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STRUCTURAL ENGINEERING / EARTHQUAKE ENGINEERING

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[\[PDF \(567K\)\]](#) [\[References\]](#)**CRACK DETERMINATION USING LASER-MEASURED
HORIZONTAL AND VERTICAL VELOCITY WAVEFORMS OF
ULTRASOUND**Hitoshi YOSHIKAWA¹⁾, Yuki OHTA¹⁾ and Naoshi NISHIMURA²⁾

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The authors have been investigating an inverse problem of determining the position and the shape of unknown cracks in a material using velocity waveform data of the ultrasound measured with a laser interferometer. In our previous works, however, only the vertical velocities have been utilized in the crack determination, despite the fact that the horizontal and vertical velocities on the surface of the material are calculated numerically using time domain elastodynamic BIEM in 3D. We measure the particle velocities from the direction tilted from the normal direction to obtain both the horizontal and vertical velocities using the vector decomposition rules for these velocities. We can determine the unknown cracks more accurately using the horizontal and vertical velocity waveforms than using only the vertical velocity waveforms.

Key Words: ultrasonic testing, NDE, crack determination, laser measurement, time domain BIEM, elastodynamics

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