Burinthon Santichewasatian 2012: Edgewise Compression Prediction of Corrugated Boards Using Quantitative Models. Master of Science (Agro-Industry Technology Management), Major Field: Agro-Industry Technology Management, Department of Agro-Industry Technology. Thesis Advisor: Assistant Professor Ravipim Chaveesuk, Ph.D. 163 pages.

This research compared multiple regression model, polynomial regression model, backpropagation neural network (BPN) model and radial basis function network (RBFN) model with traditional models i.e. Whitsitt model and modified Whitsitt model by Markstorm in predicting edgewise compression of corrugated board (ECT) from 16 design factors. Three types of model format based on type of corrugated board were studied: model for single and double wall board, model for single wall board only and model double wall board only. The result indicated that the model for single and double wall board was comparable to the others in terms of prediction accuracy and was in an acceptable industrial range. The 16-12-1 BPN model and polynomial regression model were 2 best choices in predicting ECT of single and double wall at the same time. The BPN model had mean absolute error (MAE) of 11.79 newton and mean absolute percentage error (MAPE) of 4.23% while the polynomial regression model had MAE of 14.58 newton and MAPE of 5.14%. Selection of the best model for industrial practice by analytic hierarchy process (AHP) under 4 decision factors, i.e. prediction accuracy, model development and training time, cost of developing and training, and model update capability indicated that the BPN model was the best choice. The most important decision criterion was prediction accuracy. In addition, the BPN model identified that the most influential design factor affecting the ECT prediction were the basis weight of the inner liner, the length of corrugated board and the basis weight of corrugated medium that connected to the inner liner.

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