

Spot weld growth on medium carbon steel

Part 2: Servo based electrode actuation system

Mărimea sudurii prin presiune în puncte în cazul unui oțel cu conținut mediu de carbon. Partea a 2-a: Sistem de acționare a electrodului cu servomotor.

NACHIMANI CHARDE

Department of Mechanical Engineering, Faculty of Engineering, University Malaya, Malaysia

E-mail: nachicharde@yahoo.com

Abstract

In the part 1 of this research, the medium carbon steel was welded using pneumatic based electrode actuation system and subsequently it was investigated for the fatigue strength under tensile shear load, hardness and micro structural changes. Similar type of welding conditions and strength tests were conducted in this experiment but the electrode actuation system was replaced by servo based electrode actuation system; instead. A 1.5 kW powered-servo motor and its driving mechanical assembly were electro-fitted as to improve the force profiles before, during and after the welding process takes place. In doing so, the force exertions are systematically distributed and the corresponding changes are analyzed for the welds improvements. As such the specimen sizes and corresponding alignments were kept constant that of the previous experiments had but the welding lobe parameters and force presets were slightly calibrated for. The servo based electrode actuation system improves the electrically generated forging forces during welding process and consequently minimizes the porosity occurrences at the welded region. Specifically the diameters of fused regions were increased for the same welding conditions as compared to part 1 results and therefore the tensile loading force was significantly increased to break the welded joints in this part. However the hardness distributive values were remained approximately the same as compared to the first part because the solidification process is seemed to be happened for the duration. This has been confirmed by the metallurgical study which has revealed that the micro structural orientation in similar fashion for both experiments.

Keywords

Medium carbon steel, Carbon steel welding, Spot welding of steel, Electrode actuation.