ANALYSIS OF TENSILE STRENGTH IN FRICTION WELD JOINTS OF ST 37 STEEL WITH VARIATIONS IN INITIAL MACHINE ROTATIONAL SPEED AND A FRICTION TIME OF 10 SECONDS

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ABSTRACT

This study aims to analyze the effect of variations in machine rotational speed on the tensile strength of friction weld joints in ST 37 steel with a constant friction time of 10 seconds. The welding method used is friction welding, with rotational speed variations of 1000 rpm, 1200 rpm, and 1400 rpm. After the welding process, the specimens were subjected to tensile testing according to ASTM E8 standards to evaluate maximum tensile strength, strain, and elastic modulus. The test results showed that machine rotational speed significantly affects joint strength. The 1200 rpm speed produced the highest average tensile strength of 387.28 MPa, with a strain of 61.36% and an elastic modulus of 630.94 N/mm². The 1000 rpm and 1400 rpm variations resulted in slightly lower values. All specimens fractured in the weld zone, indicating that the joint is the structural weak point. The conclusion of this study is that 1200 rpm is the optimal rotational speed for achieving maximum tensile strength in ST 37 steel under a friction time of 10 seconds.

Keywords: Friction welding, ST 37 steel, Tensile strength, Rotational speed, Weld joint.