В промышленно развитых странах основу высокоорганизованных производств составляет технологическое оборудование, создаваемое по агрегатно-модульному принципу. Созданием высокопроизводительных многопозиционных агрегатных станков занимаются ряд ведущих станкостроительных фирм, перспективные компоновки некоторых из них рассмотрены в данной статье. Выполнен обзор современных многопозиционных агрегатних станков с горизонтальной осью транспортирования заготовки в процессе обработки. Рассмотрены технические характеристики, технологические возможности и особенности компоновки.

Ключевые слова: агрегатный станок, компоновка, поворотно-делительный барабан.

УДК 621.9

Технологическое обеспечение трения качения и трения скольжения в зубчатых передачах / А.А. Клочко, М.И. Гасанов, Е.В. Басова // Вісник НТУ «ХПІ». Серія: Технології в машинобудуванні. – Х.: НТУ «ХПІ», 2015. – №40 (1149). С. 102-107. – Бібліогр.: 8 назв. – ISSN 2079-004X.

В статье рассмотрены условия контактирования цилиндрических зубчатых передач и технологические методы воздейтствия при формировании эвольвентной поверхности зубьев при которых происходит проскальзывание зубьев одной шестерни относительно профиля зуба сопрягаемого колеса и сил трения-скольжения. Потеря энергии на трение в зубчатых передачах доходит до 10% от всей потери энергии на преодоление трения. В зубчатой передаче потеря энергии происходит в зубьях вследствие их трения при несоответствии точности изготовления зубчатых передач по нормам кинематической точности, нормам плавности, нормам бокового зазора согласно требованиям ГОСТ1643-81 и особенностью трибологического контактирования эвольвентных сопрягаемых поверхностей. Показано, что при силовых расчетах цилиндрических зубчатых колес необходимо учитывать помимо динамических нагрузок и усилия трения качения-скольжения в зубчатых передачах. В зубчатых цилиндрических передачах трение качения значительно меньше трения скольжения, поэтому одной из превуалирующих научных направлений является уменьшение и сведение до минимума участка скольжения сопрягаемых эвольвентных профилей зубчатых колес с учетом изменения параметров состояния поверхностного слоя зубьев: шероховатости, волнистости, твердости, физико-механических свойств материала зубчатых колес.

Ключевые слова: трибология, контактирование, зубчатые передачи, технологическое воздейтствие, формообразовани, трение качения-скольжения.

УДК 658.512

Дослідження продуктивності і надійності складання вузла «гідроагрегат» в умовах автоматизованого виробництва / О.М. Шелковий, М.С. Мартинов, О.В. Набока // Вісник НТУ «ХПІ». Серія: Технології в машинобудуванні. – Х.: НТУ «ХПІ», 2015. – №40 (1149). С. 108-112. – Бібліогр.: 7 назв. – ISSN 2079-004X.

Наведено аналіз проблем та існуючих методів підвищення продуктивності складання вузлів. Для підвищення продуктивності та автоматизації складання вузлів запропонована математична модель системи імітаційного моделювання виробничих систем складання вузлів. Прогнозується підвищення продуктивності складання вузлів до 20% при використанні математичної моделі систем імітаційного моделювання виробничих систем.

Ключові слова: складання вузлів, підвищення продуктивності, математична модель, систем імітаційного моделювання виробничих систем.

УДК 621.923

Исследование структурных превращений и их влияние на поверхностный слой при зубошлифовании / Степанов М. С., Клочко А. А., Анцыферова О. А. // Вісник НТУ «ХПІ». Серія: Технології в машинобудуванні. – Х.: НТУ «ХПІ», 2015. – №40 (1149). С. 113-116. – Бібліогр.: 8 назв. – ISSN 2079-004X.

Одним из основополагающим фактором обеспечения высокой долговечности закаленных зубчатых колес является изучение состояния напряжений в поверхностном слое, определяющимися видом и условиями технологического воздействия в процессе зубошлифования. Рассмотрено влияние остаточных напряжений на прочность зубчатых колес в зависимости от тепла, возникающем в зоне резания и приводящие к образованию растягивающих напряжений, изменению твердости и структуры. Причиной структурных напряжений являются изменения объема по сечению материала, вызванные превращением аустенита меньшего удельного объема в структуре большего удельного объема.

