SCIENTIFIC AND TECHNICAL JOURNAL "PROBLEMS OF MATERIALS SCIENCE"

N 2(46), 2006

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ABSTRACTS OF PUBLISHED ARTICLES

UDC 621.822.5:539.538:678.067

Application of antifriction carbon fiber-reinforced plastics in plane bearings. Nikolaev G. I., Bakhareva V. E., Vlasov V. A., Lobyntseva I. V., Anisimov A.V., Petrova L. V., Simina V. N.– Problems of Materials Science, 2006, N 2(46), pp. 7–21.

In CRISM CM "Prometey" is generated the new class-room of antifriction polymeric composites – the carbon fiber-reinforced plastics exceeding under the characteristics conventional antifriction polymeric materials. Carbon fiber-reinforced plastics on the composition and working conditions are divided into two groups: phenolic – for high-speed (up to 40 m/s) and epoxy – for low-speed and highly loading (up to 60 MPa) unit of a friction. They intended for production of plane bearings of vessels, water turbines and pumps, working in water-lubricated and any other liquids.

Field experience of plane bearings from carbon fiber-reinforced plastics has shown their tall serviceability in clusters of a friction of ship gears and systems, water turbines, in basic engineering industry, accessories of pipelines, contact electrical networks of railways, actuating mechanisms of various assignment, centrifugal, pinion and piston pumps.

Key words: a carbon fiber-reinforced plastic, unit of a friction, shipbuilding, the water turbinebuilding, the pumpbuilding.

UDC 678.067:621.822:629.12.037

Binary support from modified carbon fiber-reinforced plastics for bearings of ship shaftings. Anisimov A. V., Bahareva V. E., Lobyntseva I. V., Petrova L. V., Churikova A. A. – Problems of Materials Science, 2006, N 2(46), pp. 22–26.

Bearings of ship shaftings work in extreme conditions, the solution of a problem of their reliability and serviceability water-lubricated is one of the hardest problems of a materials technology. This problem is solved by creation of a plane bearing – a binary support consisting of a phenolic carbon fiber-reinforced plastic and graphite-reinforced PTFE.

Two designs of binary support – in built-up and integral version. A bearing base of a binary support is the carbon fiber-reinforced plastic ФУТ, and protectors graphite-reinforced PTFE Ф40Г40.

The designed binary support embrace all dimensional row of plane bearings of ship shaftings.

Key words: a binary support, a carbon fiber-reinforced plastic, graphite-reinforced fluoroplastic, the stern bearing.

UDC 678.067:539.538

Modifying by metals – an efficient method of increase of a wearing quality of a phenolic carbon fiber-reinforced plastic ФУТ at friction on “viscous” rust-resisting steels. Anisimov A. V., Barahtin B. K., Bahareva V. E., Petrov S. N., Rybin V. V., Tochilnikov D. G.– Problems of Materials Science, 2006, N 2(46), pp. 27–35.

The wearing quality of a friction pair a carbon fiber-reinforced plastic ФУТ – a rust-resisting steel is unsatisfactory, therefore there is a problem of increase a wearing quality of a carbon fiber-reinforced plastic ФУТ at abrasion on rust-resisting steels with low hardness ("viscous" steels). This problem has been decided by modifying of make up of a phenolic carbon fiber-reinforced plastic by superfine metals. In quality mezzo-modifying agents powders of metals various disperse – copper, a babbit marks B-83 and a nickel of a have been elected.

Updating has supplied{ensured} adaptation of carbon fiber-reinforced plastics to counterbodies with low tribotechnical characteristics, for example to "viscous" stainless strips or titanium alloys. At updating by metals and alloys all tribotechnical characteristics of friction pairs are improved, namely the linear wear rate of a carbon fiber-reinforced plastic and a counterbody is sinked, the maximum allowable contact pressure is increased.

Key words: updating, superfine metals, a phenolic carbon fiber-reinforced plastic, a counterbody, «viscous» steels, titanium.

