

Investigation of Microstructure and Mechanical Properties of Friction Stir Welded Dissimilar Aluminium Alloys

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Abstract : Friction Stir Welding Process emerged as promising solid-state welding and eliminates various welding defects like cracks and porosity in joining of dissimilar aluminum alloys. In the present research, Friction Stir Welding (FSW) is carried out on dissimilar aluminum alloys 2000 series and 6000 series this combination of alloys are highly used in automobile and aerospace industry due to their good strength to weight ratio, mechanical, and corrosion properties. The joints characterized by applying various destructive and non-destructive tests. Three critical welding parameters were considered i.e. Tool Rotation speed, Transverse speed, and Tool Geometry. The effective range of tool rotation speed from 1200-1800 rpm and transverse speed from 60-240 mm/min and tool geometry was studied. The two-different difficult to weld alloys were successfully welded. All the samples showed different microstructure with different set of welding parameters. It has been revealed with microstructure scans that grain refinement plays a crucial role in mechanical properties.

Keywords : aluminum alloys, friction stir welding, mechanical properties, microstructure

Conference Title : ICMMME 2017 : International Conference on Mechanical, Materials and Mechatronics Engineering

Conference Location : Paris, France

Conference Dates : May 17-18, 2018