Effect of PWHT and Non PWHT with SMAW to Mechanical Properties and Micro Structure on Pipe Wall ASTM A-106 Grade B

Student Name: Khristian Chandra Luckyta
Student ID: 2709 100 026
Department: Materials and Metallurgical Engineering ITS

Abstract

In the operation of oil and gas exploration takes the reliability of the supporting facilities. Where in the design of piping systems made welding (welding) as a media liaison that is considered the most efficient. A connection with the common welding method a failure and needs to be further investigated.

In this study, the tests performed in the form of non-destructive testing (magnetic particle and radiography), tensile test, hardness test, metallography (macro and micro), test SEM / EDX, and XRD test. In the tensile test for the connection of fillet weld and butt weld with PWHT treatment showed that the post-weld heat treatment induced an increase in the value of the welded joint elongation. Whereas the hardness testing, hardness distribution of the highest in the region were followed by local HAZ weld metal and the lowest hardness distribution is base metal. As for the test metallography, microstructure specimens without PWHT treatment for connections butt weld and fillet weld is seen that the structure is dominated by ferrite (light-colored grains) and pearlite phase (dark granules) less. In the XRD testing, the process of PWHT on the welding process to give effect to the reduction of strain and residual stress in a material.

Keywords: ASTM A106, Butt Weld, Fillet Weld, PWHT, SMAW
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