The Annals of "Dunarea de Jos" University of Galati
Fascicle XII, Welding Equipment and Technology, Year XIX, 2008
ISSN 1221 – 4639

FEM MODEL FOR FRICTION STIR WELDING OF ALUMINIUM

Dan Birsan[1], Danut Iordachescu[2],
Jose Luis Ocana[2],Pedro Vilaca[3],

[1]Dunarea de Jos University of Galati, Romania
[2]Centro Láser, Universidad Politécnica de Madrid, España
[3]Technical University of Lisbon, IST, Portugal
dan_iord@yahoo.com

ABSTRACT

Despite significant advances in the application of FSW, as a relatively new welding technique for welding aluminium alloys, the fundamental knowledge of such thermal impact and thermomechanical processes are still not completely understood. The paper introduces an original 3D FEM model of Friction Stir Spot Welding phases. The outputs are the thermal, the stresses and strain fields, respectively. The recently published literature validates the process model.

KEYWORDS: solid state processes, microstructure, hardening, material flow

REFERENCES

[1] **Troeger L.P., Starke E.A**., *Microstructural and Mechanical Characterization of a Superplastic 6xxx Aluminium Alloy*, Materials Science and Engineering, A277, pp. 102-113, 2000.
[2] **Shinoda. T., Kawai M., Takegami H.**, *Novel Process of Surface Modification of Aluminium Casts Applied Friction Stir Phenomenon*, IIW Doc. III-1295-04.
[3] **Thomas W.M. et. al.**, *Friction Stir Butt Welding*, International patent Application PCT/GB92/02203, GB Patent Application 9125978.8, US Patent 5.460.317, 6 December 1991.
[4] **Iordachescu M., Scutelnicu E., Iordachescu D**., *Fundamentals of the Process and Tools Design: Friction Stir Processing of Materials*, The Annals of Dunarea de Jos University of Galati, Fascicle XII, Welding Equipment and Technology, Year XVII, pp.63-72, 2006.
[5] **Colligan K.**, *Material Flow behaviour during Friction Stir Welding of Aluminium*, Welding Journal, 75(7), pp. 229s-237s, 1999.
[6] **Mishra R.S., Ma Z.Y.**, *Friction stir welding and processing*, Materials Science and Engineering R 50 (2005) 1–78, Elsevier, 2005.
[7] **Vilaça P., Santos J.P., Góis A., Quintino, L.**, *Joining Aluminium Alloys Dissimilar in Thickness by Friction Stir Welding and Fusion Processes*, Welding in the World, Vol. 49, No. 3/4, pp.56-62, 2005.