

Eddy Current Testing Technique to Detect Imperfection Surface for Different Lift-off Value on Copper Metal

ABSTRACT

Non-Destructive Testing (NDT) known as the evaluation of properties of a wide variety of materials without causing a damaged despite after inspection is done and the material still can be used. This paper aims for a designed NDT metal instrument that is conducted using eddy current testing (ECT) technique to find an applicable lift-off (LO) value in detecting imperfection. A dual sensor was designed consist of excitation coil was applied to evaluate the surface imperfections or other excitation frequencies in controlling the signal responses from the testing material, copper (Cu) with dimension of 100 mm x 100 mm installed with artificial surface imperfection (i.e., 7 mm, 14 mm and 21 mm) was main subject in this study. An established amplifier consisting of a specific op-amp was used to boost up the voltage of the alternate current (AC). The data of setting frequencies was ranged from 5.00 - 5.25 MHz was recorded varied of the LO values (i.e., 1.0 mm, 2.0 mm, 3.0 mm, 4.0 mm and 5.0 mm). Based on the frequencies applied the result for an applicable LO value acquires the promising result of reading signal was around 2 mm and the imperfection detection performance obtained a larger voltage gradient with the increase of the imperfection sizes. The study concludes that the developed non-destructive metal testing instrument of specific ECT design by using the excitation coil is appropriate in measuring the LO value and could be used to find different imperfection for metal.