

# **In-depth evaluation of aging infrastructures by the latest elastic wave techniques**

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Visual inspections are well adapted to classify the soundness of infrastructures. The inspections yield in classification of several damage levels such as intact-, pro-active maintenance-, early repair- and urgent repair- levels. In practice, however, one can find that the internal condition of infrastructures, contributing to classify the damage, cannot be assessed by visual inspections. The authors have thus been studying NDT utilizing elastic wave approaches to quantify the internal damage of infrastructures. In the presentation periodic monitoring and continuous monitoring with elastic wave approaches are demonstrated respectively. Specifically elastic wave- or AE- tomography are applied to the existing concrete bridge deck to interpret the damage distribution with their characteristic parameters. And for crucially important infrastructures, to know the early or tiny damage trace, continuous monitoring with newly developed super acoustic (SA) sensors and a four channels FPGA based edge computing unit with event-driven technology is demonstrated. Finally to introduce the NDT into real in-situ maintenance program, essential issues studying or developing in authors' laboratory are introduced.