***COMPUTATION OF THERMAL CONDUCTIVITY OF FLAT WOOD DETAILS IN A MODEL OF THEIR ONE SIDED HEATING BEFORE BENDING***

*Nencho Deliiski, Natalia Tumbarkova, Neno Trichkov, Zhivko Gochev, Dimitar Angelski*

## ABSTRACT

*Mathematical descriptions of thermal conductivity $\lambda_w$, specific heat capacity $c_w$, heat transfer coefficient $\alpha_w$, and density $\rho_w$ of non-frozen wood in hygroscopic range have been introduced in own 1D non-linear mathematical model of one sided conductive heating process of flat wood details. For the numerical solution of the model a software program has been prepared in the calculation environment of Visual FORTRAN Professional. By means of the program, the 1D non-stationary temperature distribution along the thickness of subjected to one sided conductive heating flat wood details, aimed at their plasticizing in the production of curved back parts of chairs, has been calculated. The change of $\lambda_w$ for beech details with an initial temperature of 20 $^oC$, moisture content of 0.15 $kg.^{-1}$, and thicknesses of 12 mm, 16 mm, and 20 mm during their 30-min. one sided heating at temperature of 100 $^oC$ of the heating metal body has also been computed, visualized and analyzed.*

## REFERENCES

Angelski, D. (2010): Researches over the Processes of Plastisization and Bending of Furniture Wood Details. PhD Thesis, University of Forestry, Sofia, 156 p. (in Bulgarian).

Deliiski, N. (2003): Modelling and Technologies for Steaming Wood Materials in Autoclaves. Dissertation for DSc., University of Forestry, Sofia (in Bulgarian).

Deliiski, N. (2011): Transient Heat Conduction in Capillary Porous Bodies, p.149–176. In: Convection and Conduction Heat Transfer. InTech Publishing House, Rieka, http:// dx.doi.org/10.5772/21424

Deliiski, N. (2013): Modelling of the Energy Needed for Heating of Capillary Porous Bodies in Frozen and Non-frozen States. Scholars' Press, Saarbrücken, Germany, 116 p. http://www.scholars-press.com//system/ covergenerator/build/1060

Deliiski, N., Dzurenda L. (2010): Modeling of the Thermal Processes in the Technologies for Wood Thermal Treatment. TU Zvolen, Slovakia, 224 p., (in Russian).

Deliiski, N., Angelski, D., Trichkov, N., Gochev, Z., Tumbarkova, N. (2018) Modeling and energy consumption of the one sided heating process of flat wood details before bending. Information Technologies and Control, № 3, Print ISSN 1312-2622, On-line ISSN 2367-5357.

Gaff, M., Prokein, L. (2011): The Influence of Selected Factors on Coefficient of Wood Bendability. Annals of Warsaw University of Life Sciences, Forestry and Wood Technology, № 74: 78-81.

Hadjiski, M., Deliiski, N. (2016): Advanced Control of the Wood Thermal Treatment Processing. Cybernetics and Information Technologies, Bulgarian Academy of Sciences, 16(2): 179–197.

Hadjiski, M., Deliiski, N., Grancharova, A. (2017): Application of Neural Networks to the Optimization of the Thermal Treatment Process of Wood Materials. Information Technologies and Control, №1: 2-8, Print ISSN 1312-2622, On-line ISSN 2367-5357.

Kavalov, A., Angelski, D. (2014): Technology of furniture. University of Forestry, Sofia, 390 p. (in Bulgarian).

Kavalov, A., Rusanov, H. (2000): Technology of furniture. Publishing house “96 plus”, Sofia, 208 p. (in Bulgarian).

Pervan, S. (2009): Technology for Treatment of Wood with Water Steam. University in Zagreb (in Croatian)

Rice, R. W., Lucas, J. (2003): The Effect of Moisture Content and Bending Rate on the Work Required to Bend Solid Red Oak. Forest Products Journal, 53(2): 71-77.

Taylor, Z. (2001): Wood Bender’s Handbook. Sterling Publ. Co., Inc., New York.

Trebula, P., Klement. I. (2002): Drying and Hydro-thermal Treatment of Wood. Technical University in Zvolen, Slovakia, 449 p. (in Slovak).

Videlov, H. (2003): Drying and Thermal Treatment of Wood. University of Forestry, Sofia, 335 p. (in Bulgarian).