Strong Current Variations on SMAW Towards Torsional Strength of ST-41 Steel Using Rotary Bending Fatigue Testing
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ABSTRACT

Welding is a process of joining two or more pieces of material using heat energy. One of the widely used welding techniques for low carbon steel is Shielded Metal Arc Welding (SMAW). However, the strength of the weld joint is often unknown, which can lead to failure of the weld joint when it becomes fatigued and fractured, especially under high torsional stress. To determine the strength of the weld joint, a torsion strength test is needed. The purpose of this research is to analyze the strength of SMAW weld joints using a ball joint connection with variations in welding current strength on ST-41 steel, following ASTM E-466 standard for fatigue testing. This study adopts an experimental research design. The object of this research is the strength of the weld joint on ST-41 steel, examined using rotary bending fatigue testing. The results of the strength tests on the specimens are as follows strong welding current of 100 amperes with a value of 1,138.035 N cycles (cycles), the strength of the specimen with a strong welding current of 110 amperes with a value of 1,395.809 N cycles (cycles), rotation, the strength of the specimen with a strong current welding 120 amperes with a value of 1,716.519 N cycles (cycles), raw or unwelded specimen strength with a value of 2,592.723 N cycles (cycles) until it breaks. The fractures in the raw or unwelded specimens are brittle, whereas the specimens welded with 100A current experience brittle fractures, the ones welded with 110A current experience both brittle and ductile fractures, and the specimens welded with 120A current experience both brittle and ductile fractures.

Keywords: Strength of Melded Joints, Rotary Bending Fatigue, ST-41 Steel