

Development of Welding Parameters to Perform Root Pass Welding Using a Mechanised GTAW Process: A Case Study

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ABSTRACT

Due to a lack of skilled manual welders especially during peak production times, a local welding and fabrication firm in Trinidad was prompted to search for an alternative method to execute their welding operations. In order to address this issue the capital-intensive mechanised gas tungsten arc welding (GTAW) process was identified as an option. The objective of this paper is the development of welding parameters for an effective implementation of a mechanised GTAW process in the local industry in accordance with global welding standards. For experimental purposes, through an extensive literature search, operational parameters such as wire speed, weld current and travel speed were considered to perform root pass welding of the specimens. The selected welding parameters were successfully studied for both the 8" and 10" test coupons that produce good root reinforcement in accordance with international standards. The experimental results showed that performing root pass welding becomes much easier as the pipe diameter increases. The results indicate that the wire speed varies to a significant extent in the case of 8" diameter test coupons. Moreover, the weld current varied to a significant extent in the case of welding smaller diameter pipes. It was also observed that the travel speed was constant for 8" diameter test coupons, and decreased for 10" diameter pipes.

Keywords: GTAW process, welding parameters, wire speed, weld current, travel speed, root pass.