

Abstract

The first part of this study was to investigate the density profile of particleboard products and the factors affecting that the work of the laboratory is dedicated. Data ambiences from the first stage to create a model for predicting the quality of this product range in defaults of its features were used. For this purpose a GMDH-type neural network and genetic algorithm is developed that instrument with high reliability in a complex dynamic nonlinear systems modeling, was used. This study was undertaken to determine thickness swelling properties (TS), water absorption (WA), modulus of rupture (MOR), modulus of elasticity (MOE) and internal bond (IB), which were made under laboratory conditions. Determining the density profile along the thickness of composite boards was by gravimetric method density profile was determined. The results showed that rapid press closing density profile increased and difference density surface layers with the core layer increased. The internal bond (IB) of the panels increased with the increase in density and decreases mat moisture content. According to conditions making each of the samples. With the rise of mat moisture compression mat surface layer in the closing press increases and by the increasing density surface the bending strength improved. MOR and MOE of particleboard to increase with increasing the density of the surface layer. According to the results obtained by controlling the density profile of factors, most physical strength and mechanical board standard or above will be. Two factors mat moisture and Press temperature, respectively severity influence have on density profile of particleboard. Models built with GMDH method to predict the density profile power and high performance. The efficiency of these techniques evaluated with statistical criteria of mean square error (MSE), root mean square error, (RMSE) and the correlation coefficient (R_2). The correlation coefficient between the observed and predicted values for the training data and for the testing data, for determine the thickness and density and resistors is very high. Values of RMSE, MSE and MAD is very low which indicates better performance of the model. The main physical and mechanical properties of thick boards, as well as 6-point density profile of the model output by the software user graphical interface placed.

Keywords: Particleboard, Modeling, Density Profile, GMDH-Type Neural Network



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**Developing interactive computer software for
predict density profile effective physical and
mechanical properties of particleboard**

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