5th International Conference and Expo on

Ceramics and Composite Materials

June 03-04, 2019 | London, UK

Mathematical modeling of processes through experimental identification and artificial intelligence techniques for the improvement of energy and metallurgical efficiency

Deynier Montero Gngora

Higher Mining Metallurgical Institute, Cuba

The experimental identification of the pulp storage and liquor preheating processes, which links a complex of Plants: Thickeners-Neutral-Leaching-Sulfides, was carried out. The mathematical models were validated, and the parameters were simulated to optimize the pulp and liquor level controllers in the storage tanks. With the implementation of these results in the company, an energy saving per year of 849 CUC was reported for the use of the three-phase motor governed by the variable speed drive, with a recovery time of 36 days, which makes feasible the investment. The application of artificial neural networks for the prediction of energy consumption in a student residence and in the industrial context to the air supply processes for the combustion, sedimentation and drying of mineral ore in a nickel producing company was also addressed. The main variables that characterize the processes were identified and historical data of operation of the facility were taken, to which a stepwise regression analysis was made backwards, to determine that the coefficient of linear correlation of the variables of interest was not reached values above 0.7. For this reason, different artificial neural network structures were proposed for mathematical modeling; they showed values of correlation coefficient higher than 0.9 in their training and validation, as well as a range of 0.6 to 0.87 in their generalization.

dmonterog@ismm.edu.cu