Ключевые слова: зубошлифование, поверхностный слой, технологическое воздействие, закаленное зубчатое колесо.

ABSTRACTS

Getting nano- and submicrostructure under the action of laser radiation on the RI Carbide / G.I. Kostyuk // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P.4-6 – Bibliogr.: 23. – ISSN 2079-004X.

Experimentally determined grain size using a scanning electron microscopy (SEM-106), as well as a theoretical study of the volume and the grain size of nanostructures under the influence of ionizing radiation on the cutting tools (RI) Carbide T15K6, TN20, Elbor-R, comparing the results with experimental data which largest grain size lets talk about the adequacy of the theoretical model for determining the amount of grain.

Keywords: grain size, scanning electron microscopy, laser radiation, the amount of the nanocluster.

Wear and ctiykist cutting tools with PKNB of wear-resistant coatings based on boron nitride in the amorphous state / S.An. Klimenko, S.A Klimenko, V.M Beryesnev // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 7-10 – Bibliogr.: 4. – ISSN 2079-004X.

One of the most effective methods of the wear-resistance increasing of PCBN cutting tools is creation of functional nanostructured wear-resistant coatings on the working surfaces of the tool. The application of such coatings provides an opportunity to reduce cutting temperature and improve the performance of cutting tools, due to the purposeful change of mechanical and thermal properties of the surface layer, which allows one to increase the wear resistance of the working surfaces of PCBN cutting tool. Proper selection of the composition of the protective coating for a particular processing operation makes it possible to increase the efficiency of machining and wear-resistance of PCBN cutting-tools.

Keywords: cutting process, the cutting tool with PCBN, wear-resistant coatings, amorphous BN.

To the analysis of accuracy machining of the piston pin / A.P. Tarasyuk, N. Y. Lamnauer // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 11-1-30 – Bibliogr.: 9. – ISSN 2079-004X.

The problem of machine building, which concerns of the processing accuracy achieved. A new method for finding estimates of the model parameters of a random variable – size, proposed. This assessment can used in the calculation formulas for the analysis of the accuracy of the processing technology. The research results to assess the quality of the machining process of the .piston pin for VAZ used. Maximum percentage of quality of size for piston pin at the current processing technology was calculated. The size on which you need setting the machine defined. Application of the results of research will improve the quality of the piston pin.

Keywords: quality, accuracy, size, processing, analysis.

Temperature and thermal stresses under the action of ions to magnesium alloys and the possibility of obtaining nanostructures / G.I. Kostyuk, Behzad Razmdzhuyi, O.O Bruyaka // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 14-20 – Bibliogr.: 14. – ISSN 2079-004X.

The working vestigated the temperature field, the irrate of rise and thermal stresses under the action of the ion B^+, N^+, C^+, Al^+, V^+, Cr^+, O^+, Ni^+, Zr^+, Mo^+, Hf^+, W^+, Ta^+, Pt^+ of charge from one to three on the magnesiumalloys. Since the range of the maximum temperature in the range from $1{,}82 \cdot 10^3$ to 3,9 K, and the rate of temperature change varies from 10^{14} to 10^{17} K / s. Investigation of the sevalues depending on the energy of ions and charge it possible to find the volume of material in the area where the realized sufficient temperature to form the nanostructures, butat the same time, the temperature does not lead to graing rowth that is produced ion flow process parameters that provide the nanostructures.

Keywords: temperature, rate of temperature rise, temperature stress, ions, magnesium alloys, charge, energy ions.

The influense of quantity of fill material on holes quality when drilling composite materials / G.L. Khavin, I.O. Esip // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 21-25 – Bibliogr.: 17. – ISSN 2079-004X.

