研 究 論 文

ストロボ光弾性法による固体中のき裂と残留応力中を伝搬する超音波の可視化

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Strobe Photo-elastic Visualization of Ultrasound Propagation in the Residual Stress Field of the Solid

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Visualization of 1-MHz burst, sinusoidal, ultrasonic-wave propagation in an acrylic plate sample with a slit is achieved using a stroboscopic photo-elastic system to gain insight into how sound fields respond to residual stress. In the acrylic plate, a slit was introduced to allow the residual stress to be distributed. A C-MOS camera was used to obtain the images, which were then processed to enhance the contrast. The distribution and location of the residual stress were identified using a commercial strain detector. The ultrasonic wave around the slit in the sample was clearly visualized and was found to be affected by the birefringence of the residual stress. Visualization of both the dynamic stress of sound propagation and the static residual stress were successfully achieved.

Key Words : Strobe photo-elastic method, Visualization, Ultrasound, Residual stress, Subtraction image