

ANALYSIS OF THE EFFECT OF WELDING CURRENT ON TUNGSTEN INERT GAS (TIG) WELDED JOINTS OF ST37 STEEL ON TENSILE AND BENDING TESTS

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ABSTRACT

he mechanical properties of ST37 steel. The current variations used were 90A, 110A, and 120A with a V-groove butt joint configuration. The testing methods included penetrant testing to detect surface defects, tensile testing to determine strength and elongation, and bending testing to evaluate resistance to bending loads. The results showed that no surface defects were found in all specimens based on penetrant testing. In the tensile test, the highest tensile strength was obtained at 120A with a value of 387.96 N/mm², while the highest elongation occurred at 90A with a value of 7.65%. In the bending test, the highest value was obtained at 110A with a value of 1545.07 N/mm². These differences were influenced by the heat input, which affected the microstructural changes, especially in the Heat Affected Zone (HAZ). Higher current increased tensile strength due to better penetration, but reduced ductility due to grain coarsening. Conversely, lower current produced a finer microstructure, resulting in higher elongation. It can be concluded that current variation significantly affects the mechanical properties of welded joints, where 120A is optimal for tensile strength, 90A for ductility, and 110A for bending strength.

Keywords: *TIG welding, current variation, ST37 steel, tensile test, bending test,*