

High-Power Ultrasonics and Its Application to Industry

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↑ A polarized microscopic image of the cross section of two polyethylene films joined by torsional ultrasonic vibrations.

↑ Ultrasonic plastic joining using torsional vibrations

Applications

A bolt-clamped Langevin-type transducer used for excitation of high-amplitude ultrasonic vibration

← Cross-sectional imaging (right) of a wooden log with a hole in it (left) using ultrasonic time-of-flight computed tomography.

Content :

We have been conducting the research on industrial applications of high-power ultrasonics and visualization techniques with the use of high-intensity ultrasound sources.

More specifically, the subjects of our interest are as follows: development of high output-power piezoelectric transformers, realization of a diffuse sound field inside the ultrasonic cleaning vessel, optimized design of bolt-clamped Langevin-type transducers for excitation of high-amplitude torsional and longitudinal vibrations, investigation of optimum conditions for ultrasonic plastic joining using torsional vibrations, study on stability of degenerating vibration modes of an elastic system against temperature change, active modal vibration control of large ultrasonic vibration tools, and development of the ultrasonic time-of-flight computed tomography system for structural inspection of buildings.

What we are devoted to are not only experimental investigations for industrial applications of high-power ultrasonics, but also fundamental and theoretical studies on various phenomena that we encountered in this field of technology.

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