UDC 678.067:539.538

Research of a microstructure and the mechanism of wear process carbon-reinforced plastic in pair with rust-resisting steels. Anisimov A. V., Barahtin B. K., Bakhareva V. E., Rybin V. V. – Problems of Materials Science, 2006, N 2(46), pp. 36–43.

Process of wear process carbon-reinforced composites in friction pairs carbon-reinforced plastic ФУТ – steel 08Х18Н10Т with hardness 130 HB is investigated at friction in water. It is established, that linear intensity of wear-reinforced plastic ФУТ at friction on steel 08Х18Н10Т in an end face carbon fiber filled is lower than fibres, than along fibres. The fibres focused to a surface of friction by an end face, promote decrease of deterioration. At the same time for carbon-reinforced plastics, as well as for other, anisotropic composite materials, the factor of friction along layers of a fabric is lower, than in an end face. The dominating mechanism of deterioration carbon-reinforced plastic ФУТ in this pair along layers of a fabric – stratifying, plough the furrow and abrasive deterioration particles of carry of metal, an end face of layers of a fabric – only stratifying. With increase in contact pressure of a fibre exfoliate from a matrix more strongly.

Key words: deterioration, phenolic carbon-reinforced plastic, a counterbody, staining steadfastness steel.

UDC 678.067:539.538

Analysis of the microstructure and the mechanism of wear of surfaces of friction pairs carbon fiber-reinforced plastics-alloys on the basis of copper. Anisimov A. V., Barahtin B. K., Bakhareva V. E., Petrov S. N., Rybin V. V. – Problems of Materials Science, 2006, N 2(46), pp. 44–50.

Tribotechnical characteristics of a friction pair a carbon fiber-reinforced plastic ФУТ–metal essentially depend on metal of a counterbody. The highest wearing quality the friction pair has a carbon fiber-reinforced plastic – a tin bronze marks Бр.О10Ц2. The influences of makeup of alloys on a copper base on functionability of a friction pair a carbon fiber-reinforced plastic – metal and a microstructure of a carbon fiber-reinforced plastic are investigated.

It is fixed, that the makeup of alloys on a base of copper renders essential influence on a wearing quality of a phenolic carbon fiber-reinforced plastic. Positive influence of an alloy on a base of copper on tribotechnical characteristics of a carbon fiber-reinforced plastic will be, that the film of transmission from a counterbody can efficiently heal defects of a surface structure of a carbon fiber-reinforced plastic, sinking a wear rate and a friction coefficient. The makeup of a counterbody essentially influences a microstructure of a friction surface.

Key words: alloys on a base of copper, bronze, a phenolic carbon fiber-reinforced plastic, a counterbody, wearing.

UDC678.067:539.538

Experimental research of surfaces of contact in friction pairs polymer – metal. Anisimov A. V., Barahtin B. K, Rybin V.V. – Problems of Materials Science, 2006, N 2(46), pp. 51–61.

Results of the experiments which have been lead with friction pairs from polymeric and metal materials are extended. With the help of representations structural mezomechanics attempt is undertaken to explain a series of the facts detected at research of friction surfaces in composition a reinforced carbon fiber-reinforced plastic – metal.

A series of the inferences concerning processes of a plastic strain in a contact zone a friction pairs reinforced by fibrils a carbon fiber-reinforced plastic – metal is made. In friction pairs irrespective of structure of a material the physical nature of wear is determined by a plastic strain. A majority carrier of the rotation plasticity – a dipole of partial wedge disclinations. Authors score perspectivity of use disclinations representations in exposition and explanation of the effects escorting appearances of friction and wear.

Key words: structural mezomechanics, a carbon fiber-reinforced plastic, disclinations, friction and wear.

UDC 678.067:539.538

Effect of structure and the surface plastic straining of counterbodies on friction performances and wear rate of materials in friction pairs carbon fiber-reinforced plastic ФУТ – steel. Anisimov A. V., Bahareva V. E., Tihonov V. P., Frantsuzova S. B. – Problems of Materials Science, 2006, N 2(46), pp. 62–69.

