MODELING OF ENERGY CONSUMPTION FOR ONE SIDED HEATING OF WOOD DETAILS BEFORE THEIR BENDING, IN PRODUCTION OF STRINGED MUSIC INSTRUMENTS

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ABSTRACT

A mathematical model and numerical approach to computation of the specific energy consumption, which is needed for one sided heating of flat wood details aimed at their plasticizing in the production of curved outside parts for corpuses of stringed music instruments, have been suggested. The approach is based on integration of the solutions of a linear model for calculation of the non-stationary 1D temperature distribution along the thickness of flat wood details subjected to one sided heating.

For numerical solution of the model a software program has been prepared, which has been input in the calculation environment of Visual Fortran Professional. Using the program, computations have been carried out for determination of the change in specific energy, which is consumed by spruce details with an initial temperature of 20 ^{o}C, moisture content of 0.15 kg·kg^{-1}, and thicknesses of 6 mm, 8 mm, and 10 mm during their 10 min one sided heating at temperatures of the heating body of 100 ^{o}C, 120 ^{o}C, and 140 ^{o}C and of the surrounding air of 20 ^{o}C. The obtained results have been graphically presented and analyzed.

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