

Numerical Simulation of Inertia Welding of Inconel 718

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Abstract

This paper presents the results of numerical simulations and experimental measurements of the temperature distributions in the heat affected zone. These were obtained for the inertia welding of IN718 to IN718 and the inertia welding of IN718 to 1045 Steel. Microstructures of the heat affected zone are presented along with microhardness profiles for the similar and dissimilar inertia welds. The measured temperature profiles are compared with numerical/finite element predictions of the temperature distributions in the heat affected zone. The effects of friction welding parameters on the temperature distributions in the heat affected zone are modeled using the finite element method. The experimental results are compared with predictions from numerical analysis. The implications of the results are then discussed in the final section of the paper.