Dependence of wear rate of carbon fiber-reinforced plastic from structure of a steel counterbody is investigated. Researches friction performances carbon fiber-reinforced plastic ФУТ in contact to steels –

the martensitic (07Х16Н4Б, 20Х13) martensitic-ferritic (08Х17Н6Т) and austenitic (10Х17Н13М2Т) are lead.

It is established, that the microscopic structure and hardness of counterbodies strongly influence on friction performances carbon fiber-reinforced plastic. From investigated rust-resisting steels the most tall friction performances carbon fiber-reinforced plastic ФУТ are provided in a steam with martensitic steels. Unstable stability of process of a friction in a steam carbon fiber-reinforced plastic ФУТ – martensitic-ferritic steel and catastrophic wear steams carbon fiber-reinforced plastic ФУТ – austenic steel is detected. The surface plastic straining of steels reduces wear rate of carbon fiber-reinforced plastic.

Key words: counterbody, structure of steel, carbon fiber-reinforced plastic, austenite, martensite, wear.

UDC 678.067:539.538:620.187

Application of atom-force microscopy for research of a surface of contact in friction pair the modified carbon-reinforced composites – metal. Bakhareva V. E., Blyshko I. V., Nikolaev G. I., Malygin A. A., Trifonov S. G., Sosnov E. A. – Problems of Materials Science, 2006, N 2(46), pp. 70–78.

In the present work for the first time in practice of researches of antifrictional polymeric materials the microstructure and phase structure of a surface of friction phenolic carbon-reinforced composites marks ФУТ with use of a methods of atom-force microscopy (AFM) have been determined. Interest represented not only the results received by a new method, but also their comparison with the results received on a raster electronic microscope and X-ray spectroscope.

On the basis of the carried researches sharing of methods AFM and SEM for research of a microstructure carbon-reinforced composites, formed is established, that during friction, allows to receive with a high degree of reliability the information on processes of wear process carbon-reinforced composites and about influence of modifiers on these processes. The opportunity of use of techniques AFM for research of such difficult objects what composite carbon materials are is shown.

Key words: atom-force microscopy and electronic microscopes SEM, carbon-reinforced composites, friction, wear.

UDC 678.067:539.538:621.91

Habits of machining of antifriction carbon fiber-reinforced plastics. Malanjuk A. I. – Problems of Materials Science, 2006, N 2(46), pp. 79–84.

The basic habits of machining antifriction epoxy (УГЭТ) and phenolic (ФУТ) of carbon fiber-reinforced plastics are surveyed. Guidelines at sampling a material of an edge tool, its critical bucklings, regimes of shearing are designed at turning carbon fiber-reinforced plastics. Observance of data in paper of guidelines allows to obtain units from carbon fiber-reinforced plastics of pinpoint accuracy and reduces probability of origination of unremovable defects.

Key words: carbon fiber-reinforced plastic, machining, a chip formation, cutting speed.

UDC678.067:621.91

Achievement of the given parameters of quality of surfaces of details from carbon fiber-reinforced plastic by machining. Petrov V. M., Ivanov O. A., Fedosov A. V. – Problems of Materials Science, 2006, N 2(46), pp. 85–99.

Composite a carbon fiber-reinforced plastic have special antifrictional properties. The given properties are expressed in the raised wear resistance of surfaces of details of pairs friction. These properties may render separate influence on productivity of processes of the machining connected to formation of the given form by methods of removal of a layer of a material. Now the most widespread are methods connected with cutting a material: turning processing, drilling, milling. Final, finishing processing by the standard abrasive tool does not give desirable result. The complex approach including therefore is necessary: the analysis (requirements of the drawing to accuracy and quality of processing, a way of reception of preparation and preliminary technology of formation of the form – a technological heredity); to a choice of a method of the further processing (to the circuit of cutting, the process equipment, cutting tool, the lubricant and cooling technological environment, modes of processing); to choice of a way of the control of parameters of accuracy and quality of the processed surfaces and the sizes. Due to this approach it is possible to reach (achieve) the given productivity and quality of machining.

