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EFFECT OF MOULDING MATERIAL ON PROPERTIES OF CHIPBOARD

The presented results of researches reflecting influence of the pressing weight, including a grinding dust received from calibration and grindings, and also the rest from peat hydrolysis, on physic mechanical properties chipboard plates. The presented dependence approximated, obtained mathematical equations describing these relationships.

Introduction. An increase in production of chipboard induces an increase in demand for raw wood, with one of the main ways to decrease its consumption being waste return. It is established that only by using wood dust obtained by abrasive cutting and grinding of boards the specific consumption rate for raw wood can be cut by 8–9%.

The grinding dust is burned now, however as the material which has undergone heat treatment and pressing, and also containing outcast binding, is of interest for increase of water resistance of plates. It is also established that it is exposed to a mechanochemical degradation on calibration and grinding operation. At the same time these particles, owing to the fractional structure, possess a big specific surface and activity. Each particle has a set of the branches increasing its sorption ability. Therefore using of dust in the production of pressed wood-fiber board causes an additional expense of binding materials that leads to their overexpenditure. Elimination of these negative effects can be carried out by deactivation of the active centers of such particles by water.

However water possesses weak surface-active properties, and also in connection with increase in moisture content of a package possibly emergence of stratification of plates at their pressing.

Joint researches with the Institute of NAN peat of Belarus on establishment of the substances possessing surface-active properties, capable to deactivate the active centers of a dust were carried out. Such substances as a hydrolytic lignin, sulfite and alcohol bard were used.

A mixture of a hydrolytic lignin and the grinding dust was taken in the ratio of % respectively 70–90: 10–30, put on the pitched cuttings at continuous hashing in number of 15% from total of wood cuttings [1]. The offered way allowed to receive stronger and waterproof plates. Such plates have high factor of water resistance of plates.

A wood dust was hashed by 20% water sulfite solution and alcohol bards. Further it was mixed with the pitched cuttings of external layers of plates, replacing 20% of shaving. Results of researches showed possibility of receiving wood-cuttings plates with the improved mechanical properties at a simultaneous intensification of process of pressing.

Main part. The purpose of researches was in identification of possibility of use of the rest from hydrolysis of riding peat for deactivation of the active centers wood dust. Riding peat by its content of carbohydrates practically doesn't differ from the wood raw materials used by the hydrolytic industry.

The rest from peat hydrolysis is a product received in the form of a withdrawal by production of fodder yeast from a small extent of decomposition of peat. The quantity of the rest from hydrolysis of peat reaches 45–50% from initial raw materials arriving for processing. According to researches of the Institute of NAN peat of Belarus, the rest differs from hydrolysis of peat by the high maintenance of such reactive groups, as carbonyl, carboxyl and phenolic hydroxyls in the sum of 16%. It contains about 25% of polysaccharides, 50% of humin substances and represents a valuable organic material [2]. Absolute humidity of the rest from peat hydrolysis – 100–110%, an acidity indicator pH a water extract – 5.3. In this regard processing was carried out by a calcium hydroxide to an acidity indicator pH = 7.2. Molding materials were obtained by mixing of a wood dust and the rest from peat hydrolysis by absolute humidity of 100% in the ratio 90: 10; 80: 20; 70: 30; 60: 40.

Then the received weight in number of 10%, 20%, 30% and 40% from a filler was put on the pitched cuttings of an inside layer of plates. The expense binding (on the dry rest) made: 14% for external layers of plates and 12% – for an inside layer. Concentration of karbamidoformaldehyde pitch of brand KF-MT-15 for external layers made 55%, for the internal – 60%. In binding for an inside layer 20% solution of chloride ammonium was entered. Formation of a carpet of plates was carried out by proceeding from a ratio external and internal layers respectively 1: 2: 1.

Pre-pressing of the carpet was led at pressure of 0.6 MPa.

