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Studies of chemical and atmospheric resistance of selected materials showed that the most resistant to toxic chemicals and weathering were polyolefins (polyethylene and polypropylene). Based on these results for use in the construction of reservoirs was recommended composition MDPE -2 comprising 0.1% of OA benzon (OA benzon is a light stabilizer against atmospheric aging) and 0.8% of NN diaphene (NN Diaphene – is a heat stabilizer to prevent decomposition of the starting material in the process of rework into products at high temperatures). This material has an atmospheric and chemical resistance, is economical as compared with stainless steel. It is well processed by rotational molding allows to obtain large hollow products, tanks of various capacities.
The experimental data allowed to recommend a composition based on low-density mark 168.0 of polyethylene stabilized 0.8% of benzon and 0.1% of NN diaphene, for the manufacture by rotational molding containers of pesticides agricultural machinery, long working outdoors.
Based on received results and conducted tests was developed composite polymeric materials for the manufacture of tanks for the chemical treatment of cotton.

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Physical, Mechanical and Frictional Properties of Composite Wood-Polymer Materials For Bearing of Friction Units of the Machines

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Abstract: Ant frictional composite wood and polymeric materials on the basis of local wood (a poplar and tale) and the modified polymers - polyethylene of high density and polypropylene, the ant frictional properties filled with fine carbon and graphite powders, improving and wear resistance of wood and also allowing to change purposefully physic mechanical and operational properties of the received composite materials and to receive materials with the set properties for production of the bearings of sliding used in working bodies of a complex of cars and mechanisms of the cotton-processing industry are developed. The technology of receiving ant frictional composite wood and polymeric materials is developed. Physic mechanical and ant frictional properties of composite wood and polymeric materials are studied.
Called on test in working conditions bearing slides from composite wood-polymeric material has shown that, using them in nodes of friction worker organ of the machines and mechanism will allow vastly to raise double resource of their work, as well as will allow to raise reliability and capacity to work of the machines, working in condition of friction and wear-out.
Keywords: composition, composite material, ant frictional material, wood, wood and polymeric material, property, physic mechanical properties, ant frictional properties.
The most acceptable wood material as bases anti-friction composite material of the sort are sliding for bearing of the slide - a poplar and melted.
The Known that in base all technology production wood-polymeric composite material on base of the poplar and melted lies preparation of raw wood to pressing by way to giving to her plasticity. Considering that with increasing of the temperature and moisture raw wood her(its)

component parts - lignin and hemicelluloses are vastly softened and become more viscous in consequence of which resistance compression falls. So originally wood was subjected to the preliminary timber a ferry under low temperature.

For the reason increasing mechanical characteristic, her(its) water- and wood willow and for reception of the stocking up bearing slides from poplar and melted, they are soaked fluid mineral mask. Exist the different ways of the soak, which is caused by need of the deep filling capillary-porous system more viscous material. One of such ways of the soak wood is a way of the soak wood without using the surplus pressure. At way raw wood first warms up in hot-tub before 95-
115 ^{o}C, residing in capillary-porous system, air enlarges and partly leaves outward. Then raw wood fits in bath with cool by composition, remained at air decreases in volume, creating inwardly it vacuum, which is filled by modifier. Small wood are soaked during 60 mines in hot-tub and are carried on 60 mines in get cold. This way is well soaked wood moisture before 10 %.

On base of the called on studies is designed way of the soak wood-poplar and melted the machine mask and polymeric composition (the polyethylene to high density, modified by smut or graphite), which is realized on unceasing scheme under determined mode of their reception as follows:

-Cutting of beams and boards on stocking up, having section in the manner of square or rectangle by length before 300 mms;

- A simultaneous drying and soak wood in oil bath, warmed before t = 40-60 ^{0}C during 24-48 hours. Then temperature of the butter is brought before t = 110-120 ^{0}C, herewith occurs partial wood-willow for 2 hours, with the following cooling in butter; oil; grease before t = 20-25^{0}C during 12-15 hours;

- Keeping imbrued sample on storehouse before their modification and pressing, herewith their shrinkage or swelling are negligible will measly be small, but cracking is practically excluded;

-Modification and soak loaded timber melted before t = 150-160 ^{0}C solution mixture to polymeric composition at pressure P = 1,2 -1,5 MPa and the temperature 393-413 K;
363 K;

- A pressing hot modified timber in cool die under specific load 15,0-20,0 MPa before necessary degree of the pressing;

- An endurance of the pressed stocking up in die under universal press during 5-10 mines for cooling them before the temperature t = 40-50 ^{o}C;

- A removing pressed self-lubricated pressed modified timber - a stocking up the details from die;

- A normalization (maturing) pressed wood in surrounding air ambience under t = 15-25 ^{o}C or in bath with cool dehydrated mask during 24-48 hours.

