Abstract

This paper deals with a novel interactive approach of Artificial Neural Network (ANN) as an optimization tool for optimizing process parameters of rotary furnace. This approach solves a very challenging problem in the area of rotary furnace i.e. selection of optimal process parameters for producing homogenous quality castings. Rotary furnace involves several critical parameters like flame temperature, preheat air temperature, rotational speed of the furnace, excess air percentage, melting time, fuel consumption and melting rate of the molten metal which should be controlled throughout the melting process. In this paper the relation between input parameters such as flame temperature, preheat air temperature, rotational speed of the furnace and excess air percentage is established with output parameters such as melting time, fuel consumption and melting rate. Our model of feed-forward and backward ANN can work in practical scenario of industry by predicting the output process parameter in any number, this also help the decision maker to know the impact of input parameter on output of furnace before actually running it and input parameter needed to fed to the rotary furnace to have output of perquisite parameter. Back propagation neural network is used as a decision support tool. The network maps the forward and reverse relationship between process inputs and process output and predicts the optimal process parameters almost instantaneously. Accuracy of the forecast depends on training of the input parameters and a well trained set of parameters provides high
accuracy. Trained network replaces the knowledge of an experienced worker reducing labor cost drastically. The input and output process parameters of rotary furnace used in this work are obtained from the intensive experimentation conducted in the faculty of engineering, Dayalbagh Educational Institute, Agra.

References


Index Terms

Computer Science  Neural Networks
Keywords
  Rotary furnace  Artificial Neural Network  Back propagation  Optimization