Key words: carbon fiber-reinforced plastic, antifriction properties, raised wear-resistance, complex approach, quality of machining.

UDC 678.067:539.538

Friction of carbon fiber filled thermoplastics in water medium. Rashkovan I. A., Krasnov A. P., Kazakov M. E., Afonicheva O. V., Kulachinskaya O. B. – Problems of Materials Science, 2006, N 2(46), pp. 100–104.

Some aspects of application of the carbon fiber filled thermoplastics as antifriction materials are considered in this paper. Distinguishes features of their friction, lacks and advantages are analyzed at example of chaotic short carbon fiber filled polypropylene and polyamide-6. Experimental results of the investigation of carbon fiber filled polyamide-6 friction in water are discussed. It was established the stabilization of the sizes and improvement of friction properties at the exposure in water. Carbon fiber filled УПА-6/30-АФ has the best friction properties. It is recommended to conduct stand tests of antifriction carbon fiber filled polamide-6 in friction assemblies running in water.

Key words: carbon fiber filled thermoplastics, antifriction materials, carbon fiber filled polamide, friction in water.

UDC 678.067:539.538

1nfluence of tribochemicalactive bindings in creation of new reinforced antifrictional material. Krasnov A. P., Timofeev V. A., Afonicheva O. V., Buyaev D. I., Chukalovsky P. A., Kuznetsov V. V. – Problems of Materials Science, 2006, N 2(46), pp. 105–112.

The possibility of using of thermostable rigid chain polymers as a fibers existing in maximum thermofriction stable condition is the most interesting.

Investigation of influence of chemical structure of binding on tribochemical properties of model materials reinforced by thermostable fibers based on poly-1-3-4-oxadiazole and cotton fibers has been carried out. Resol type phenol-formaldehyde resin was used as a binding agent.

Investigation of tribochemical processes performed by us permits to substantiate the possibility of using of thermostable polyheteroarylenes as a basis for new generation of high-wear-resistant organoplast materials.

Key words: reinforced composite, antifriction material, phenol-formaldehyde binding, tribochemical process, wear-resistance.

UDC 678:539.538

Tribological characteristics organic plastics on the basis of a phenolic matrix and organic fibres. Anisimov A. V., Bakhareva V. E., Blyshko I. V., Ginzburg B. M., Kirik E. V., Tochilnikov D. G. – Problems of Materials Science, 2006, N 2(46), pp. 113–118.

Are investigated tribological characteristics and water absorption of antifrictional polymers with the phenolic matrix, reinforced organic fabric and compositions with a various combination organic and cotton fibres and graphite at friction on steel with water and without water in a wide range of contact pressure at speed of sliding of 1 m/s.

Comparison tribological characteristics organic plastics with tribological characteristics of known antifrictional polymeric materials – Polyamide and Thordon («Thordon Bearings Inc.») is executed. It is established, that organic plastics on contact pressure, wear resistance and factor of friction surpass polyamide and thordon. Researches of water absorption organic plastics have shown, that they increase the sizes in water. This complicates their wide application in the bearings.

Key words: organic plastics, cotton, graphite, friction, water absorption.

UDC 678.067.7:539.538

Research of pair friction material 7В-2А – steel 25Х17Н2Б-Ш on water greasing. Vjazankin B. V., Motkov L. L. . – Problems of Materials Science, 2006, N 2(46), pp. 119–126.

The general data about filled PTFE marks 7В-2А are submitted, features of its behaviour in water, its physicomechanical characteristics, and also questions of processing, deformability of a material are investigated. Results of researches friction characteristics of pair friction material 7В-2А – steel 25Х17Н2Б-Ш are resulted depending on loading, temperature and factor of mutual overlapping.

The pair friction graphite-PTFE a material 7B-2A – steel 25Х17Н2Б is recommended for use in serial tight electropumps and the main circulating pumps of the atomic power station at temperatures of water up to 200°C.

