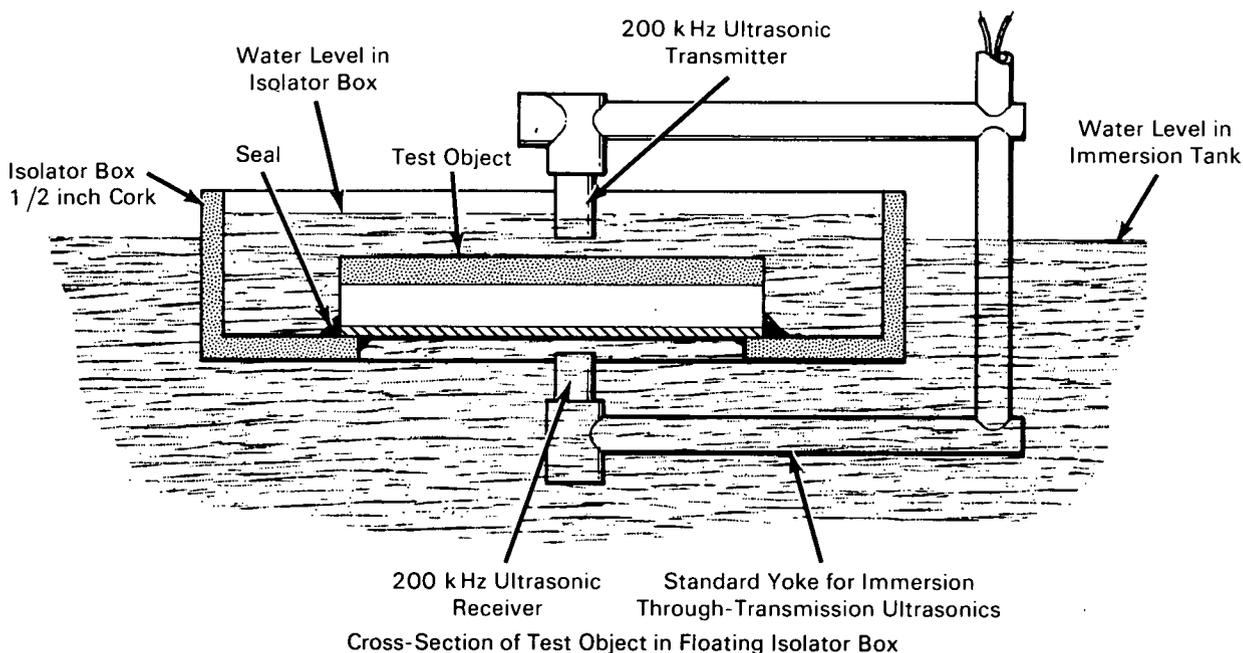


NASA TECH BRIEF



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Immersed Ultrasonic Inspection of High Acoustical Attenuative Structures



The problem:

To produce a low frequency, high power transducer which can penetrate certain types of acoustically high absorbing structures. Conventional ultrasonic immersion inspection of this type of structure is not possible because of the high reflected noise level developed within the immersion tank. A method is needed that will permit the use of ultrasonic equipment for the inspection.

The solution:

By building a floating isolator box of cork around the test object and using a low frequency transducer to penetrate the structure, automated conventional "C" scan equipment was adapted to inspect the

object ultrasonically. Vibrations were isolated and reflected noise from the immersion tank walls was reduced by employing this technique.

How it's done:

A typical application is through-transmission ultrasonic inspection of a structure consisting of 1/4-inch cork on 1-1/2-inch foam on 1/8-inch aluminum to detect unbonded areas between cork and foam. The drawing shows a cross-section of the test object in a floating cork isolator box. Primary factors are the isolator box around the part; 200 kHz transducers; transmitter on attenuative side inside of the containment box; and transmitter and receiver close to the test part. Although high gain levels are used,

(continued overleaf)

even more attenuative structures may be examined by preamplifying the receiver signal.

Notes:

1. This technique allows ultrasonic inspection of acoustically high absorbing structures such as cork or honeycomb core panels. It should be of interest to manufacturers and fabricators of plastics, rubber products, and construction materials.
2. No additional documentation is available. Specific questions, however, may be directed to:
Technology Utilization Officer
Manned Spacecraft Center, Code BM7
Houston, Texas 77058
Reference: B70-10055

Patent status:

No patent action is contemplated by NASA.

Source: F. H. Stuckenberg of
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