THE EFFECT OF WELDING CURREN VARIATION ON BENDING STRENGTH AND IMPACT TOUGHNESS IN TIG WELDING OF ST37 STEEL

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ABSTRACT

This research aims to determine the effect of welding current variations on bending strength and impact toughness in TIG welding of ST37 steel. The research method used was experimental using ST37 steel material with a thickness of 6 mm and a V-groove joint with an angle of 60°, employing ER70S-6 electrode with a diameter of 2.4 mm and welding current variations of 90A, 100A, and 120A. The tests conducted included bending test using the three-point bending method, impact test using the Charpy method based on ASTM E23 standard, and microstructural observation using an optical microscope with 40x magnification in the weld metal (WM), heat affected zone (HAZ), and base metal (BM) areas. The results showed that variations in welding current affect bending strength and impact toughness, where higher current increases heat input, leading to changes in the microstructure, particularly in ferrite and pearlite grain size, which influence the mechanical properties of the material. It can be concluded that the proper selection of welding current is important to obtain optimal weld joint quality in ST37 steel, so that it can be used as a reference in manufacturing and construction processes.

Keywords: Heat input, microstructure, HAZ, weld metal, ferrite, pearlite.