The temperature of water 250–300°C for a material 7B-2A is inadmissible in connection with significant decrease of durability and wear resistance.

The material 7B-2A cannot be applied for large-sized bearings in connection with low durability and insufficient adaptability to manufacture.

*Key words***:** graphite-PTFE, temperature, factor of mutual overlapping, friction characteristics.

UDC 621.67:621.822.5:678.067.7

Research of serviceability of the graphite-PTFE material 7B-2A in the bearings of sliding working on pump over to environment in horizontal centrifugal pumps of low power. Bojarko N.N., Chernov A.E., Katsov S. N. – Problems of Materials Science, 2006, N 2(46), pp. 127–132.

Results of experimental researches of serviceability built – in pumps such as Кс80-100 and Кс80-150-6 hydrodynamical basic bearings of sliding the cartridge type, greased pump over to environment by the pump water are considered.

As an antifrictional material it was used графитофторопластовый a material of mark 7B-2A.

Serviceability antifrictional graphite-PTFE material in quality cartridges in the forward and back built – in basic bearings of sliding has been checked up at carrying out of resource tests of pump Кс80-100 during 1000 hours. On the actual values of parameters of wear resistance of a combination of materials of pair friction received as a result of tests (a material 7B-2A – steel 30Х13, 38–42 HRC) the material 7B-2A is referred to a class 1 of wear resistance and for him settlement definition of a prospective resource of work which has made 5300 hours is executed.

By results of the lead tests the material 7B-2A is recommended for application as an antifrictional material in the built – in designs bearings of sliding at greasing water with loading – high-speed parameters pv = 30 kg m/cm^2.

Key words: slide bearings, graphite-fluoroplastic material, centrifugal pumps of small power.

UDC 678:539.538

Quality appreciation of friction pairs efficiency. Lysenkov P. M. – Problems of Materials Science, 2006, N 2(46), pp. 133–135.

Efficiency of friction pairs is always considered from two positions. On the one hand it is ability of friction pair to prevent from moving one detail on a surface of other detail. The second area of researches is responsible for durability. In this case the wear of each detail forming a friction pair acts as object of research.

At all stages of mankind development attempts to estimate efficiency of the friction pairs were undertaken. For this purpose numerous techniques which correctness is not obvious were used.

Wide use of the quality appreciation basing on numerous experimental data with reference to various materials and conditions of operation represents as the modern direction in this area.

Key words: friction, pair, efficiency, quality appreciation.

UDC 678:539.538

Ability of some nonmetallic materials to form a binary surface of friction. Lysenkov M. P. – Problems of Materials Science, 2006, N 2(46), pp. 136–138.

Efficiency of tribocouplings with use of binary friction surfaces has served as a pulse for creation of polymeric materials in which the binary surface at a microlevel can be presumably realized.

The article attempts to have answered the following questions: can the binary surface be formed on filled polymers after friction along a metal counter body and what quantitative parameters of a binary surface are at a microlevel.

The article answers to the specified questions are based on results of special experiments:

Key words: friction, a binary surface, a microlevel.

UDC 678:539.538

Efficiency of elastomer – elastomer friction pairs. Lysenkov M. P., Tchoulkin S. G. – Problems of Materials Science, 2006, N 2(46), pp. 139–142.

Results of research of friction pair elastomer – elastomer which seldom meets in practice of mechanical engineering are considered. Filled and unfilled rubber of average hardness and also filled and unfilled moulded polyurethanes are considered as the materials forming a friction pair.

The statistical analysis of the received experimental data with reference to the fixed factor of friction is resulted at work of friction pair without greasing. By results of researches it is judged that all investigated friction pairs cannot be related to an antifriction class.

Key words: friction pair, elastomer, factor of friction.

UDC 621.822.6:539.538:678.067

Experimental researches of roller bearings from polymeric materials. Babenko A. A., Kudryashov Yu. A., Hisamutdinov R. S., Kiseleva L. A., Lasutkin V. M. – Problems of Materials Science, 2005, N 2(46), pp. 143–149.

