

عنوان مقاله:

Prediction of Tensile Strength of Friction Stir Welded Al-5083 by Using Artificial Neural Network

محل انتشار:

پنجمین کنفرانس بین المللی جوشکاری و آزمایش های غیرمخرب، بیست و سومین کنفرانس ملی جوش و بازرسی و دوازدهمین کنفرانس ملی آزمایش های غیرمخرب و اولین کنفرانس ملی ساخت افزایشی (سال: 1401)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

In this research, the optimization of friction stir welding (FSW) of Al5083 alloy was investigated using artificial neural network (ANN). For this purpose, parameters such as rotation speed and tool advance speed were selected as neural network input and tensile strength as output of neural network. The microstructural and mechanical studies of the created joint showed that the high traverse speed of the tool leads to the undesired shaking of the central area of the joint and pitting of the joint due to the lack of proper material flow to the back of the tool. A very low traverse tool advance speed also leads to differences in the structure and properties of the central area of the joint and the adjacent areas of joint loss of the joint properties. Similarly, the maximum strength was obtained at the optimal rotation speed of the tool. The investigations showed that the neural network has a high capability in predicting the strength of the established connection and the multi-layered perceptron neural network with three intermediate layers with a value of MSE equal to 0.033 and correlation coefficient of 0.94 has a favorable ability of and high accuracy for estimation of tensile strength of FSW bonded Al5083.

کلمات کلیدی:

Al-5083; FSW; Strength, Rotating Speed; Traverse Speed; Artificial Neural Network

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1618510>

