The Effect of Parameters to the Mechanical Properties on AZ80A Magnesium Alloy Resistance Spot Welds

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ABSTRACT

In the 21st century, everyone accent the “ Green concept ” in the worldwide. Design & develop of the high technology product was changed from function-oriented to light-weight behavior and fine quality. Also, abate the environmental nuisance and the energy crisis. The light-weight transportation vehicle can fabricate by the light-weight materials which come to useful. Especially is like the “ Magnesium Alloy ”. As we known, magnesium alloy exist many excellent characteristics; ex: low specific density, high specific strength and rigidity, good thermal conductivity, high damping capacity, high electromagnetic interference, and recycle, etc. However, the structure of magnesium alloy doesn ’t have the good malleability in the room temperature. Also, it is not easy to finished and forming. Therefore, not only improve the quality and properties of material but promote the manufacture processing techniques are important. For the manufacturing industry, the technology of resistance spot welding is a basic process technology. In this research, using this technology to study and find the welding parameters to obtain the best mechanical properties on AZ80A magnesium alloy spot weld. Extent as to resistance spot weld, it has many potential problems which will affect the quality of spot weld. Ex: the flatness of electrode copper surface, the concentricity of up and below weld drop, and the applied pressure of electrode, etc. From the experimental results shown that if maintain the same electrical time, the higher the electric current applied the better melting condition of spot weld, and the tensile load will get higher. Nevertheless, if the electrical time gets longer with the electric current increased, the over-melting phenomena will occur. Not only get an ugly surface but even produce a spontaneous combustions result. According to the results, if one want to obtain good properties of spot weld on AZ80A magnesium alloy sheet metal, can consult the following datum sets which can reach the fine achievement of welds. Set up machine panel with 88 amperes electric current and 26 seconds current time, or set up 94 amperes current with 23 seconds current time two set parameters. Hopefully, the result of this study not only can accumulate the knowledge of magnesium spot welding, but also helps the traditional metal working industries to promote their welding skills and expand the applications of magnesium alloy.

Keywords : AZ80A magnesium alloy, Resistance spot welding, Tensile load, Grain refinement.

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