Pengukuran cacat las baja dengan membandingkan metode ultrasonik konvensional dan ultrasonik phased array = Measuring welding defect of steel by comparing conventional ultrasonic with phased array ultrasonic method

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Abstrak

Munculnya teknologi ultrasonik baru seperti phased array, mulai menggeser fungsi ultrasonik konvensional dalam mendeteksi cacat material. Penelitian ini fokus untuk memaksimalkan fungsi pengukuran cacat las ultrasonik konvensional seperti nilai panjang, lebar, tinggi, kedalaman, dan posisi cacat. Data diilustrasikan dalam tampilan C-scan dan B-scan. Data ultrasonik konvensional dibandingkan dengan hasil ultrasonik phased array. Tujuannya untuk memperoleh kelebihan dan kekurangan keduanya. Metode pengukuran ultrasonik konvensional menggunakan metode beam boundary dan maximum amplitude, sedangkanphased array menggunakan metode sectorial scanning.Pengujian dilakukanpada plat ukuran 200x100 mm, tebal 13 mm, lebar lasan 26 mm danpipa panjang 203 mm, diameter luar 114 mm, lebar lasan 15 mm. Kedua hasil menyimpulkan bahwa ultrasonik konvensional lebih baik dalam hal akurasi pengukuran panjang dan kedalaman cacat, sedangkan phasedarray memiliki keunggulan pada penggambaran dan perekaman data.
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New technology ultrasonic such as phased array, began to change the function of a conventional ultrasonic to detect defects in the material. This research focused on maximizing the function of a conventional ultrasonic to measure welding defect such us length, width, height, depth, and the position of defects. The data were illustrated in C-scan and B-scan image. The data of conventional ultrasonic were compared with phased arrays results. The purpose was to obtain the advantages and disadvantages of both. Methods applied in conventional ultrasonic testing were beam boundary and maximum amplitude, where as the method in phased array was sectorial scanning. The testing was conducted by using a sample in plat and pipe. The dimension of the plat was 200×100 mm, thickness 13 mm, and cap width weld of 26 mm. The length of pipe was203 mm, outside diameter of 114 mm and cap width weld of 15 mm. The results showed that ultrasonic conventional is better i nterms of length and depth measurement, mean while phased array has the advantages on the imaging and recording the data.