

ABSTRAK

Penelitian ini bertujuan untuk menganalisis pengaruh variasi arus pengelasan SMAW terhadap karakteristik struktur mikro dan nilai kekerasan Rockwell baja ST 37. Metode penelitian dilakukan dengan memberikan variasi arus pengelasan sebesar 65 A, 85 A, dan 105 A menggunakan elektroda E6013 berdiameter 2,6 mm. Selanjutnya dilakukan pengujian kekerasan menggunakan metode Rockwell skala B (HRB) sesuai ASTM E18 serta pengamatan struktur mikro pada daerah *base metal* (BM), *heat affected zone* (HAZ), dan *weld metal* (WM) menggunakan mikroskop optik setelah melalui proses preparasi metalografi.

Hasil penelitian menunjukkan bahwa variasi arus pengelasan SMAW memberikan pengaruh terhadap distribusi nilai kekerasan dan karakteristik struktur mikro baja ST 37. Pada arus 65 A diperoleh nilai kekerasan sebesar 62,26 HRB pada *base metal*, 73,72 HRB pada HAZ, dan 76,56 HRB pada *weld metal*. Pada arus 85 A nilai kekerasan berturut-turut sebesar 60,49 HRB, 71,11 HRB, dan 65,43 HRB. Sementara itu, pada arus 105 A diperoleh nilai kekerasan sebesar 66,98 HRB pada *base metal*, 79,07 HRB pada HAZ, dan 64,24 HRB pada *weld metal*. Nilai kekerasan tertinggi diperoleh pada daerah HAZ dengan variasi arus 105 A sebesar 79,07 HRB, sedangkan nilai terendah terdapat pada *base metal* dengan arus 85 A sebesar 60,49 HRB. Pengamatan struktur mikro menunjukkan bahwa variasi arus pengelasan menyebabkan perubahan karakteristik mikrostruktur pada setiap zona pengelasan akibat perbedaan masukan panas selama proses SMAW.

Kata kunci: baja ST 37 *Shielded Metal Arc Welding* (SMAW), variasi arus pengelasan, *normalizing*, struktur mikro, kekerasan Rockwell.

ABSTRACT

The research was conducted using welding current variations of 65 A, 85 A, and 105 A with an E6013 electrode of 2.6 mm diameter. Rockwell hardness testing on the B scale (HRB) was performed in accordance with ASTM E18, while microstructural observations were carried out using an optical microscope on the *base metal* (BM), *heat-affected zone* (HAZ), and *weld metal* (WM) after metallographic specimen preparation.

The results showed that variations in SMAW welding current significantly affected the hardness distribution and microstructural characteristics of ST 37 steel. At a welding current of 65 A, the average hardness values of the base metal, HAZ, and weld metal were 62.26 HRB, 73.72 HRB, and 76.56 HRB, respectively. At 85 A, the corresponding hardness values were 60.49 HRB, 71.11 HRB, and 65.43 HRB. Meanwhile, at 105 A, the average hardness values were 66.98 HRB for the base metal, 79.07 HRB for the HAZ, and 64.24 HRB for the weld metal. The highest hardness value was obtained in the HAZ at a welding current of 105 A, reaching 79.07 HRB, whereas the lowest hardness value was recorded in the base metal at 85 A, with a value of 60.49 HRB. Microstructural observations indicated that variations in welding current led to changes in the microstructural characteristics of each welded zone due to differences in heat input during the SMAW process.

Keywords: ST 37 steel, *Shielded Metal Arc Welding* (SMAW), welding current variation, normalizing, microstructure, Rockwell hardness.