Detection of back-side cracks in steel structure using a differential Eddy current testing probe

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ABSTRACT
Eddy current testing (ECT) is a technique that is used to identify deficiencies and faulty in metallic components including aircraft, piping, bridges, and other civil engineering structures. Early detection of cracks is essential for ensuring structural integrity, safety, and reliability before it reaches the point of fracture. ECT method becomes common in NDT because it can detect a defect in conductive materials. Crack can exist in any form of size and shape either on surface or subsurface components where it can contribute to the complete fracture. The development of an ECT probe for the evaluation of backside defects in the galvanized steel plate is discussed in this paper. The ECT probe is developed based on fluxgate sensors for identifications of defects. The ECT probe that was created is assessed by executing a phase-sensitive detection technique at the excitation field of 70 Hz to 310 Hz. The efficiency of the magnetic probe is estimated by identifying the existence of slits based on the changes of the magnetic response where the induced eddy current is caused. Using the developed magnetic probe, the signal intensity is evaluated on the backside of the sample plate. The results show a signal change in the crack area. The integrated ECT probe is expected to be applied for the evaluation of backside inaccuracies.

KEYWORDS
Eddy current; Nondestructive Test; Crack

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