INFLUENCE OF PULSED GAS METAL ARC WELDING PARAMETERS ON THE ELECTRIC ARC AND DROPLET GEOMETRY

L. R. Mistodie, C. C. Rusu, E. Scutelnicu

"Dunarea de Jos" University of Galati, Romania
47 Domneasca St., 800008 – Galati, Romania, Tel. +40336130212
carmen.rusu@ugal.ro

ABSTRACT

The paper focuses on the experimental research of the metal transfer, results analysis and assessment when pulsed gas metal arc welding process (GMAW-P) is applied. Data correlation has been performed between pulsed gas metal arc welding parameters on one side and of the arc geometry and droplet diameter on the other side. The aim of this study is to establish the influence of the pulse parameters on the electric arc shape evolution during the welding process and, finally, to predict the weld bead geometry. The experiments were carried out using a modern power supply and a high speed film camera system in order to record and analyse the images of the metal transfer in the arc column.

KEY WORDS: GMAW-P process, high speed camera, arc geometry, pulse parameters.

REFERENCES

[1] **Haidar J.**, *An analysis of the formation of metal droplets in arc welding*, J. Phys. D: Appl. Phys. 31 no. 10, 1998, pp. 1233-1244.
[2] **Jesper S. T.**, *Advanced Control Methods for Optimization of Arc Welding*, Ph.D. Thesis, Aalborg University, Denmark, 2004.
[3] **Kovacevic R., Zhang Y. M., Liguo E., Beardsley H.**, *Dynamics of droplet geometry during metal transfer in GMAW - a model for process control*, ASME International Mechanical Engineering Congress and Exposition, Atlanta, Georgia, 1996, pp. 143-144.
[4] **Mistodie L. R., Constantin E., Rusu C. C., Constantin V.**,. *Influence of the Drop Dynamics Transferred through the Electric Arc on the GMAW-P Stability*, Welding in the World, vol. 51, Special issue, ISSN 0043-2288, pag. 685-692, 2007.
[5] **Nordbruch S., Tschimer P., Grase A.**, *Visual online monitoring of PGMAW without a lighting unit*, International Sheet Metal Welding Conference IX, Sterling Heights, Michigan, USA, 2000.
[6] **Ponomarev V., Scotti A.**, *Mechanism of long arc MIG/MAG welding metal transfer mixed modes provoked by inadequate dynamic features of the power source*, Paton Welding Journal no. 3, 2005, pp. 7.
[7] **Praveen P., Kang M.J.**, Yarlagadda, P.K.D.V., *Arc voltage behavior in GMAW-P under different drop transfer modes*, Journal of Achievements in Materials and Manufacturing AMME' 2009, Vol. 32, Iss. 2, 2009.
[8] **Ščemeliovas J.**, *Determination of pulse current optimal parameters for manual arc welding*, Scientific Journal Mechanika, 2005, no. 1, pp. 66–69.
[9] **Subramaniam, S., White, D.R., Jones, J.E., Lyons, W.,** *Experimental Approach to Selection of Pulsino Parametes in Pulsed GMAW*, Welding Research Supplement, May 1999, pp. 166-171.
[10] **Valerian A. Nemchinsky**, *Electrode melting during arc welding with pulsed current*, J. Phys. D: Appl. Phys. 31 no. 20, 1998, pp. 2797-2802.
Vilarinho, L. O., Lucas, B., Raghunathan, S., *Cuidados ao se extrair dimensões de fotografia/filmagem em soldagem*, Soldagem e Inspeção (Impresso), vol. 14, p. 358-368, 2009.

ISSN 1221-4639