Results of works on improvement of a design of roller bearings for дейдвудных devices are resulted. Advantages of a new design with rollers from skilled rubber like materials in operating conditions in the environment with the maintenance of abrasive inclusions in pair with shaft from stainless steel are shown. Results of comparative bench tests are resulted.

Analyzing results of tests it is possible to assert, that pair friction a shaft from stainless steel and the roller bearing with the combined rubber rollers are compatible and can reliably work long time at frequency of rotation up to 950 rev/min.

As a result of the lead researches it is possible to draw a conclusion, that application of the bearing with the rubber combined rollers of the design offered by authors will considerably improve operational characteristics shaft line as a whole, that, undoubtedly, will be reflected in commercial appeal of the project to again builded and under repair courts.

Key words: roller antifriction bearings, abrasive inclusions, resin-like materials, the deadwood devices.

UDC 62–714.76:621.822.6

Introduction of roller bearings with rubber rollers on the circulation pumps of ОПВ-185 and ДПВ-170 typs on the Kalinin nuclear plant. Sinitzyn E. M., Sokov E. V. – Problems of Materials Science, 2006, N 2(46), pp. 150–152.

Possibility of significant increasing the service life of the water lubricated circulation pump guide bearings through improvement of the design and replacement of the sliding friction by the rolling one is explored.

Key words: guide sliding bearing, rolling bearing,roller, shaft, water lubrication, service live, accumulated operating time.

UDC 678.675`126

Modification of caprolon by fulleroid materials. Potalitsyn M. G., Babenko A. A., Alekhin O. S., Alekseyev N. I., Arapov O. V., Charykov N. A– Problems of Materials Science, 2005, N 2(46), pp. 153–157.

The technology is developed for obtaining different modifications of caprolon, which contain fullerens and fulleren soot. The obtained samples possess the physical and chemical properties substantially improved in comparison with the unmodified caprolon: increased hardness according to Brinnel, impact toughness, resistance to abrasion, temperatures of softening and melting, reduced content of monomer, moisture absorption. Modifications make it possible to vary significantly also some electrophysical characteristics of caprolon: specific volumetric (surface) resistance, dielectric resistance and the tangents of dielectrical losses.

Key words: fulleren, fulleren soot, caprolon, modification, electrical conductivity, wear resistance.

UDC 678.745.2:539.538

The influence of the carbon nanotubes on the thermo-mechanical and tribological properties of the nanocomposites based on the semi-crystalline polyimides. Shumakov A. N., Yudin V. E., Svetlichnyi V. M., Didenko A. N., Bogorad N. N., Popova E. N., Letenko D. G., Fadin Yu. A., Solovyev A. N. – Problems of Materials Science, 2006, N 2(46), pp. 158–165.

The influence of carbon nanotubes on the mechanical properties of the nanocomposites based on semicrystalline polyimides was investigated. It was concluded, that carbon nanotubes act as a nucleating agent, facilitating recrystallization of the polyimide matrix. Tribological properties of new polymide nanocomposites based on carbon nanotubes were investigated also.

Key words: carbon nanotube; crystallization; polyimide.

UDC 620.178.16:621.822.5:678

The bench tests of slide bearing made from the antifriction material Torplas of the company "Thordon Bearings Inc.". Grigoryev A. K., Zvyagintsev V. N. – Problems of Materials Science, 2006, N 2(46), pp. 166–172.

Test object: Thorplas - antifriction material of “Thordon Bearings Inc.” (Canada). Test objective: Thorplas workability in water lubricated bearings.

Results of Thorplas friction bearing static and dynamic tests, performed employing 200 mm stainless steel shaft, show low friction coefficient of water lubricated Thorplas material under the entire range of loads and rotational velocities. At bearing length to shaft diameter ratio of 1.25 friction bearing can be employed in absence of system of force lubrication. Thorplas has passed shock loading test performed for a period of time set in the test program.

According to the test results, Thorplas can be recommended for employment in bearings on condition that the latter are lubricated with water free of abrasive particles.

