

INFLUENCE OF INFRARED RADIATION ON TERMORADIATION CHARACTERISTICS OF WOOD

Foros V.V., PhD student

(National University of Life and Environmental Sciences of Ukraine)

Annotation

Currently, the plywood production has a number of problems that hinder further enhancing the competitiveness of this product in comparison with other board materials. These conditions promote plywood industry to pay attention to improve efficiency, reduce costs of raw materials per unit of production, effective recycling of waste generated, reduce production costs while maintaining quality. One method to increase the efficiency of manufacturing is the use of new materials and technologies in improving and intensifying existing technological conditions and operations that are present during the plywood production.

Analysis of the process of manufacturing plywood showed that bonding of plywood - the most time-consuming process, because the production of 1 m³ of plywood, complexity, which refers to the station gluing plywood, is 22.2%. Upon further analysis of the processes in bonding station, found that pressing process is most longer operation of the station.

Underlying the pressing process principle of simultaneous supply of heat and pressing surfaces to each other, which is a prerequisite for the formation of a strong adhesive bond. But the speed at the contact heating method is long and has several significant shortcomings that are the basis for finding alternative ways to intensify the process of bonding plywood.

By alternative ways to supply heat and sources of heat include infrared radiation (IR), which is widely used for drying and heating of various kinds of materials, including wood.

Research on effects of infrared radiation on the wood showed that wood is permeable material for this type of radiation and helps to eliminate moisture from it. Infrared rays are able to penetrate the wood at a certain depth, depending on the species, moisture content and wavelength beam.

The study is an analysis of the theoretical foundations of thermal energy transfer infrared radiation, wood optical and termoradiation characteristics , measurement of wood and veneer packets heating rate during infrared light irradiation. By termoradiation characteristics include: absorbing, reflecting and bandwidth, which simultaneously depend on the spectral characteristics and the condition and properties of the material which is irradiated.

Measuring the temperature increase in the intersection veneer package is an important aspect in the study process intensification pressing, because the rate of heat supply directly affects on the process duration. For the purpose of comparing the duration of the warm-up held two measurement using infrared radiation and the conditions of pressing in a hot press to reach the desired temperature inside the veneer package that is required to start the process of curing adhesive. Usually pressing plywood press is not carried out above 150 ° C, on this basis was chosen range from 150 ° C to 230 ° C.

The best result compared to the warming between plates press, showed warming on the use of 230 ° C, as compared to warming in the press mark of 140 ° C are reached at the same time for 70 seconds.

Analysis of optical and termoradiation properties of wood are changed under the influence of infrared radiation showed that the wood with necessary humidity and size, is a material with a high degree of absorption of the radiation spectrum, which leads to a rapid supply of heat, removing of moisture and uniform output stabilizes internal tension.

Exploratory researches on heat input to the package veneer wood confirmed the high absorption of infrared radiation and suggest the rationality of using this type of radiation for previous heating of veneer package.