

عنوان مقاله:

Simulation of Heat Transfer and Recrystallization in Aluminum Alloy AA 5.Y. by TIG Welding Method

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خلاصه مقاله:

Aluminum alloys have many applications in transportation industry because of their abundance, ease of production, as well as proper mechanical and physical properties. One of these alloys is obtained by combining aluminum with silicon and magnesium (AI-Mg-Si alloys). Since the plates of this alloy are rolled up, heat transfer and crystallization in the heat-affected zone (HAZ) is an important point in their welding. In this study, we have attempted to investigate weldinginduced recrystallization in this alloy using the finite element method. For this purpose, the physics of the problem was defined and simulated using ANSYS software. In the next step, the results of theoretical (simulated) and experimental investigations were compared and the effect of current on the size of weld pool and thermal cycle of different samples was assessed. Then, through microscopic examination of different areas of the welded samples, the size of recrystallized area was measured and compared with the results of mathematical calculations. Finally, the hardness of weld zone and recrystallized area was analyzed. A temperature of ۶۳.0°C and holding time of about 0.1" seconds is .sufficient for recrystallization of this alloy during welding

کلمات کلیدی: heat transfer, Recrystallization, TIG Welding, Aluminum ۶۰۷۰, Finite element method

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