

Experimental investigations and Optimization of process parameters involved in friction stir welding of aluminum by doping of Pb, Sb and Zn

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Mode of Study : F. Time

ABSTRACT

Friction stir welding is a solid state welding process in which metals are joined together by rotation of tool and application of pressure over the workpieces. Aluminium metal is widely used in aerospace, ship building industry as well as in our daily life. So, durability of aluminum components is essential. When similar metals are welded they don't give the better strength at the welding point. Doping is a process used for the formation of alloy. With the help of alloy formation it gives the better strength as well as properties of metal can be improved. So, experimental investigations of aluminium plates by doping of metals such as lead, antimony and zinc by solid state diffusion process before being joined by friction stir welded was carried out. The various tool shapes used are cylindrical, tapered cylindrical, triangular and square, tool rpms are 800, 900, 1000 and 1100 and feed rates are 30, 35, 40 and 45mm/min. After experimentation, it has been found that the aluminium sample doped with Pb (Lead) and welded with cylindrical tool profile gives the maximum value of micro hardness, impact strength and tensile strength. However, there is reduction in values of micro hardness, impact strength and tensile strength if the aluminium is doped with antimony metal. Increase of 13%, 10% & 6% in tensile strength, micro hardness and impact strength respectively has been observed by its doping with lead than welded base metal without doping