

## Investigation of Optimized Mechanical Properties on Friction Stir Welded Al6063 Alloy

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**Abstract :** Friction Stir Welding (FSW) is relatively new, environmentally friendly, versatile, and widely used joining technique for soft materials such as aluminum. FSW has got a lot of attention as a solid-state joining method which avoids many common problems of fusion welding and provides an improved way of producing aluminum joints in a faster way. FSW can be used for various aerospace, defense, automotive and transportation applications. It is necessary to understand the friction stir welded joints and its characteristics to use this new joining technique in critical applications. This study investigated the mechanical properties of friction stir welded aluminum 6063 alloys. FSW is carried out based on the design of experiments using L16 mixed level array by considering tool rotational speeds, tool feed rate and tool tilt angles as process parameters. The optimization of process parameters is carried by Taguchi based regression analysis and the significance of process parameters is analyzed using ANOVA. It is observed that the considered process parameters are high influences the mechanical properties of Al6063.

**Keywords :** FSW, aluminum alloy, mechanical properties, optimization, Taguchi, ANOVA

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