THE EVALUATION OF ALTERNATING CURRENT FIELD MEASUREMENT (ACFM) RESPONSE ON MILD STEEL SURFACE DEFECT

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Ahmad Zubir Zainal Abidin

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ABSTRACT

THE EVALUATION OF ALTERNATING CURRENT FIELD MEASUREMENT (ACFM) RESPONSE ON MILD STEEL SURFACE DEFECT

Alternating current field measurement (ACFM) technique is an electromagnetic inspection method that uses hand-held probes, computerized control, data acquisition and computational model. This technique has been developed for the accurate detection and sizing of defects through coatings and know both the length and depth of the defects. Furthermore, it is more efficient than conventional inspection method for example Ultrasonic Testing (UT), Radiography Testing (RT) and Magnetic Particle Testing (MPT).

This research present two case studies where the designing of ACFM calibration block with the difference depths and also to measure the maximum depth of crack on surface material that can be reached at certain condition. The mild steel material is used as sample and the defect surface is tested by using the ACFM technique. Results from the experimentally suggest that ACFM can be an extremely useful method to determine flaw size, but that a knowledge of the limitations of the technique must also be well understood.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Non-destructive testing (NDT) is a wide group of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage (Lugg M.C *et al.*, 1990). Because NDT does not permanently alter the article being inspected, it is a highly-valuable technique that can save both money and time in product evaluation, troubleshooting, and research. In addition NDT is defining as the use of non-invasive techniques to determine the integrity of a material component or structure. There are in excess of 50 NDT systems available for use at present time, not all which can sensibly be applied to the detection of surface cracks. Each of the technique will have advantages, disadvantages and applications.

Common methods of NDT were developed by the aerospace industries and adapted for automotive and ship building industries. NDT plays a crucial role in ensuring cost effective operation, safety and reliability of plant, with resultant benefit to the community (Raine A *et al.*, 1998), NDT is used in a wide range of industrial areas and is used at almost any stage in the production or life cycle of many components. The mainstream applications are in aerospace, power generation, automotive, railway, petrochemical and pipeline markets. Some of these methods can be applied underwater. Many of the structures, piping, and processing equipment, used in the petrochemical field, require