DETERMINATION TYPE OF DEFECTS TOWARDS CARBON STEEL SAMPLE WELDING USING ANGLE BEAM TECHNIQUE WITH LATERAL AND TO-AND-FRO PATTERN SCANNING

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ABSTRACT

DETERMINATION TYPE OF DEFECTS TOWARDS CARBON STEEL SAMPLE WELDING USING ANGLE BEAM TECHNIQUE WITH LATERAL AND TO-AND-FRO PATTERN OF SCANNING

The focuses of the study were to determine type of defects in each sample welding using angle beam probe with lateral and to-and-fro pattern scanning. Welding is the process of joining two steel pieces together by heating them to the point that molten filler material mixes with the base metal to form one continuous piece. Each sample welding was applied with grease which acts as couplant. Then, lateral and to-and-fro pattern scanning was used during inspection. Type of defects had been determined based on the pattern of signal on flaw detector. A good quality of sample welding is the material does not have any discontinuities or defects which it can affect the performance of products. There are some possible defects include in the material such as incomplete fusion, lack of penetration, cracks, slag inclusion and porosity. During inspection, probe with 60° was used and in angle beam technique, cracks or other discontinuities perpendicular to the surface of a test piece, or tilted with respect to that surface, are usually invisible with straight beam test techniques because of their orientation with respect to the sound beam. The signal pattern between these two scanning pattern was compared and it shows that in sample 5, 6, 7, 8, 11 consists of cracks, porosity, slag, lack of side fusion and lack of penetration defects respectively. Based on the signals, crack and porosity defects were determined by multiple signals that produced and the height of each signal that differentiate between them. Then, for slag, lack of side fusion and lack of penetration defects were determined by single signal that produced but the time of sound travel was differentiating between these defects.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Welding is one of the main categories of material joining processes that required in the production of product. This process is efficient, economical and dependable as a means of joining metals. Besides, this is the only processes which have been tried in the space. There are three methods of material joining processes such as mechanical fastening, adhesive bonding and welding. The most common types of welding are the bead, surfacing, plug, slot, fillet, and groove. To obtain satisfactory welding, we must have a source of energy to create union by fusion or pressure. Then, we also must have a method for removing surface contaminants, a method for protecting metal from atmospheric contamination and lastly must have control of weld metallurgy.

Energy supplied usually in the form of heat generated by a flame, an arc, the resistance to an electric current or by mechanical (friction, ultrasonic vibration or by explosion). Surface contamination may be organic films, oxide film and absorbed gases. When we used heat as a source of energy, it