6. High mineral content in the stems of rape will have a positive effect on the adhesion of mineral binders.

7. It is predicted that low wax content of substances in the stems of rape positive impact on the degree of correlation with fine particles of binder, ie increase adhesion.

8. The presence of highly internal parenchyma tissue in the stems of rape allow its use for the manufacture of insulating materials derevynnokompozytsiynyh.

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Proanalyzyrovanы Component composition, properties and stroenye rastitelno raw materials base of the stem to rape, wheat-rzhanoy solomы s point of view perspective s production Using a shaving plates and second drevesnokompozytsyonnыh materials.

Drevesnokompozytsyonnыe materials, struzhechnыe stoves, rastytelnoe raw materials, himicheskij composition, structure, wheat-straw rzhanaya, stems rape.

The chemical composition, structure and properties of plant based raw materials such as stalks of rape, wheat and rye straw have been analysed from the viewpoint of their future use in the manufacture of particle boards and other wood-based composite materials.

Wood-based composite materials, particle board, plant based raw materials, chemical composition, structure, wheat and rye straw, stalks of rape.

UDC 674,047

VOLOHOPROVIDNIST of wood along the grain

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Experimental study of factors volohoprovidnosti wood pine, beech and oak along the fibers.
The basic factors that influence the rate of moisture conductivity along the fibers.

Wood, physical characteristics, anatomy, mechanism of moisture transfer coefficient volohoprovidnosti, longitudinal movement of moisture,

One of the most important physical characteristics of wood, which makes it possible to calculate the processes of drying and wetting of wood - wood volohoprovidnosti factor. Currently focused on determining factors volohoprovidnosti wood across the grain, as they are usually determined by the duration of productions timber and determine the coefficients volohoprovidnosti wood along the grain, other than purely scientific interest, dictated by the need to solve some specific problems related ' linked to the research process drying lumber face area, the impact of moisture on longitudinal flow drying short pieces and others.

Based on previous studies [1] average ratio volohoprovidnosti wood along the grain may be determined from the ratio $a_{поз} = 15a_{танг}$. However, it does not give the opportunity to evaluate the ratio volohoprovidnosti wood along the grain of such important factors as moisture, density, temperature wood. The purpose of this study was to determine the factors volohoprovidnosti along fibers and impact assessment of its value fixed factors.

Methods of research. The main methods of determining the moisture conductivity coefficient method is steady and unsteady flow of moisture and drying method research designs wetting contact.

The first two methods make it possible to obtain values of the coefficients depending on the moisture content of wood in the past - the average coefficient of moisture conductivity in a range of humidity.

One of the most simple and reliable methods for determining moisture conductivity coefficient is the method of stationary flow of moisture [2,3,4].

This method follows. The sample timber in the form of a cylinder with isolated lateral surface is attached to a glass filled with water is placed in a sealed vessel which is supported by a given temperature and humidity .. The presence of a constant elasticity difference of water vapor on opposite surfaces of the sample leads to the establishment of the moisture in the sample stream. Upon reaching a constant moisture passing through the sample (steady state), the sample rozrizuyut the layers perpendicular to the flow of water and determine their moisture. These data build water distribution curve for the length of the sample, which gives a graphical differentiation factor to determine volohoprovidnosti in different sections of the sample by the equation:

$$\frac{dM}{dz} = -a' F \frac{du}{dx},$$

where $\frac{dM}{dz}$ - The rate of water flow through the sample; $\frac{du}{dx}$ - Gradient of humidity;

F - cross-sectional area of the sample.

Research results to determine the coefficients of moisture conductivity of wood along the grain samples were carried out on three species of wood - pine, beech and oak at temperatures 20,50,700S.

Samples cylindrical shape with a diameter of 45-50 mm, Dovzhynoyu100 mm vytochuvaly of pieces that were dried under atmospheric conditions. On the lateral surface of the samples deposited multilayer coating with shellaka, Tin foil, rubber. Prepared samples thus placed in a desiccator with sulfuric acid, which peremishuvalos air by a fan placed in a desiccator. In each series of experiments conducted surveillance for 10 samples of certain wood species, as listed in Table volohoprovidnosti coefficient value is the average of the ten measurements, and the accuracy of the data is in the range of 2-4%.

The resulting coefficient volohoprovidnosti wood along the fibers and their dependence on humidity and temperature compared with similar known data in the direction across the grain. The variation coefficients volohoprovidnosti depending on these factors determined form of communication with the material and moisture transfer mechanism of moisture in it.

It is known that the moisture in the wood moves two systems - the macro and mikrokapilyariv [5]. Analysis of the structure of wood makes it possible to predict that in the longitudinal direction of the moisture moves mainly makrokapilyariv system and mainly in the form of steam. It brings in features of the movement of moisture in the wood in the longitudinal direction, and thus influence factors on the rate volohoprovidnosti.

