

# **STRUCTURAL SOUNDNESS OF MONITORING OF PRO-ELASTIC MATERIALS BY ULTRASOUND**

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Non-destructive evaluation and monitoring of structural soundness of pro-elastic materials are investigated with model materials of uniform size glass spheres. Damaged zones and non-uniformity of structure are studied by ultrasound. Signal analyses of waves, transmitted through the sample, with fast Fourier transform, attenuation, and phase, provide structural information. Signal transmitted through the damaged sample, and reference signal, through a healthy sample, are compared by two pairs of ultrasound sensors of 40 kHz, arranged in pitch-catch mode. Separate samples were prepared by 1, 2, 3, and 3.5 mm in diameter uniform glass spheres in water, to determine pore-size effect. Signal analyses were performed by a 500 MHz advanced oscilloscope. Experimental results and mathematical modeling show that a damage zone in the sample and its size are detectable. This technology, when fully automated, could provide the real-time health monitoring of structures and advance poroelastic materials, with industrial and biomedical applications.