Pressing of plates was carried out at pressure of 2.0 MPa and temperature 165–170°C. Time of pressing was changed in a range of 0.35 mines/mm of thickness of a wood-scutting plate. Preparation of the samples for establishment of physicomechanical indicators was carried out according to a standard [3]. The following physicomechanical

properties of plat were investigated: humidity, density, strength at stretching perpendicularly a layer of a plate and strength at a bend of plates according to standards [4], and also for the purpose of establishment of stability of glutinous connection to long influence of water dynamics of water absorption and swelling of plates on thickness during 30 days was investigated. Reliability of the results received during the experiment was checked by a method of variation statistics. An average square-law deviation was calculated, factor of a variation of V which didn't exceed in all cases of 10%, an indicator of accuracy of R which didn't exceed 5%, and a interval with reliability of 0.95% which was in admissible values. Results of the carried-out research are presented in Fig. 1–6.

The analysis of the received results showed that the greatest durability of adhesive interaction of components of an inside layer of the plates, established on a strength indicator at stretching, is reached at the contents in an inside layer of plates of 10% press-mass, including 90% of a wood dust and 10% of a waste of hydrolytic production.

This indicator was higher for 21.2%, than at control plates, and for 39.2% in comparison with the indicators including the similar quantity of the raw wood dust.

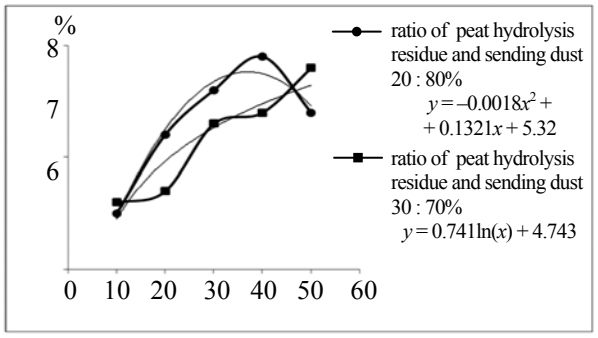

Fig. 1 Dependence form the content of moisture in the inner layer of boards press-mass

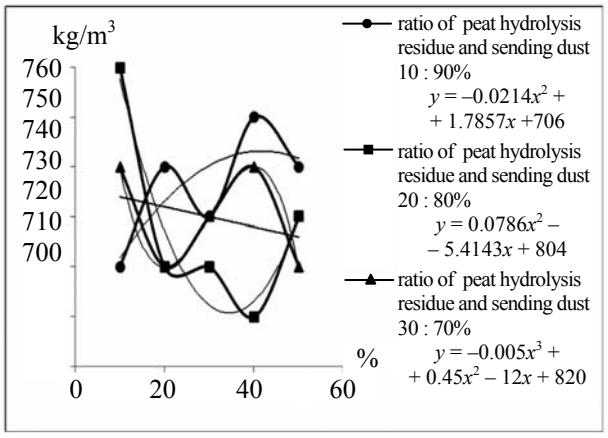

Fig. 2. Dependence of density from the number of press-mass of board in the inner layer of plates

