



DESIGN AND DEVELOPMENT OF A TURNING SYSTEM FOR FRICTION STIR WELDING OF PIPE

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“I declared that this thesis is the results of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree.”

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ABSTRACT

Friction stir welding (FSW) is one of the latest technologies in the joining of metal. FSW had been popular for welding of plate material particularly aluminum metal. However when come to welding of pipe, the technology is still under research in industrialized countries. One of the essential tools to perform FSW is the requirement of a powerful turning system. It should be able to accommodate a pipe of specific diameter in 1G position, rotated at a specific speed, relevant for FSW applications. Another alternative design is to orbit the stirring tool around the pipe in 5G position.

The turning system for friction stir welding of pipe comprised of a base frame, a cylindrical clamping mechanism for securing a cylindrical work piece, a worm gear, and a dc motor with variables speed. The basic mechanism for this turning system is the dc motor, which drives the worm screw and rotate the worm gear and the worm gear will drive the pipe that will be welded.

This turning system controlled by the speed controller system. The actual welding speed has to select by trial welding. The motor must deliver adequate torque at any selected speed. The current design demonstrated the successful operation of FSW, delivering the required travel speed. The motor power however has to be increased.

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