

# Feasibility Study of Evaluating the Length of Capped Piles with Impact Response Method Incorporated with Array Receivers

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## Abstract

In this paper, a new elastic-wave-based NDT system which can be applied to reveal the defects inside the concrete specimens by imaging is proposed. It integrates the point-source/point-receiver scheme with the synthetic aperture focusing technique (SAFT) to achieve the effect like scanning with a phase array system; hence it is equipped with large functioning depth because of the high-energy feature that transient elastic wave method possessed over traditional ultrasonic method. This NDT system is mainly composed of an impact source generator, a vertical displacement transducer, a signal capturing unit and an operation software. To evaluate the feasibility of this system for concrete structures, a concrete slab with artificial void inside were built for experiment. Then 2D plane stress FEM numerical simulations were performed for further comparison. Experimental result shows good agreement with the numerical result not only on the B-scan diagram but also on the processed scanning image. The elastic-wave-based scanning system proposed in this paper exhibits high potential in inspecting the defects of in-situ concrete structures by imaging.

Keyword : NDT, image, concrete, elastic wave