According to the results of experiments conducted at different temperatures, built dependence of moisture conductivity along the fibers from moisture (Fig. 1).

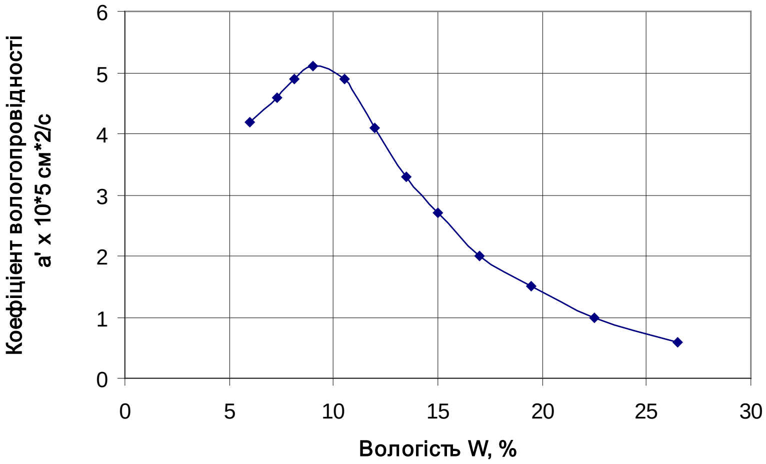

Fig. 1. Dependence of the moisture conductivity along the fibers from moisture wood (pine, core, core density of 340 kg / m3, the temperature 20°S.

From Fig. 1 shows that with increasing moisture content of wood to 9-10% rate volohoprovidnosti slightly increased by increasing the moisture on the second system volohoprovidnyh ways with increased size and makrokapilyariv mizhmitselyarnyh intervals. But, as the process is mainly determined by the efficiency of the first system volohoprovidnyh ways (makrokapilyariv system), then despite the increased flow of moisture second system with increasing humidity wood, efficiency first system volohoprovidnyh tract decreases, which can be explained by a decrease in the diameter of the holes (pores) in Joints vessels and cells. Ultimately, this leads to a decrease in moisture conductivity coefficient in the longitudinal direction with increasing moisture content of wood.

Similarly, changes in factor volohoprovidnosti across the grain direction depending on humidity, with the only difference that the sharp differences effectiveness of first and second volohoprovidnyh ways in the longitudinal direction variability factor volohoprovidnosti along the fibers much higher than across the grain. Moving the maximum curve coefficients volohoprovidnosti towards less moisture in experiments with longitudinal tokom moisture indicates a preferential transfer of moisture in the vapor state humidity in the range between 10% and humidity limits water absorption.

Mathematical treatment of curves moisture dependence of conductivity along the fibers from moisture material shows that the curves correspond to the type of equation $a_{позд} = b \exp cW$ Where b and c - constants.

1. The coefficient volohoprovidnosti wood along the grain.

Breed wood	Crop-guest W,%	The temperature of 200C			Crop-guest W,%	The temperature of 500C			Crop-guest W,%	Temperature 700S		
		a'Tanh 106 cm2 / s	*and*'Po zd105 cm2 / s	$\frac{a'_{позд}}{a'_{танг}}$		*a*'Tanh 106 cm2 / s	*and*'Po zd105 cm2 / s	$\frac{a'_{позд}}{a'_{танг}}$		*a*'Tanh 106 cm2 / s	*and*'Po zd105 cm2 / s	$\frac{a'_{позд}}{a'_{танг}}$
Pine (core)	10	3.36	5.30	15.7	10	8.3	30.0	36.1	10	15	95	64
basic density of	15	4.30	2.75	6.4	15	10.4	15.9	15.2	15	19	51	26.8
340 kg / m3	20	5.40	1.95	3.6	20	12.1	8.6	7.1	20	24	27.5	11.4
	25	4.98	1.20	2.4	25	12.1	4.7	3.9	24	24	17	7.1
	30	3.86	0.46	1.2	28	11.4	3.3	2.9		-	-	-
Beech	10	1.26	2.60	20.6	10	3.48	14.5	42	10	7.1	46	65
basic density of	15	1.44	1.30	9.1	15	3.96	7.2	18.2	15	8.1	23	28.4
495 kg / m3	20	1.73	0.72	4.1	20	4.75	4.0	8.4	20	9.7	13	13.5
	25	1.80	0.38	2.1	25	4.90	2.2	4.5	24	10.1	7.9	7.8
	30	1.80	0.22	1.2	28	4.90	1.5	3.1		-	-	-
Oak	10	0.36	1.15	31.6	10	1.0	6.6	66	10	1.76	19.5	110
basic density of	15	0.43	0.62	14.6	15	1.1	3.5	30.6	15	2.1	10.5	50
650 kg / m3	20	0.49	0.38	6.7	20	1.3	1.9	14.6	20	2.37	5.0	23.6
	25	0.50	0.18	3.6	25	1.3	1.05	8.0	24	2.48	3.4	13.7
	30	0.48	0.10	2.1	28	1.4	0.73	5.4		-	-	-

