

Public Abstract

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Title:CHARACTERIZATION OF MECHANICAL PROPERTIES AND STUDY OF MICROSTRUCTURES OF FRICTION STIR WELDED JOINTS FABRICATED FROM SIMILAR AND DISSIMILAR ALLOYS OF ALUMINUM

The objective of this research which is to characterize the mechanical properties and studying the microstructures of the friction stir welded alloys fabricated of similar and dissimilar alloys of Al was successfully achieved. The optimal conditions for obtaining a good welded joint is a rotational speed of 1045 rpm, feed rate of 5.75 in/min and a plunge depth of 0.080 in. for AA 2024- T3, rotational speed of 840 rpm, feed rate of 7.625 in/min and a plunge depth of 0.080 in. for AA 7075-T6 and rotational speed of 675 rpm, feed rate of 5.75 in/min and a plunge depth of 0.080 in. for the joining of the dissimilar alloys of aluminum of AA 2024-T3 and 7075-T6.

The mechanical property which reflects the formability of the friction stir welded joints is recognized as ductility, Formability of FSW sheets as measured by ductility in tension test and stretch forming test is acceptable for further processing.

The research could be taken further by applying the same technique to other Aluminum alloys such as 5XXX and 7XXX which are the basic alloys used in the automotive industry. This could help the increase of use of the friction stir welding in the automotive industry. Different design of the tool could be used to investigate the effect of the tool design. The probe shape could be a triangle, square or rectangular one as the probe used for the current research was a cylindrical one with threads on it. The study could be extended to lap joints and investigated the same way.