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**A Multi Criteria Decision Making approach for process improvement in Friction Stir
Welding of Aluminium Alloy**

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Abstract

This work is an attempt to select the optimum process parameters for friction stir welding of aluminium 2024 alloy based on multiple criteria decision making approach. The friction stir welding experiments have been conducted according to L9 orthogonal array with preferred input parameters are tool rotational speed, welding speed and tool offset. The response parameters measured are ultimate tensile strength, impact toughness and hardness of welded joint that determines quality of joint. The multi criteria decision making techniques namely Grey Relational Analysis and Technique for Order Preference by Similarity to Ideal Solution are used to find the optimum process parameter which provides maximum value of all responses. Same result is obtained through both techniques and the optimum conditions are tool rotational speed of 1000rpm, welding speed of 80mm/min and tool offset at 0mm.

Keywords: Friction Stir Welding, Aluminium, Grey Relational Analysis, TOPSIS, Design of Experiments, Multi Criteria Decision Making.

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