

## EVALUATION OF THE HARDNESS AND MICROSTRUCTURE OF A TUNGSTEN INERT GAS WELD OF A MILD STEEL PIPE JOINT

INNOCENT UDUENIABHULIMEN

Department of Materials and Production Engineering, Faculty of Engineering and Technology,  
Ambrose Alli University, Ekpoma, Edo State, Nigeria

### ABSTRACT

The hardness and microstructure of Tungsten Inert Gas (TIG) weld of a mild steel joint has been investigated. The hardness of the weld joint and the Heat Affected Zone (HAZ) of a mild steel is important when considering its performance during its application in industries. In the use of pipelines for the transportation of gases and fluids over long distances to different destinations, the pipes need to be joined together by mostly welding. Tungsten Inert Gas (TIG) process was used in this research having chosen current, voltage, gas flow rate and electrode diameter as the process parameters. The hardness test was conducted using the Rockwell hardness scale B while the microstructure was evaluated using the metallurgical microscope. The different variation in the hardness values was observed and it was noted that the weld joint has the highest hardness values followed by the HAZ and finally the base metal. With choice of the process parameters, current was also noted to have contributed mostly to the effect of the hardness values.

**KEYWORDS:** Hardness, Microstructure, Parameters, Rockwell and Scale