

New approaches on antigravity welding processes

Danut Iordachescu*, Emil Constantin*,
Mihaela Iordachescu*,
*Dunărea de Jos University of Galați, România

ABSTRACT

The antigravity welding processes are defined as the welding processes where the welding molten metal has the natural tendency to flow. There are cases when it is necessary a very carefully technological and equipment designing activity to make efficient the mechanized antigravity welding. That was the reason to establish theoretically and experimentally some limits for the mechanized position welding parameters, with the view to obtain in a maximum productivity with imposed quality rules. For this purpose, a mathematical model of the forces that act towards the welding bath has been created. It was also necessary to verify experimentally the model and to offer some useful indications for designers and welders. Original laboratory research equipment was designed, was manufactured and was used for different experiments. The equipment have possibility to test: diverse equipment units; diverse specific features welding power supply units; welding techniques and technologies in almost every welding position; several mechanized antigravity welding processes: GMAW, PW (Plasma Welding), TIG etc. The welding electric arc deflection angle, the global equilibrium of the antigravity welding bath, a new approach of the correlation between the arc welding parameters and the weld geometry, some extreme (pushed to the limits) welding process parameters were experimented by means of the laboratory stands. Based on these experiments, industrial equipment was designed, manufactured and tested. The authors developed several welding techniques in order to be certified, as well as the industrial equipment.

References

1. Iordachescu, D., Constantin, E., Georgescu, V. *Sudarea antigravitationala*, Editura Tehnica, Bucuresti, Romania, 1999.
2. Iordachescu, D. *Computation of the welding arc deflection angle*. In: The Annals of Dunarea de Jos University of Galati, Fascicle XII, year III - V, 1992 - 1994, pag. 13-18.
3. Iordachescu, D., Constantin, E., Georgescu, V. *Link Between the Weld Geometry and the Power Introduced in the Welding Processes*. In: proc. of The 8th International Conference on Sheet Metal, SheMet 2000, 17-19 April 2000, University of Central England, Birmingham, United Kingdom, pag. 551-561.
4. Constantin, E. *Tehnologia sudarii prin topire*. Galati, Universitatea Dunarea de Jos din Galati, Romania, vol. I - 1993, vol. II - 1994.
5. Constantin, E., Iordachescu, D. *Equipment and technologies for antigravity welding*. In: Proc. of EUROJOIN 3, Bern, Switzerland, April 1998, 729-738.