

## **Influence of groove size and reinforcements addition on mechanical properties and microstructure of friction stir welded joints**

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### **ABSTRACT**

The butt joints fabricated by friction stir welding were found to have more strength than the joints obtained by conventional joining process. The important outcome of this process is the successful fabrication of surface composites with improved properties. Thus in order to further enhance the strength of the dissimilar alloy joints the reinforcements can be deposited in to the aluminium matrix during the process of friction stir welding. In the present study the multi-walled carbon nanotubes were embedded in to the groove by varying the width during joining of dissimilar alloys AA2024 and AA7075. Four widths were selected with constant depth and optimum process parameters were selected to fabricate the sound welded joints. The results show that the mechanical properties of the fabricated butt joints were influenced by the size of the groove, due to variation in the deposition of reinforcement in the stir zone. The microstructural study and identification of the elements of the welded joints show that the reinforcements deposition is influenced by the size of the groove. It has also been observed that the groove with minimum width is more effective than higher width. The mechanical properties are found to be improved due to the pinning of grain boundaries.

### **KEYWORDS:**

Butt welding; Deposition; Dissimilar metals; Fabrication; Friction