

Feasibility Study of Welding Wire for Low Carbon Welding on Heavy Equipment Components based on Welding Strength and Microstructure Analysis

Abstract

In this article, the use of welding wire is examined in relation to the weld strength and microstructure of low carbon steel used in the construction of components for heavy machinery. The goal of this research was to compare the microstructure and mechanical properties of two types of welding wire (A and B) that conform to the Japanese Industrial Standard (JIS) Z 3312. A tensile test, a Vickers hardness test, and a metallographic test were carried out. Type B welding wire had a tensile strength of 472.5 MPA, while type A welding wire had a tensile strength of just 448.9 MPA. Average hardness was determined to be 165 HV for type B welding wire, which also requires the most heat input. Type A wire, with its 162 HV hardness and low heat generation, is an excellent example. These findings indicate that the welding heat input is strongly correlated with the tensile strength and hardness value. The metallographic analysis also revealed the presence of pearlite and ferrite. Type A welding metal welding wire had a maximum pearlite content of 16.40%, whereas type B welding metal welding wire peaked at 17.33%. The strength of a material can be affected by its pearlite content, with a positive correlation between the two.