

FRICTION STIR WELDING OF ALUMINIUM ALLOYS

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Abstract: Friction stir Welding (FSW) is a process of assembly in a solid state. Developed since ten years, it makes it possible to be freed from the intrinsic defects obtained by traditional welding processes in liquid phase. However the mechanisms of formation of the welds joints by friction stir remain relatively ignored because of the complexity of the phenomena brought into play, on the one hand the space variation of the deformation states and temperature, and on the other hand, nature and the thermal and mechanic behaviors of materials and the tool used. In this context, the study suggested will aim to choose a grade of a well-defined aluminum alloy, then to carry out operations of welding with various parameters. With through this study, the microstructures of welded joints will be finely characterized by optical microscopy, DSC, TEM, SEM and EBSD. In order to highlight the interactions between the deformations, the precipitation and the recrystallization occurring during the welding state. And to establish the link between the microstructure and the mechanical properties of the joints will be mechanically tested: microhardness; tensile test and the fatigue test.

Keywords : Friction Stir Welding, deformation, Temperature, microstructure, TEM