Investigation on welding distortion in stainless steel sheet using gas tungsten arc welding process

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ABSTRACT
TIG welding has found wide applications in various industries for sheet metal joining process due to its simple process with high quality welds. However, it still experiences various form of defects to the weld components such as incomplete fusion, undercut, cracks and distortion which might affect production accuracy, appearance and strength of weld components. It is obvious that various welding parameters can affect the welding distortion. The present study attempts to investigate the effect of welding parameters namely welding current and diameter of filler rod on the distortion angle, tensile strength and change in microstructures. The experiment was performed on a closed butt joint type of welding using a commercial TIG welding machine. A full factorial experiment was utilized in the present study. A higher welding current produced more heat input into the weld zone thus resulting in a higher angular distortion. Similarly, a bigger diameter of filler rod produced more angular distortion attributed to the bigger size of weld bead. While, the tensile strength increased with an increase of welding current whereas, the filler rod diameters showed no clear and direct effect. Based on the microstructures of weld area, there were full penetration joints with no obvious defects such as hot cracking and porosities.

KEYWORDS
Heat affected zone; Tensile strength; TIG welding; Welding distortion

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