

# ABSTRACT

Title: Fabrication and characterization of eddy-current detectors for flaw detection and metal sorting

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In this work, multiple-frequency eddy-current sensors for flaw detection and metal sorting were fabricated and investigated. The eddy-current sensors consist of ferrite-cored coils with enameled copper wires. The low-frequency square-wave pulses were used for excitation to increase the skin depth and enrich the available information from the eddy-current signal. For the eddy-current probe with a reference sensor, the variation in thickness of metal plates up to 10 mm is found to be detectable, which indicated that such a sensor are promising to detect the deep laying flaws. For the bridge-type absolute and different eddy-current probes, the probe size can be further reduced to enhance the spatial resolution. The surface defects and materials of magnetic and non-magnetic metal plates can be characterized with pulsed excited bridge-type probes by analyzing the harmonics spectrum of eddy-current signals. The proposed eddy-current detection techniques can be applied to portable flaw detectors and metal sorters.

