage; can be used with water to remove residue from coupling fluid



C Scan from a standard probe with fixed water column height



Improved scan obtained from the Sandia adjustable water column device showing good contrast at all depths

POTENTIAL APPLICATIONS

- Aircraft
- Automotive
- Wind turbines
- Military
- Civil structures
- Oil and gas

Focused ultrasonic probe with adjustable water column height

CONTACT US

For more information, please contact:
Sandia National Laboratories
ip@sandia.gov

Refer to SD #12071, SD #10649, SD #6167

Or to learn more, please visit our website at:
https://ip.sandia.gov