Empirical Modeling of Air Dried Rubberwood Drying System

Authors : S. Khamtree, T. Ratanawilai, C. Nuntadusit

Abstract : Rubberwood is a crucial commercial timber in Southern Thailand. All processes in a rubberwood production depend on the knowledge and expertise of the technicians, especially the drying process. This research aims to develop an empirical model for drying kinetics in rubberwood. During the experiment, the temperature of the hot air and the average air flow velocity were kept at 80-100 °C and 1.75 m/s, respectively. The moisture content in the samples was determined less than 12% in the achievement of drying basis. The drying kinetic was simulated using an empirical solver. The experimental results illustrated that the moisture content was reduced whereas the drying temperature and time were increased. The coefficient of the moisture ratio between the empirical and the experimental model was tested with three statistical parameters, R-square (R²), Root Mean Square Error (RMSE) and Chi-square (χ²) to predict the accuracy of the parameters. The experimental moisture ratio had a good fit with the empirical model. Additionally, the results indicated that the drying of rubberwood using the Henderson and Pabis model revealed the suitable level of agreement. The result presented an excellent estimation (R² = 0.9963) for the moisture movement compared to the other models. Therefore, the empirical results were valid and can be implemented in the future experiments.