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Hull

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[54] **INVERSE METHOD TO MEASURE THE BREATHING WAVE SPEED IN A LIQUID-FILLED CYLINDRICAL SHELL**

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[52] **U.S. Cl.** 367/13; 367/901; 367/130
[58] **Field of Search** 367/13, 901, 130, 367/106, 154, 24, 21

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[57] **ABSTRACT**

Disclosed is an inverse method for measuring the breathing wave speed in a liquid-filled cylindrical shell. The model used with this method is based on an experimental configuration where a shell is attached to a mechanical shaker at the forward end, which initiates longitudinal wave propagation. The resulting spatial field in the shell consists of extensional and breathing waves. End-mounted accelerometers and force transducers are used to measure the extensional wave speed. Once this is accomplished, transfer functions between five equally spaced hydrophones that are in the fluid and a forward accelerometer are recorded. These data are then combined to yield a closed form value of the complex, frequency-dependent breathing wave speed. The experiment included to validate this method is extremely easy to implement and can be executed in a short period of time.

16 Claims, 2 Drawing Sheets

