Studies on Parametric Influences in Narrow Seam Welding Process by DOE

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ABSTRACT

The seam welding constraints are the most main factors affecting the quality, efficiency and price of welding. The Resistance Seam Welding (RSEW) is very much similar to the Spot Welding (RSW) but here circular rotating electrodes are used.

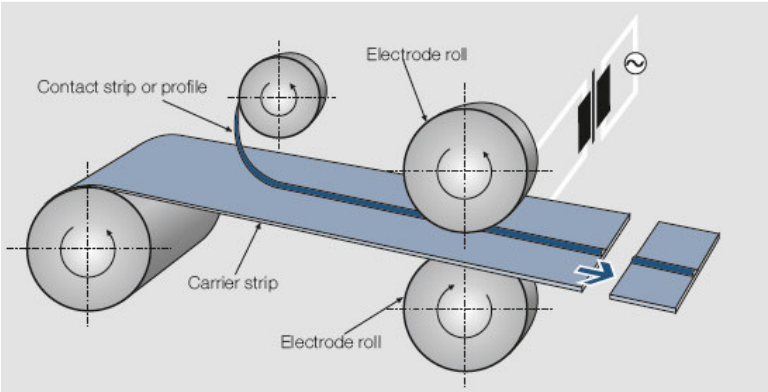

Figure 1: Seam welding process.

The various factors which limit the welding speed were therefore determined for the many variants of the seam welding process. A comparison was made of conventional wide seam welding with narrow wheel and wire seam welding techniques, using either an AC or DC secondary current. Nugget growth in the through thickness direction was promoted by increasing the proportion of the welding current which flowed towards the exit side of the arc of contact between the welding electrodes and the sheet being welded. The influence of a DC welding current compared to an AC current depended on the factors which limited the maximum speed when an AC welding current was used. The electrode force pattern during welding was predominantly a function of machine and welding current characteristics.

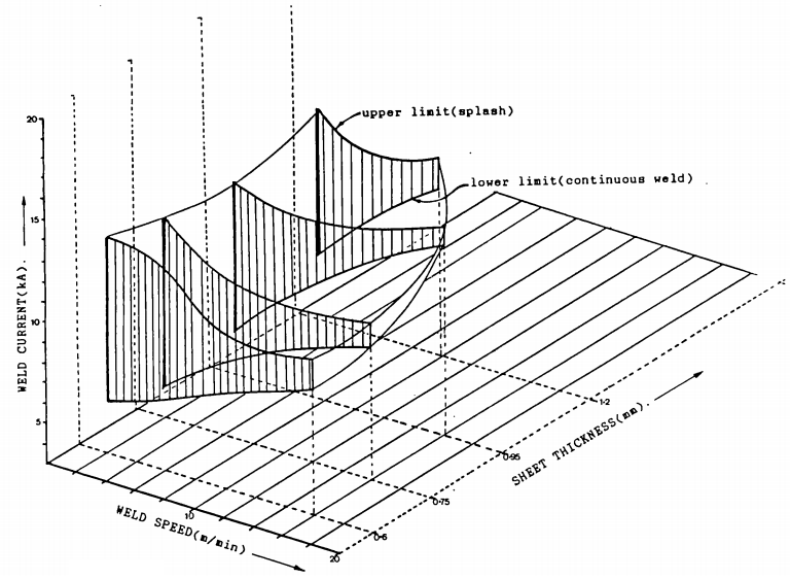

Figure 2: Weldability of narrow seam welding with A.C. current.

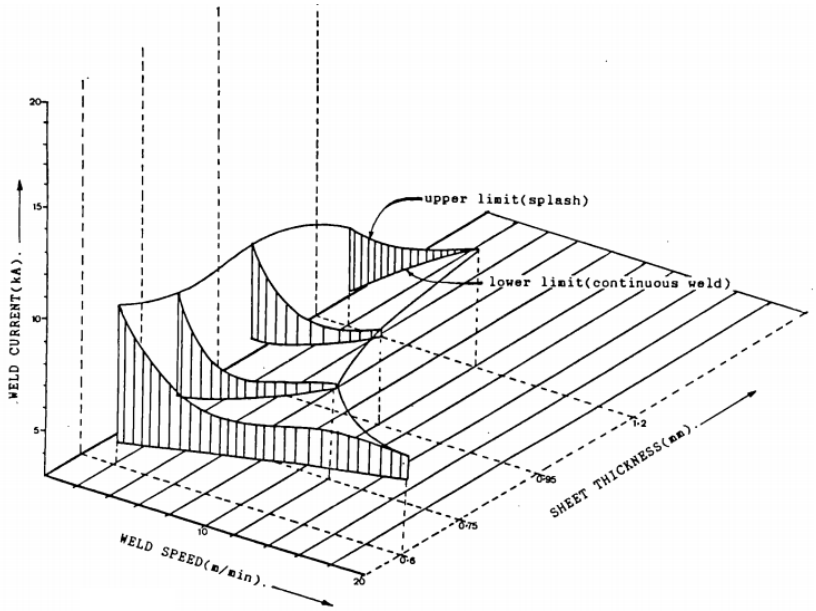

Figure 3: Weldability of narrow seam welding with D.C. current.

In narrow welding using an AC current, the maximum welding speed which could be achieved was lower for the 1.2mm steel as seen from figure 2. Using a DC current increased the maximum speed from 8m/min to 20m/min, when the sheet thickness was decreased from 0.75mm to 0.60mm as seen figure 3. With respect to the minimum current requirement, a slight increase in the necessary current for weld formation was observed as the sheet thickness increased.

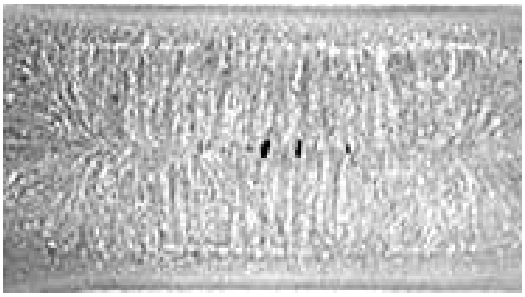

Figure 4: nugget formation in seam welding.

References

1. A. C. Reddy, Effect of Particle Loading on Microealstic Behavior and interfacial Tractions of Boron Carbide/AA4015 Alloy Metal Matrix Composites, 1st International Conference on Composite Materials and Characterization, Bangalore, 14-15 March 1997, pp.176-179.
2. A. C. Reddy, K. Gokul, P. Mahesh, G. S. Reddy, C. R. Suresh, Effect of shielding gases on the performance of weld bead in MIG welding, 13th National convention of Mechanical Engineers, Conference on Modern Trends in Manufacturing Technology, New Delhi, 6-7th November 1997, pp. 273-279.
3. A. C. Reddy, K Ravaivarma, E. Thirupathi Reddy, A study on the effects of joint and edge preparation to produce cost reduction and distortion free welds, National Welding Seminar, IIT-Madras, 07-09 January 2002, pp. 51-55.
4. A. C. Reddy, B. Kotiveerachari, Evaluation of high temperature creep strength of austenite stainless steel during MMAW, NATCON-ME, Bangalore, 13-14th March 2004, pp. 63-64.
5. A. C. Reddy, V.M. Shamraj, Reduction of cracks in the cylinder liners choosing right process variables by Taguchi method, Foundry Magazine, vol. 10, no. 4, pp. 47-50, 1998.