MODELLING OF THERMO-MECHANICAL EFFECTS GENERATED BY FRICTION SPOT STIR WELDING PROCESS

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ABSTRACT
The paper addresses the numerical modelling of Friction Spot Stir Welding, one of the optimal processes which can successfully replace the conventional resistance spot welding and riveting techniques in performing the lightweight structures in the automotive and aerospace industries. Based on finite elements analysis, the three-dimensional model, described in this work, combines the mechanical action of the shoulder and the thermomechanical effect of the welded material. It could be an efficient tool in the prediction of temperature and stress fields generated in 6061-T4 Al alloy joint by FSSW process. The tool was considered a rigid solid and the workpiece was considered a ductile material characterized by elasticity, plasticity, and a kinetic hardening effect. The outcomes of the numerical analysis provide information on heat transfer, temperature and Cauchy stress evolution in the plunging and stirring phases of the process.

KEY WORDS: FSSW process, FEA, temperature and Cauchy stress evolution

REFERENCES