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DETERMINATION OF STEEL CARBURIZING PARAMETERS BY USING NEURAL NETWORK

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The article discusses the application of neural networks for calculating the laws of complex processes, with carbon diffusion processes in steel carburizing classified among them. Empirical and mathematical models for the CarboMaag carburizing process, which have been proven in practice, are presented for the determination of technological carburizing parameters resulting in a required carbon concentration profile in the carburized layer. A comparison between the mathematical model (MM) and the neural network model (NNM) and the empirical model (EM) with respect to the time required for shallow and great carburizing depths is given special attention in this article. The results of the empirical carburizing model were used as a neural network training set and compared with the results of computer simulation of the MM. A comparison of results obtained at shallow and great carburizing depths shows that the NNM approximates much better the EM than the MM. It is assumed that the carrying out of a larger number of experiments and the repeated neural network training with new sets of experimental data would result in increasingly better solutions. Thus, the disadvantages of theoretical models, i.e., MMs, would be avoided.