

## Developing an Empirical Relationship to Predict Tensile Strength and Micro Hardness of Friction Stir Welded Aluminium Alloy Joints

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**Abstract :** Aluminium alloy 6061 is a medium to high strength heat-treatable alloy which has very good corrosion resistance and very good weldability. Friction Stir Welding was developed and this technique has attracted considerable interest from the aerospace and automotive industries since it is able to produce defect free joints particularly for light metals i.e aluminum alloy and magnesium alloy. In the friction stir welding process, welding parameters such as tool rotational speed, welding speed and tool shoulder diameter play a major role in deciding the weld quality. In this research work, an attempt has been made to understand the effect of tool rotational speed, welding speed and tool shoulder diameter on friction stir welded AA6061 aluminium alloy joints. Statistical tool such as central composite design is used to develop the mathematical relationships. The mathematical model was developed to predict mechanical properties of friction stir welded aluminium alloy joints at the 95% confidence level.

**Keywords :** aluminium alloy, friction stir welding, central composite design, mathematical relationship

**Conference Title :** ICAMAME 2016 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

**Conference Location :** Vancouver, Canada

**Conference Dates :** August 04-05, 2016