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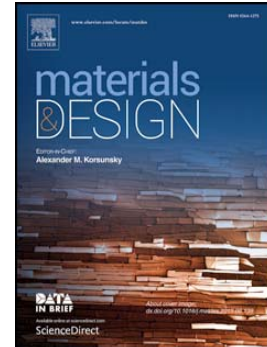
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# Characteristics of shunting in resistance spot welding for dissimilar unequal-thickness aluminum alloys under large thickness ratio

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## ABSTRACT

This paper reports the shunting characteristics of dissimilar aluminum alloys 2219/5A06 of unequal-thickness for the resistance spot welding (RSW) process. Shunting experiments of two and multiple spot welds with different weld spacing were conducted. Numerical simulations were carried out to analyze the shunting effect by using the finite element code ANSYS. The results show that increasing the weld spacing is not an effective method to alleviate the shunting effect during RSW in dissimilar aluminum alloys with large thickness ratios because of the low bulk resistance of the aluminum alloy. Therefore, increasing the welding current is the preferred method to overcome the shunting effect. The shunting effect in multiple spot welds is influenced by a combination of effects due to both weld spacing and specimen temperature when other welding conditions are maintained constant.

**Keywords:** Resistance spot welding; Shunting; 2219/5A06 dissimilar joint; Unequal-thickness aluminum alloys; Numerical simulation

## 1. Introduction

Resistance spot welding (RSW) is the principal method for joining panels and bodies in automobile, railroad, airplane structures, and in certain nonstructural components in aerospace industry.[1-3] The RSW of 2219/5A06 aluminum alloys with large thickness ratios (3:1) is commonly used in the manufacture of aircraft tanks.[4] During the production process, the manufactured

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