ABSTRAK

Paduan aluminium 6061 digunakan secara luas dalam industri otomotif dan dirgantara karena sifat fisiknya yang baik. Namun, proses pengelasan dapat menurunkan kekuatan dan keuletan material, terutama pada area *Weld Metal* (WM) dan *Heat Affected Zone* (HAZ). Penelitian ini bertujuan untuk mengidentifikasi pengaruh *Post Weld Heat Treatment* (PWHT) terhadap sifat mekanis dan struktur mikro paduan aluminium 6061. PWHT dilakukan dengan variasi waktu penahanan 1, 2, dan 3 jam pada temperatur 240°C. Hasil pengujian menunjukkan bahwa PWHT selama 2 jam memberikan hasil optimal dengan peningkatan kekerasan sebesar 3% dan kekuatan tarik yang hampir sama dengan spesimen tanpa PWHT. Struktur mikro menunjukkan bahwa PWHT dapat mengurangi ukuran butir Mg_2Si dan meningkatkan homogenitas material. Namun, PWHT selama 3 jam menyebabkan *over-aging* yang menurunkan kekuatan tarik dan kekerasan material.

Kata Kunci: Aluminium 6061, HAZ, PWHT, Sifat Mekanis, Struktur Mikro, WM.

ABSTRACT

Aluminum alloy 6061 is widely used in the automotive and aerospace industries due to its good physical properties. However, the welding process can reduce the strength and ductility of the material, especially in the Weld Metal (WM) and Heat Affected Zone (HAZ) areas. This study aims to identify the effect of Post Weld Heat Treatment (PWHT) on the mechanical properties and microstructure of aluminum alloy 6061. PWHT was carried out with holding times of 1, 2, and 3 hours at a temperature of 240°C. The test results show that PWHT for 2 hours provided optimal results with a 3% increase in hardness and tensile strength almost equal to the specimen without PWHT. The microstructure show that PWHT could reduces the grain size of Mg_2Si and increases the material's homogeneity. However, PWHT for 3 hours caused over-aging, which reduces the tensile strength and hardness of the material.

Keywords: Aluminum 6061, HAZ, PWHT, Mechanical Properties, Microstructure, WM.