ABSTRAK

Industri transportasi seperti perkapalan, industri kereta api, dan otomotif banyak menggunakan aluminium paduan seri 5083. Peralatan yang membutuhkan sambungan las biasanya menggunakan aluminium paduan seri 5083 karena paduan tersebut memiliki kekuatan tarik relatif tinggi, sifat mampu las (*weldability*) yang baik dan ketahanan korosi yang baik. Pengelasan *Metal Inert Gas* (MIG) banyak digunakan untuk material aluminium karena proses mudah dilakukan, produktivitas pengelasan yang tinggi, dan biaya yang lebih rendah. Namun disisi lain, sambungan las dapat menyebabkan distorsi dan menurunkan sifat mekanis material. Penelitian ini dilakukan untuk melihat pengaruh perlakuan *static heating* saat proses pengelasan MIG terhadap distorsi dan sifat mekanis material hasil pengelasan.

Spesimen yang digunakan adalah pelat aluminium paduan seri AA5083-H116 dengan tebal 3 mm. Proses pengelasan MIG dilakukan dengan arus 110 A dan kecepatan las 10 mm/s. Variasi perlakuan *static heating* dilakukan dengan temperatur 100 °C, 150 °C, 200 °C dan tanpa perlakuan. Setelah pengelasan selesai, dilakukan pengujian yang meliputi data pengukuran distorsi, pengamatan struktur mikro, pengukuran nilai kekerasan mikro Vickers, dan kekuatan tarik.

Hasil penelitian ini menunjukkan bahwa perlakuan *static heating* saat proses pengelasan dapat menurunkan nilai distorsi yang dihasilkan, distorsi terkecil didapat pada perlakuan *static heating* sebesar 200 °C. Spesimen yang memiliki nilai kekerasan paling tinggi adalah spesimen dengan perlakuan *static heating* sebesar 200 °C. Namun, kekuatan tarik paling tinggi terdapat pada spesimen tanpa perlakuan.

Kata Kunci: Metal Inert Gas (MIG), static heating, distorsi, kekerasan, struktur mikro, kekuatan tarik.

ABSTRACT

The transportation industries such as marine industry, the railway industry, the rail industry, and automotive industry use Aluminum alloy 5083. Equipment that require welded joints are made from mainly 5083 series aluminum alloy because the alloy has relatively high tensile strength, good weldability and good corrosion resistance. *Metal Inert Gas* (MIG) welding is widely used for welding aluminum materials because of its easy welding process, high welding productivity, and lower costs. On the other hand, however, welded joints can cause distortion and reduce mechanical properties of the weld joints. This research was conducted to study the effect of static heating treatment during the MIG welding process on the mechanical properties of the weld joints.

The specimens used were AA5083-H116 series aluminum alloy plates with 3 mm thickness. The MIG welding process is carried out with a current of 110 A and a welding speed of 10 mm/s. Variations in static heating treatment are carried out with a temperature of 100 °C, 150 °C, 200 °C and without treatment. After welding is complete, testing is carried out which includes distortion measurements, microstructure observation, measurement of Vickers micro hardness values, and tensile strength.

The results of this study indicate that giving *static heating* during the welding process can reduce the resulting distortion value, the smallest distortion obtained in the treatment of giving *static heating* of 200 °C. Giving a static heating of 200 °C also has the highest hardness value is the treatment of giving static heating of 500 Hz. But, the highest tensile strength is found in the non treatment variable.

Keywords: Metal Inert Gas (MIG), static heating, distortion, microstructure, hardness, tensile strength.