

Effect of Reinforcement Addition on Joint Properties of Friction Stir Welds: A Review

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ABSTRACT

Friction stir welding process is now widely used to produce efficient joint of various metals and alloys varying from low melting point materials such as aluminium, magnesium, and copper to higher melting point materials such as steel, titanium and metallic matrix composites. Enhancing the joint characteristic properties along with high temperature withstanding capability of the weld region is an interesting investigation in the current research scenario. The joint strength of friction stir welds was considerably improved by uniformly distributing the reinforcement within the matrix of composites. This idea was used for formation of composite structure through placement of particles and foils as reinforcement across the abutting faces of weldments during FSW process. This review provides an overview of welded joint properties altered by the presence of reinforcing particles/foils. The effect of tool features, tool rotation speed, welding speed, number or direction of after weld passes, reinforcement particle size and volume fraction on final joint quality was summarized. At last, research advances in FSW joints by addition of reinforcements accompanied by recommendations for carrying out experimental analysis has been presented followed by scope for future work.

Keywords: Friction stir welding; reinforcements; weld properties; composite structure.