Key words: test rig, sliding bearing, shaft, rotational speed, friction coefficient, regime, load.

UDC 678.067:539.538

Influence of fulleroid nanomodificators on the structure of the rubbing surface and special features of the wear of bronze-fluoroplastic antifriction materials. Vinogradov S. Ye., Rybin V. V., Shekalov V. I.. – Problems of Materials Science, 2006, N 2(46), pp. 173–180.

Comparative researches of a surface bronzePTFE samples modified and unmodified nanodispersive fulleroid modificators after their tests are lead in structure of pair friction bronzePTFE – steel by methods of optical, electronic and raster electronic microscopy. It is established, that the abrasive mechanism of deterioration of an antifrictional material prevails. Fatigue crumbling and adhesive deterioration is not observed. The sizes of particles of modifiers make about 1 micron that results in the advanced specific surface and provides appreciable increase in wear resistance bronzePTFE at their small concentration. In result heating during friction and owing to significant excess of factor of linear expansion PTFE in comparison with bronze there is an allocation PTFE from internal volumes bronze on a surface of contact between rubed surfaces. The form and the sizes allocation modified PTFE are close to the form and settlement sizes of backlashes between particles of bronze that testifies to their insignificant deformation while unmodified PTFE it is much more than allocation in the sizes, have the oblong and wrong form. Introduction of modifiers influences on реологические characteristics PTFE, raising temperature of transition from elastic-plastic in a viscous-plastic condition therefore speed of its distance from a contact zone is less than speed of its allocation from пор due to heating that provides plastic greasing of rubed surfaces and reduces their deterioration.

Key words: bronzeflourplastic antifriction materials, rubbing surface, fulleroid nanomodificators.

UDC 62–762:669.65’784.018.24:539.538

Tests of graphite-babbit of corrected composition for end-face seals of propeller shafts. Kulik V. P., Khomov S. N. – Problems of Materials Science, 2006, N 2(46), pp. 181–185.

Results of physical, mechanical, tribotechnical corrosion and bench tests under operation conditions of graphite-babbit ППГ-Б83 conformably to friction pairs of end-face seals of shipboard propeller shafts are presented.

It has been shown that studied material has high level of tribotechnical properties and heat conductivity, size stability, corrosion resistance in seawater, sufficient strength. It provides operation of

seals of propeller shafts under all service regimes in friction pairs with steel 08Х18Н10Т and titanium alloy hardened by thermal oxidation or Al_2O_3 + 5%Cr_2O_3 detonation-sprayed coating. It is possible to use the graphite-babbit ППГ-Б83 in end-face seals of propeller shafts instead of material ЭГО-1-Б83, which is not produced now.

Key words: the end packings of propeller shafts, grafitobabbit, tribotechnical properties, improvement of composition.

UDC 62–762:669.65`784.018.24:539.538

Tribotechnical tests of materials for high-speed bearings of steam-turbine plants. Kulik V. P., Khomov S. N. – Problems of Materials Science, 2006, N 2(46), pp. 186–192.

Tribotechnical properties of the friction pair molybdenum – carbon-carbon composite are investigated.

Laboratory tribotechnical tests were carried out with regard for conditions of materials in high-speed bearings of steam-turbine plants – in regimes of boundary friction (water environment), dry and semi-dry friction.

According to data obtained the friction pair molybdenum – carbon-carbon composite is perspective for further investigations. It is necessary to carry out tests under operation conditions or conditions similar to them.

Key words: tribotechnical properties, friction, wear, molybdenum, carbon-carbon composite.

UDC 621.67:621.822.5:678.067.7

Statistical criterion of evaluation of tribotechnical properties of carbonic materials. Kozyrev Yu. P., Sedakova E. B.– Problems of Materials Science, 2006, N 2(46), pp. 193–198.

Standard tribotechnics tests of the carbon materials impregnated with metals, having plastic properties, are carried out. At tests speed and loading varied. Results of tests were approximated by universal dependence. The criterion to estimate the accuracy of an approximation is offered. It allows to choose the multifactorial function connecting the wear of the material with external conditions.

