عنوان مقاله:

(Modelling of Friction Stir Extrusion using Artificial Neural Network (ANN

نویسندگان:

Mohammad Ali Ansari - *Department of Mechanical Engineering, University of Wisconsin-Madison, USA*

Reza Abdi Behnagh - *Faculty of Mechanical Engineering, Urmia University of Technology, Iran*

Dong Lin - *Department of Industrial and Manufacturing Systems Engineering, Kansas State University, USA*

Sarang Kazeminia - *Faculty of Electrical Engineering, Urmia University of Technology, Iran*

خلاصه مقاله:

In the present study, an artificial neural network (ANN) model is developed to predict the correlation between the friction stir extrusion (FSE) parameters and the recycled wires' average grain sizes. FSE is a solid–state synthesis technique, in which machining chips are firstly loaded into the container, and then a rotating tool with a central hole is plunged into the chips at a selected rotational speed and feed rate to achieve indirect extrusion. Selecting rotational speed (RS), vertical speed (VS), and extrusion hole size (HS) as the input and average grain size as the output of the system, the ۳–۶–۱ ANN is used to show the correlation between the input and output parameters. Checking the accuracy of the neural network, R squared value and Root–Mean–Square–Error (RMSE) of the developed model (۰.۹۴۴۳۸ and ۰.۷۵۷۹۴, respectively) have shown that there is a good agreement between experimental and predicted results. A sensitivity analysis has been conducted on the ANN model to determine the impact of each input parameter on the average grain size. The results showed that the rotational speed has more effect on average grain size during the FSE process in comparison to other input parameters.

کلمات کلیدی:

Average Grain Size, Artificial Neural Network, Friction Stir Extrusion, Recycling, Sensitivity analysis

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