عنوان مقاله:

Comparison of the Arbitrary-Lagrangian -Eulerian and Coupled -Eulerian-Lagrangian methods during simulation of the friction stir spot welding

محل انتشار:

شانزدهمین همایش ملی و پنجمین کنفرانس بین المللی مهندسی ساخت و تولید (سال: 1398)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

This article studies the evolution and progression of different interfacial characteristics during friction stir spot welding utilizing numerical analysis. Arbitrary-Lagrangian-Eulerian (ALE) and Coupled-Eulerian -Lagrangian (CEL) numerical methods are presented and analyzed with experimental characteristics of joined areas. It had been shown that the ALE technique exhibits low mesh quality as the interface undergoes intense stir action and plastic deformation. Therefore, the ALE method cannot exactly obtain the morphological change near to the stir zone and also cannot properly estimate the continuous bond formation around the interface zone. On the other hand, the Eulerian technique displays a good option to tackle those restrictions of the ALE process. Results and data through Eulerian methods are accepted well with the laboratory investigations of friction stir spot welding phenomena. The substantive performance along the entire length of the spot weld, namely stir formation, severe plastic deformation, and distribution of temperature are precisely examined. The force and equivalent plastic strain history produced through the numerical study also compare well with the laboratory result.

کلمات کلیدی:

Friction stir spot welding - Arbitrary - Lagrangian Eulerian - Coupled Eulerian Lagrangian - Deformation, strain

لینک ثابت مقاله در پایگاه سیویلیکا: