

PARAMETER DETERMINATION AND PERFORMANCE COMPARISON OF THE RHEOLOGICAL MODELS FOR CREEP IN PARTICLEBOARD

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ABSTRACT

A rheological model presents the stress-strain relationship in a material throughout the entire exploitation period. The change of the properties of a stressed and strained material in the time domain could be assessed on the basis of the rheological model. This paper focused on the determination of model parameters and the comparison of several rheological models for particleboard coated with melamine foil. The model parameters were defined for four models: the purely mathematical power-law model (two-parameter) and two viscoelastic models, i.e., the Zener (three-parameter) and Burger (four-parameter) models, as well as a semi-empirical modified Burger (five-parameter) model. The performance of models was compared in two ways: (i) according to the fit to the experimental data and (ii) according to the better total strain prediction. The power-law and modified Burger models stood out as the best. The modified Burger model achieved better fitting to the experimental data, and the power-law model was slightly better at making predictions.

Keywords: rheological model, viscous creep, particleboard