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Abstract

In this study, behavior of welding parameters such as rotational speed, probe shape and traverse speed in Friction stir welding for both thick and thin sheets was investigated. Three dimensional numerical simulation of friction stir welding was conducted using ABAQUS to validate and model the available experimental data for similar material Al-5052 and model was created to distinguish impact of parameters for dissimilar aluminum alloys i.e. 6061-T651 and 5052-H321. Two types of material properties were considered for analysis i.e. Thermo-physical properties and Thermo-mechanical properties. For each sample, two models were created, tool plate model to obtain residual stresses which were incorporated as input value in tensile sample model to obtain required tensile strength. To avoid distortion, meshing was performed independently on tool and plates. After simulating data, numerical results were compared with experimental results to validate optimal parameters affecting weld strength. Results obtained from both similar and dissimilar validated the experimental results.

Keywords: Friction Stir Welding, Process Parameters, Simulation and Weld Strength.