With increasing temperature coefficient volohoprovidnosti wood along the grain increases dramatically due to rising vapor diffusion coefficient and viscosity reduction. Fig. 2 shows plots of the coefficient volohoprovidnosti wood along the grain temperature for three species of wood with a moisture content of 10%.

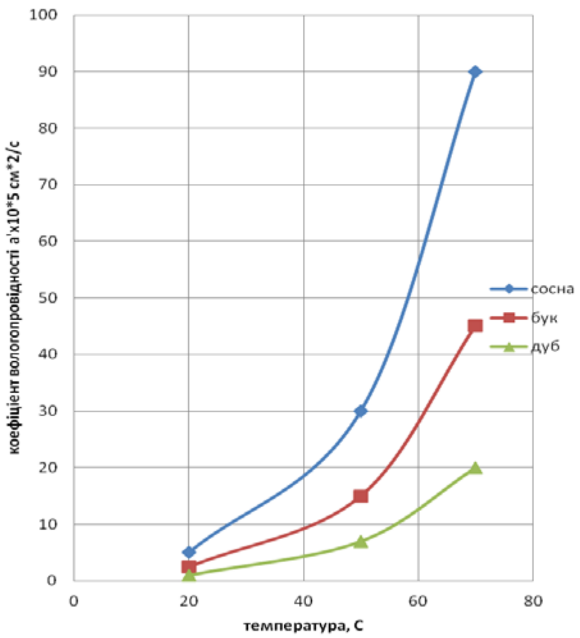

Fig. 2. Dependence of volohoprovidnosti along the grain temperature.

Shows the curve described by the equation:

$$a'_{позд} = bT^{18}$$

As a result of mathematical processing of experimental data obtained from the equation determining factors volohoprovidnosti along the grain of wood, beech, pine and oak kernel depending on the temperature and moisture content

$$a'_{позд} = 0{,}345 \cdot 10^{-48} T^{18} \exp(-0{,}122W)$$
$$a'_{позд} = 0{,}694 \cdot 10^{-48} T^{18} \exp(-0{,}122W)$$
$$a'_{позд} = 0{,}153 \cdot 10^{-48} T^{18} \exp(-0{,}122W)$$

Odds volohoprovidnosti along the fibers obtained by us and volohoprovidnosti coefficients in the tangential direction are shown in the table of data which shows that a reduction in moisture content of wood and with increasing temperature ratio $\frac{a'_{позд}}{a'_{танг}}$ increases. Thus in oak, this ratio more than pine and beech wood, which may explain the influence on the increase of the vascular conductance wet oak wood along the grain, as this anatomical element is most developed in oak wood.

For practical application for the above equation based nomogram (Fig. 3), which allow to calculate coefficients volohoprovidnosti beech wood along the grain of oak and pine certain density depending on the humidity and temperature of wood.