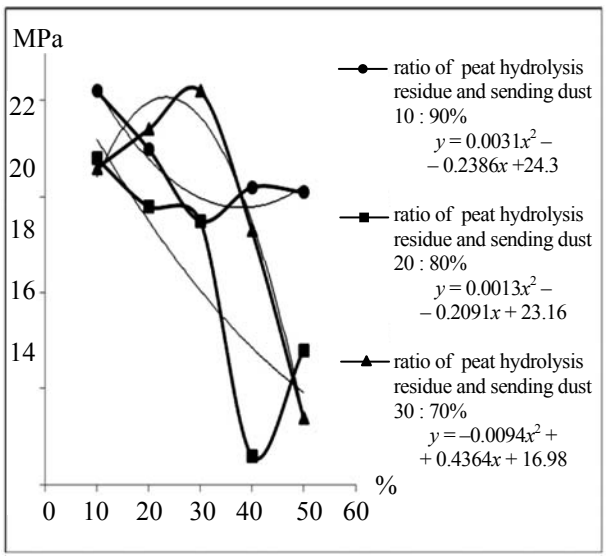

Fig. 3 Dependence of the strength resistance

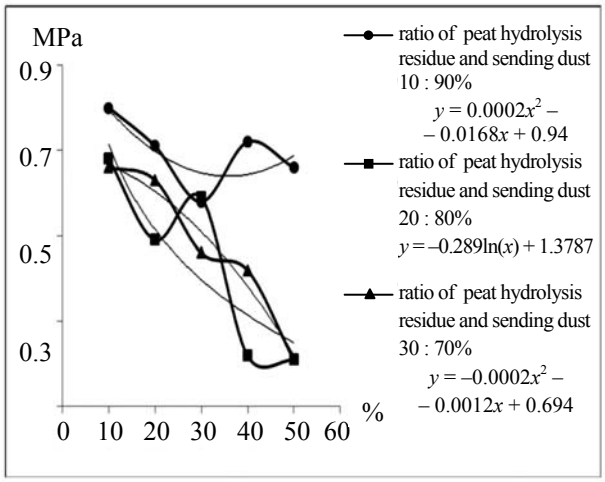

Fig. 4. Dependence of the strength perpendicular to the tensile plastic plates on the content of the inner layer press-mass

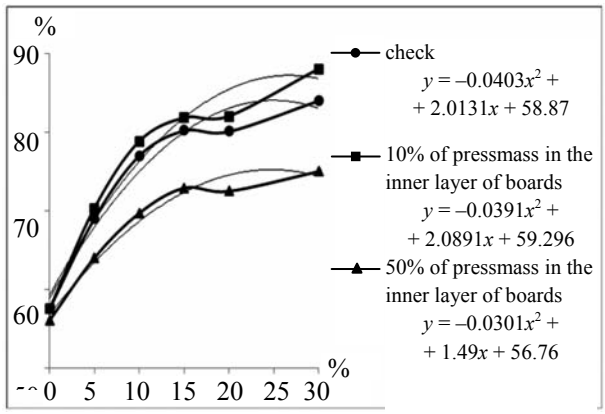

Fig. 5. Dependence of the dynamics of water absorption chipboard on the content in their inner layer boards press-mass

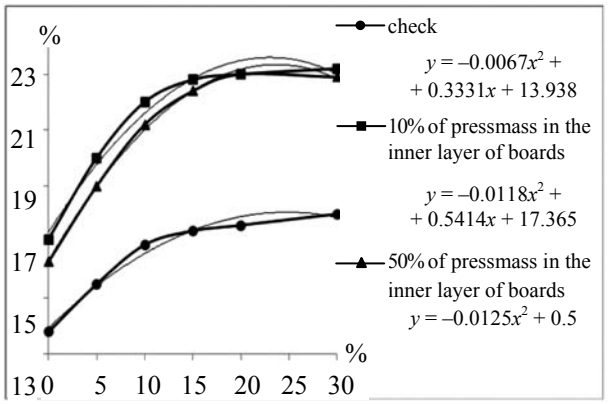

Fig. 6. Dependence of the dynamics of swelling the thickness of chipboard on the content of inner layer boards press-mass

It testifies to reactionary ability of components press-mass that proves to be true indicators of durability of plates at a bend, their swelling and water absorption. The greatest water resistance of plates is reached at the contents in an inside layer of plates of 50% press-mass.

Conclusion. The given results of researches show:

1) Application press-mass from a wood dust from calibration and grinding of wood-cutting plates and the rest from hydrolysis of riding peat in the ratio respectively 90: 10 in number of 10% from cutting weight allows to improve physicomechanical properties of plates.

2) The greatest water resistance is reached at the maintenance of the specified structure in number of 50% from cutting weight of an inside layer;

3) The economy of wood raw materials is reached at the expense of reactionary ability of components press-mass from a utilized waste of productions of wood-cutting plates and fodder yeast from riding peat.

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