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AUTOMATED CONTROL OF THE WOOD DRYING PROCESS

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It is known that wood drying is a mandatory technological operation in woodworking technology. In automated wood drying control systems, the final moisture content is calculated depending on the initial temperature and drying time, which affects the quality of the dried material. This makes it possible to improve the quality of regulation and significantly reduce energy consumption.

In order to increase the regulation accuracy of the wood drying process, a method of automatic regulation is proposed.

An algorithm for stabilizing the weight mode of the drying chamber has been developed [1].

The program for controlling the technological parameters of the wood drying process should cyclically poll the state of input variables, sensor signals, and form the output data based on their state.

After entering the system, a cart with wood is fed into the chamber and the door is closed. Then, the set weight value is set and the wood is initially weighed m_{int}. If the mass of the wood does not match the specified parameters, the message about sensor failure is displayed and the camera stops working. Block provides the input parameters of the wood drying process, which includes the material П, the given humidity W_{giv}, the initial humidity W_{int}, the drying time τ (i), the steam temperature Q (i), and the set temperature of wet and dry thermometers. Then, the system should receive the specified operating mode. The choice of the wood drying mode depends on the temperature in the chamber. This temperature is 80 °C for the soft mode R = 1. The temperature is set to 100 °C and 130 °C, respectively, for the normal and forcing modes. Then, the temperature sensor is polled. In case of non-compliance with the set temperature regime, a failure occurs and the system starts from the beginning. Block interrogates the dry bulb temperature sensor. If the readings go beyond the permissible limits 2, it signals a malfunction of the sensor and the camera stops working. If the temperature is within the acceptable limits, the sensor readings are shown on the display. Then, there is a survey of the readings of the wet thermometer. Block monitors the temperature and the message displays the stop of work in case of violation of the specified parameters. The temperature of

the wet bulb is displayed on the display, and the system calculates the psychrometric difference ΔT (i) and displays it on the screen.

After that, the second weighing of the dried lumber takes place. Taking into account the specified and current weight we calculate the moisture content of the material and compare it with the specified one. In case of insufficient amount of moisture, an error message is displayed and the wood drying process is continued and the inaccurate set parameters are taken into account. When the required humidity indicators are achieved the message is displayed about the completion of work, the system switches to the cooling mode, turning on the fans, and the camera stops working.

In conclusion, it is necessary to state that the use of the proposed method of automated regulation of the wood drying process will allow to increase the accuracy of regulation and to reduce the heat carrier consumption.

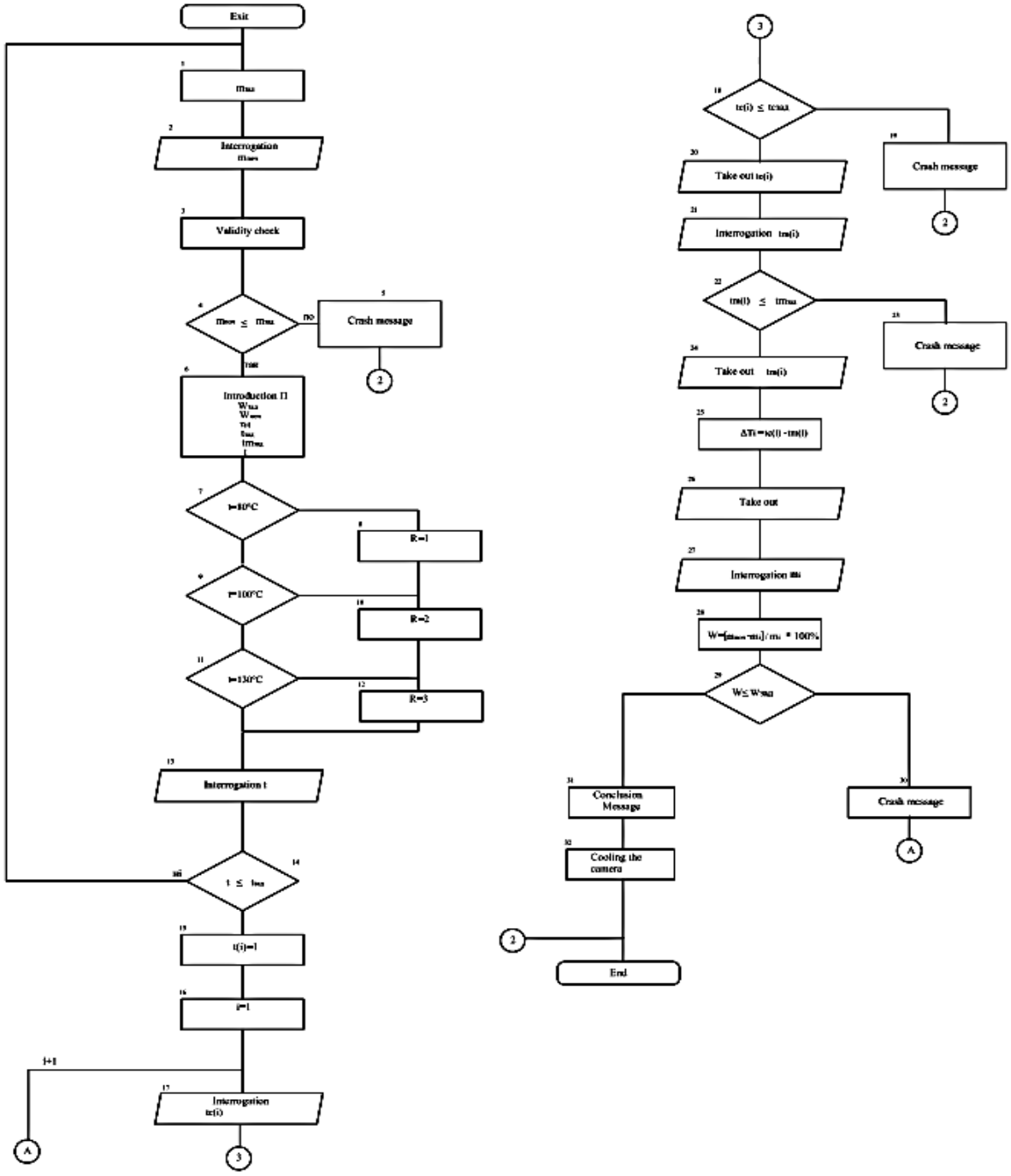

Fig. Algorithm of the weight mode stabilization of the drying chamber

References

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