Key words: wear, carbon materials, tribotechnics tests, approximation, variance*, pv*-factor, wear particles.

UDC 62–762:669.65`784.018.24:539.538

Experimental research of materials for friction pairs for the backup bearings of the turbomachines of modular helium-cooled reactor with gas turbine GT-MGR. Kodochigov N. G., Belov S. Ye., Shishkin V. A., Borovkov M. N., Yatmanov A. V. – Problems of Materials Science, 2006, N 2(46), pp. 199–203.

The materials of friction pairs for the backup bearings of the turbomachines of modular helium-cooled reactor with the gas turbine are investigated. One of the most important components of the supporting system of the rotor of the turbomachine GT-MGR are the backup bearings, which are intended for the retention of rotor in the case of the failure of electromagnetic bearings. The backup bearings of turbomachine – slide bearings, operating with the high slip rates and large axial and radial loads.

In the axial backup bearings the contact is achieved by the end to the end, in the radial bearings by the bushing to the holder. Rotor parts in them are made of metal, in stator they are made of composite.

All tested materials of friction pairs have showed good tribotechnical characteristics, acceptable for their application in the backup TM bearings installed in GT-MGR units.

Key words: wear resistance, coefficient of friction, intensity of wear, helium, the material of friction pairs, temperature, specific load, slip rate, the unit of end friction.

UDC 678.049.16:539.538

The system approach to a problem of creation of glutinous connections in units of friction. Sytov V.A., Verstakov A. E., Voronin A.E. – Problems of Materials Science, 2006, N 2(46), pp. 204–210.

Questions of reception of efficient glutinous connections are considered. Are submitted the structure of adhesive system, property epoxy-rubber adhesives, are considered questions of a design, preparation of a surface and technology of application adhesives. It is shown, that only the correct choice and

performance of all making and technological operations of structure of adhesive system receive efficient glutinous connection.

Key words: adhesive system, epoxy-rubber adhesive, preparation of a surface, a design, technology.

UDC 678.049:539.538

Physical-chemical processes in solid lubricating coatings during production and friction. Drozdov Yu. N., Zelenskaya M. N. – Problems of Materials Science, 2006, N 2(46), pp. 211–217.

Interaction between composite antifriction filling compound and epoxy matrix in solid lubricating coating was studied by IR-spectroscopy method. It's shown that composite filling compound activates reductive-oxidative processes, forms chemical bonds with matrix and gives rise to matrix structuring.

Friction leads to intensifying the processes of structuring, oxidation, hydratation and transformation of amines; etc.

Key words: solid lubricating coating, friction, structuring, reductive-oxidative processes.

UDC 678.5:621.67

On the problem of application of parts of flow area of high-pressure centrifugal pumps of the type ЦНС made of the plastics. Bagmanov A. A., Bazhaykin S. G., Mikhaylov V. I., Akhmetgaliyev R. Z. – Problems of Materials Science, 2006, N 2(46), pp. 218–220.

Some specifications, design features and maintenance of centrifugal sectional pumps of ЦНС-type for injection of water into oil-bearing formations are reduced.

It is specified, that the majority of pumps of ЦНС-type have a low power-speed coefficient n_s. The efficiency of pumps depends, in base, from a surface figure of channels of a blading section of the pump and magnitude of slotted clearances in impellors sealings. Application of impellors from a steel founding does not ensure a surface figure of channels. The large mass of the rotor and the considerable length result in a deflection of the shaft and restrict installation of required magnitudes of slotted clearances of impellors. For a decrease of mass of the rotor and as corollary, abatements of a deflection of the shaft, and also a heightening of a surface figure of flow passages of the pump is offered application of different types of plastic in a construction of impellors of the pump.

Versions of a construction and production process of impellors from plastic for pumps of ЦНС-type are considered.

Key words: high-pressure centrifugal pumps, the power-speed coefficient, application of plastics.