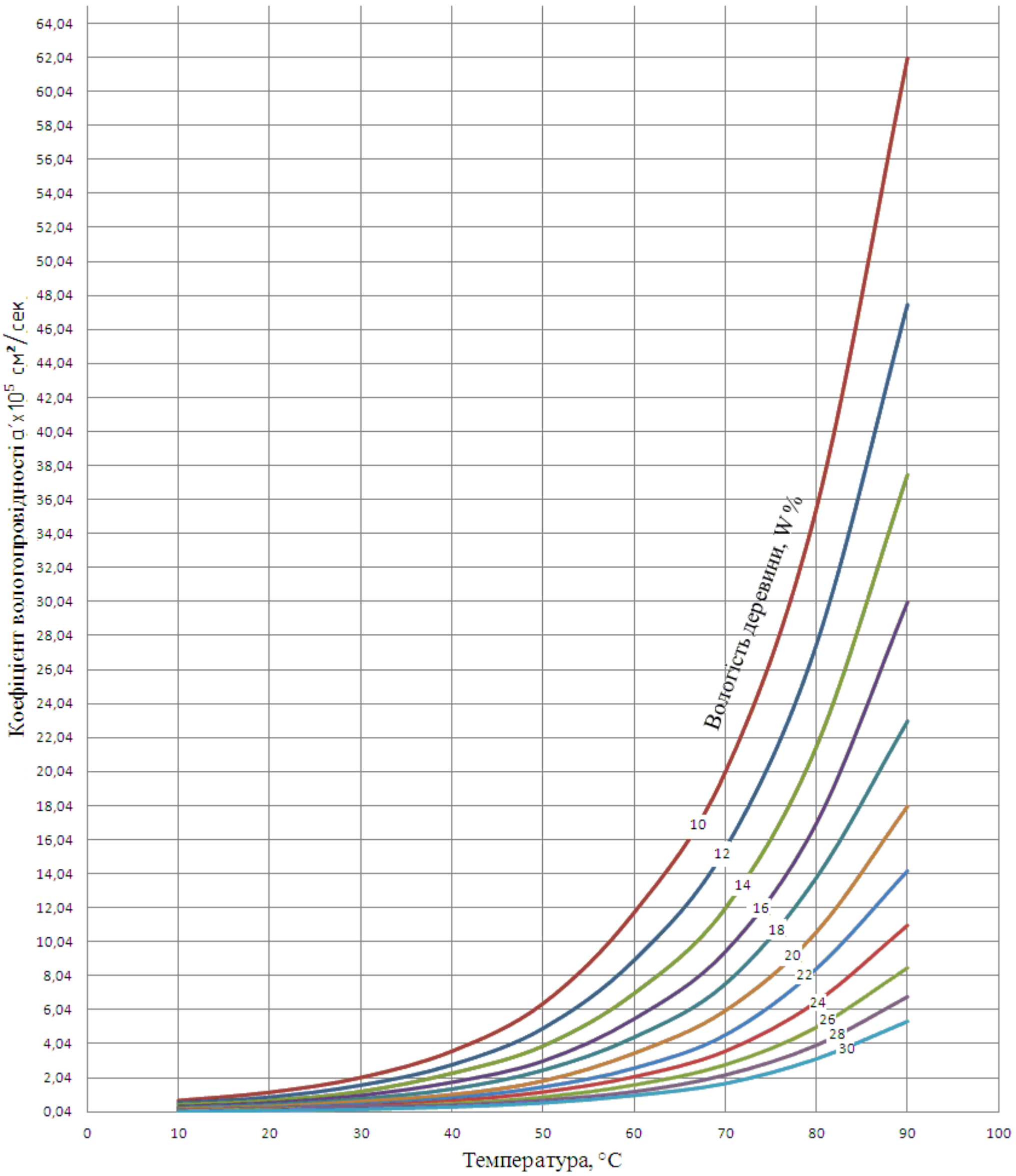

Fig. 3. Nomogram values of volohoprovodnosti oak wood along the grain (core, core density of 650 kg / m3).

These equations and nomograms obtained for the studied density, which may differ significantly from the average density of the wood species. In order to bring the results obtained to the average wood density of species introduced dependency ratio moisture conductivity of wood density.

For these species, this dependence has the form:

- Wood core $a'_{позд} = c\rho^{-2,35}$;
- Wood sap $a'_{позд} = b\rho^{-2,55}$.

According to these dependencies obtained generalized equation coefficients volohoprovidnosti along the fibers studied species:

- Wood core and ripe wood:

$$a'_{позд} = 0{,}62 \cdot 10^{-42} T^{18} \rho^{-2{,}35} \exp(-0{,}122W);$$

- Wood sap and sap wood:

$$a'_{позд} = 0{,}255 \cdot 10^{-41} T^{18} \rho^{-2{,}55} \exp(-0{,}122W).$$

Conclusions

The intensity of the movement of moisture in the longitudinal direction of the wood is determined mainly transfer efficiency of the system makrokapylyariv. In this connection, as opposed to the transverse direction, revealed a significant effect of humidity on the wood along the grain volohoprovidnosti factor.

The correlation coefficients volohoprovidnosti in the longitudinal and transverse directions in the temperature range 20 -70 ° C and humidity of wood from 10% to limits water absorption.

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Provedenы Experimental Studies koэffytsyentov vlagoprovodnosti sosnы timber, beech and oak vdol fibers. Vыyavlenы Major Factors for Factor vlyyayuschye vlagoprovodnosti vdol fibers.

Timber fyzycheskye characteristics anatomycheskoe stroenye, Mechanism of transfer of moisture, koэfytsyent vlagoprovodnosti, prodolnыy flow moisture.

Experimental study of hydraulic conductivity coefficient of pine, beech and oak wood along the grain. The main factors affecting the coefficient of hydraulic conductivity along the fibers.

Wood, physical characteristics, anatomy, mechanism of moisture transport, the coefficient of hydraulic conductivity, the longitudinal flow of moisture.