

Etude mécanique et microstructurale des soudures des alliages d'aluminium soudées par friction

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Abstract: This work is related to the study of the friction welding process. This type of welding has many applications in different branches of industry. This process has many advantages. First, the very high quality assemblies can be made. In addition, this process is much faster than any other conventional processes. Furthermore, it can be completely automated so that constant quality is guaranteed. The aim of this study is the optimization of the parameters of friction welding: (by varying the friction time [s] and the rotational speed [rpm], forging time [s] and the friction pressure and forging [MPa] remain constant). An experimental procedure was used to obtain a welded junction (alu-alu), the alloy used is Al 6013-T8. We used several characterization methods, simple but effective and suitable for this kind of research work; such as microstructural characterization by optical microscope and mechanical characterization namely microhardness and tensile testing. We observed that the microstructure has three zones (TMAZ, HAZ and MDZ), The microhardness profile has a certain homogeneity and the tensile tests have shown that the tensile strength, elongation and elastic limit increase with increased friction time. In general, the mechanical properties are influenced by the overall effect of the metallographic structure of the weld. The latter is closely linked to the process parameters.

Keywords : Friction welding, 6013-T8 alloy, Welded joint, mechanical properties, microstructure, Microhardness