

## A REVIEW ON THE EFFECT OF INTERLAYER ON FRICTION STIR WELDING OF SIMILAR AND DISSIMILAR MATERIALS

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### ABSTRACT

Friction stir welding (FSW) is becoming popular as an energy efficient green technology as it involves no shielding gas and little harmful emissions. FSW is a solid state joining process in which plastic deformation takes place to join the similar or dissimilar materials rather than melting. It has a wide range of applications in the field of industries ranging from aerospace to ship building and rail to electronics. FSW plays a key role in joining many non-weldable aluminium alloys such as from 2xxx series alloys (Al-Cu) and 7xxx series alloys (Al-Zn) which is not possible with conventional welding processes. The joining of the materials in the conventional process leads to softening of weld plates which in turn leads to reduction in mechanical properties. Hence, to enhance the mechanical properties of the weld in FSW process is to insert the interlayer between the base plates. Hence, the study of various interlayers such as zinc, copper, brass, nickel, tin etc. has become a hot topic for researchers. The joining of dissimilar material is often difficult due to difference in physical properties and composition and hence use of interlayer in FSW helps in effective joining. Use of interlayer between the plates not only enhances the tensile strength of the weld joint but also impedes the formation of hard and brittle intermetallic compounds (IMCs) and leads to controlled formation of fine and uniform distribution of IMCs and reduces the residual stresses and further increases the joint efficiency. This work contains the review of some important research papers on FSW using interlayer for similar material i.e., Al/Cu/Al and for dissimilar material Al/Zn/Mg. The work also focuses on review of the tool material that can be used for different workpiece material in order to get optimum results and also throws light upon the fractural analysis of the weld joint. The effect of process parameters (tool rotation, transverse speed, tool tilt angle) on the joining of materials by FSW has been discussed along with the suggestions of the researchers.

**Keywords:** interlayer, intermetallic compounds, FSW, green technology

