

Model Based Development of a Processing Map for Friction Stir Welding of AA7075

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Abstract : The main goal of this research relates to the modeling of FSW from a different or unusual perspective coming from mechanical engineering, particularly looking for a way to establish process windows by assessing soundness of the joints as a priority and with the added advantage of lower computational time. This paper presents the use of a previously developed model applied to specific aspects of soundness evaluation of AA7075 FSW welds. EMSO software (Environment for Modeling, Simulation, and Optimization) was used for simulation and an adapted CNC machine was used for actual welding. This model based approach showed good agreement with the experimental data, from which it is possible to set a window of operation for commercial aluminum alloy AA7075, all with low computational costs and employing simple quality indicators that can be used by non-specialized users in process modeling.

Keywords : aluminum AA7075, friction stir welding, phenomenological based semiphsical model, processing map

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