Such soak wood with butt end under pressure provides relative lightness of the advancement to liquids along filaments wood and displacing from container of water and air, high velocity of the filling damp wood. She enables to change in given direction structure wood material by way of stocking up through channel of the variable section under simultaneous presenting the flow of
the heated modifier in her(its) butt end under the action of high pressure.

The successful solution of the problems of creation and introduction of new composite materials based on local raw materials-wood (poplar, tala) and modified polymer (high density polyethylene - HDPE, polypropylene - PP) is closely linked to the development of high-performance way to filling its capillary-porous system of multi-component substances.

Wood has a characteristic structure - high-fiber pulp associated with lignin into a rigid and durable capillary-porous system. Cellular tissue timber has a certain porosity. The presence of micro pores in the wood and hardwood trunk is a very favorable factor, as after the removal of free moisture, which can be impregnated with a variety of lubricating polymer and other materials, which gives them dimensional stability, and a completely different properties.

To improve the antifriction properties and wear resistance of the wood into the polymer material was injected carbon-graphite fillers (carbon black and graphite). The introduction of carbon-graphite fillers in polymer and wood allows purposefully change the physical-mechanical and operational properties of the resulting composite materials.

Furthermore soot increases wear resistance, reduces the friction coefficient and the value of the composition, and the graphite has a high electrical and thermal conductivity. As lubricant were selected motor oil.

For an introduction to wood modified polymer optimal composition studies have been conducted to study the properties of polymers depending on the content of fillers. Using experimental data, the curves of the dependence of the physical and mechanical properties of the compositions. Figure 1 shows the dependence of the compressive strength of HDPE and PP on the content of carbon and graphite filler-carbon and graphite. Curves expressing the dependence of compressive strength of the content of graphite and carbon black (figure 1) shows that when the content of 5 to 10 wt. h. graphite and carbon black achieve maximum compressive strength. The development of wood-plastic composite materials filled with finely divided wood and carbon-graphite powders represents certain practical interest in the manufacture of plain bearings used in the working bodies of various machines and mechanisms.

To this end, we have developed composite wood-polymeric material (CWPM) on the basis of local wood (poplar tal) and modified polymer (HDPE + carbon black, graphite HDPE + PP + PP + carbon black and graphite) with desired properties for the manufacture of slide bearings used in the working bodies of the complex machinery of the cotton industry (CWPM -1 - poplar + HDPE + black, CWPM --Train Station 2 + PP + graphite, CWPM -3 -tal + HDPE + graphite, WPCM -4 -tal + PP + soot) and technology of their production, as well as studied their physical and mechanical properties [1]

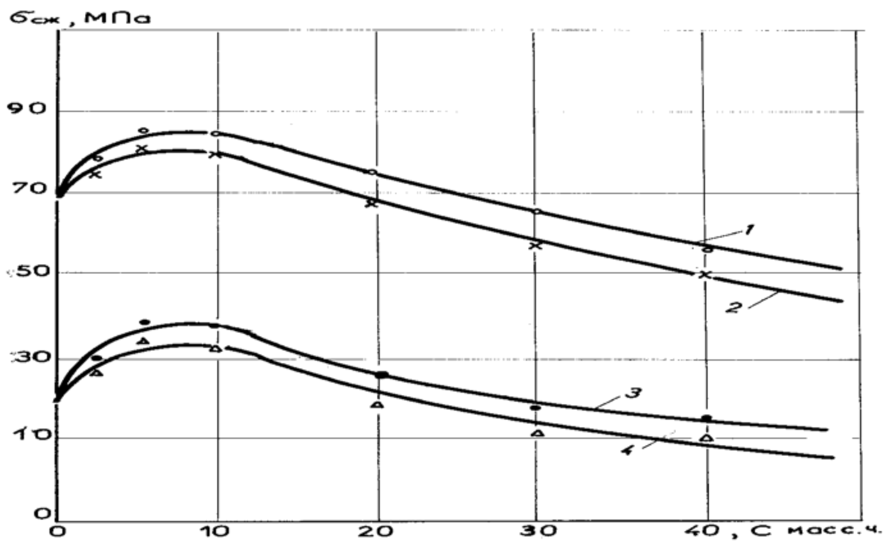

Figure 1. The dependence of the compressive strength PP (1,2) and HDPE (3,4) from the content of the fillers: 1,3 graphite; 2,4 - black

