

Depth Evaluation of Slits on Galvanized Steel Plate Using a Low Frequency Eddy Current Probe

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ABSTRACT

This study performs an analysis of a small eddy current probe configuration based on differential anisotropic magnetoresistance (AMR) sensors for characterization of small surface defects in galvanized steel plates. Owing to the advantage of the AMR sensor, the system of eddy current testing (ECT) with the AMR sensor has a huge benefit to detect sub-millimeter defects in steel structures. In this study, an ECT probe is developed by using AMR sensors to perform crack detection in 2-mm galvanized steel plates with regards to the depth of artificial slits where the ECT probe is scanned above the slits' area. The signal that is detected by a lock-in amplifier is investigated with different frequencies of an excitation field. The line-scanned of signal intensity shows a clear intensity change at the crack area. This signal depends on the depth and frequencies. Finally, a correlation between depth and detected signals is clarified with respect to different frequencies.

KEYWORDS:

Slit detection; Steel; Defect; Eddy current testing (ECT); Anisotropic magnetoresistance (AMR)

DOI: https://doi.org/10.1007/978-981-15-2317-5_6

ACKNOWLEDGEMENTS

The authors would like to thank the Universiti Malaysia Pahang (grant no. RDU170377 and PGRS190321) for laboratory facilities and financial assistance.