Thereby, at present, with provision for such soaks wood mask and polymeric composition, us are received composite wood-polymeric material (CWPM) on base local cheese - a poplar (CWPM-1, CWPM-2) and willow (CWPM-3, CWPM-4), which characteristic are provided in table 1.

Physical, mechanical and frictional properties of composite wood-polymer materials

Table 1

Indicators	Composite wood-polymer material			
	CWPM-1	CWPM -2	CWPM -3	CWPM -4
Density, ρ, g / cm^3	0.9-1,0	0.9-1,0	0.9-1,0	0.9-1,0
Compressive strength, MPa	9,0	10,0	12,0	14,0
Brinell hardness, MPa	90	110	120	130
Friction coefficient	0,11	0,12	0,13	0,14
Wear rate, I.10-9	0,8	0,85	0,90	1,0
Water absorption for 24 h,%	48,3	35-45	35-45	37,4
Degree of compaction,%	38,5	38,1	37,8	36,1
The degree of compaction, Δh	1,5-2,0	1,5-2,0	1,5-2,0	1,5-2,0
During pressing force, MPa	10-15	10-15	10-15	10-15
Swelling in oil for 24 hours,% by weight	3-5	4-5	3-5	1-2
by volume	0-2	1-2	0-2	0-2
Swelling in water for 24 hours,% by weight	35-45	35-45	35-45	35-45
by volume	18-28	20-25	20-25	20-25

As can be seen from table, designed composite wood-polymeric material possess it is enough high strength and anti-friction characteristic meeting the demands, presented to material bearing slides for nodes of friction worker organ of the machines and mechanism, working in condition of friction and wear-out.

Currently in modern machines and mechanisms are widely used in the bearings friction, which provide a significant reduction in the frictional force, and hence, reduce power consumption, increase durability node. However, operation of such assemblies in the dusty atmosphere and other such conditions leads to premature wear assembly. The resulting small gap at the same time causes vibration of machinery, and they fail. Features clearance adjusting roller bearings or repairing them is not available, only to replace them with new bearings, in particular on the bearings of wear-resistant wood-polymer composite materials.

In view of the non-use of structural steel as anti-friction material, we recommend the use of plain bearings CWPM reinforced with aluminum pins as the most effective for heat transfer.

On base these material is designed optimum designs bearing slides for nodes of friction worker organ of the machines and mechanism in lieu thereof bearing of the swing. To improve heat dissipation from the friction zone at medium and high sliding speeds and moderate specific loads ($\upsilon = 0,3 \div 1,5 / 1,5 \div 2,5$ m / s, $p = 0,5 \div 1$ MPa), based on the results of the experiment thermal conductivity, the bearings is recommended to do with aluminum heat-pins of cylindrical shape in the amount of three or four pieces.

Such design bearing slides from composite wood-polymeric material on base of the local sort wood and thermoplastic polymer promotes the improvement to reliability and efficiency of the functioning(working) the nodes of friction worker organ of the machines and mechanism, working in condition strong conditions surrounding ambiences [2].

Thus, the introduction of plain bearings of wear-resistant composite wood-polymer materials in friction working bodies of the ginning machinery and equipment would reduce their metal content and the number of technical maintenance, increase the durability of the friction units in 2-3 times and to double the life of plain bearings, and the economic effect. In addition, the bearings of the CWPM reliably operate in a self-lubricating abrasive, corrosive, humid environments and water. The complex features required for the operating conditions allow materials to maintain their stability at high temperatures (up to 100 ° C) and low (down to minus 30 ° C) temperature and humidity of the environment and the impact of any environmental factors, pressures up to 2.5 MPa and sliding velocities up to 5,0 m /s.

Called on test in working conditions bearing slides from composite wood-polymeric material has shown that, using them in nodes of friction worker organ of the machines and mechanism will allow vastly to raise double resource of their work, as well as will allow to raise reliability and capacity to work of the machines, working in condition of friction and wear-out.

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