The influence of quantity of fill material on holes roughness and delamination when drilling of multilayer composite materials are considered. The analysis of experimental and theoretical studies of delamination and roughness in the workpiece during drilling is represented. The mechanism of occurrence of such defects and the current state of the problem of predicting their quantitative characteristics is described. The influence of different technological parameters on the reduction in the amount of defects, including delamination factor is analyzed.

Keywords: drilling defects, layered composites, roughness during drilling.

The analysis characteristic of two-stage information-measuring system of coordinate setting parameters of diamond grinding / A.F. Enykeev, F.M. Evsiukova, O.Iu. Prykhodko // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 26-31 – Bibliogr.: 3. – ISSN 2079-004X

It is offered of program motions of hardware systems to reduce time of processing time details and ensure the desired «quality class» of the surface smoothness. The development of architecture of information-measuring system is made on the basis of: methods of coordinate and digital control, the hierarchical principle, indirect measurements of roughness, and principles of decentralization and parallelization of processes of incoming information processing. It is built the mathematical models of interference of information-measuring system in a form of linear and harmonic linear stochastic processes. Devices of signal processing means are designed on the basis of minimizing of a quadratic quality criterion with using standard mathematical models of hardware means with a known delay. It is developed the application software and database, the schema of computer simulation of processes of transformation of information through data channels.

Keywords: hardware means, information-measuring system, indirect measurements, computer simulation.

The volume of the nanocluster and its depth under the action of ions of different energies, varieties and charges on the titanium alloy / G.I. Kostyuk , T.O. Postelnyk , O.M. Melkozorova // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149). – P. 32-38. – Bibliogr.: 18. – ISSN 2079-004X.

Researches volume values nanocluster and its depth, depending on the energy, charge and the type of ions (B^+, N^+, C^+, Al^+, V^+, Cr^+, O^+, Ni^+, Zr^+, Mo^+, Hf^+, W^+, Ta^+, Pt^+), which allows to determine the composition of the ions, their energy and charges for a desired nanostrutkur layer, and with the required density of the ion current estimate virtually all process parameters required for the layer thickness and the physical and mechanical characteristics of the titanium alloy.

Keywords: volume nanocluster, ions, the depth, the ion current density, titanium alloy, nanostructures.

Simulation of shock deformation of plates hemispherical drummer / S.S. Dobrotvorskyy, S.S.Gnuchih, L.G. Dobrovolska // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149). – P. 39-42. – Bibliogr.: 3. – ISSN 2079-004X.

Computer simulation of shock deformation process plates consisting of materials of different thicknesses, hemispherical drummer. The increased processing speed machine parts, protective design of machine tools need improving shock resistance, while reducing material consumption. Considered the problem of contact plate dynamic deformation at high speeds of the process. For high-speed deformation process took into account the dependence of physical and mechanical properties of the material level rate of deformation. Computer modeling process conducted specialized software package ANSYS in the module "Explicit Dynamics " based on the method kintsevyh- items at high speeds. Analysis of the data showed the benefits of multi-layer ceramic plates.

Keywords: mathematical modeling, finite element method, multilayer plate.

Conditions of high-performance grinding with an initial preload in the process system / F.V. Novikov, I.A. Ryabenkov // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149). – P. 43-46. – Bibliogr.: 6. – ISSN 2079-004X.

Analytically describes the variation over time of the cutting force, the material removal rate and the size of the elastic movement occurring in the process system, when grinding with an initial preload in the process system. It has been shown that these parameters decline over time processing, providing the required performance accuracy and quality of machined surfaces. Theoretically, it found that the intensity of the changes of technological parameters of processing time considered the scheme exceeds the elastic grinding circuit grinding. This indicates the efficiency of its use in the final stage of the grinding operation under low stringency processing system to provide high levels of precision machining. Examples of effective practical use of the grinding circuit. Thus, when machining holes with a diameter of 6 - 10 mm, rings of high hard magnetic alloys ANKO YuNDK and 3A-18 (HRC 62-63) transition from the rigid to the grinding circuit grinding circuit with initial preload in the processing system will reduce the processing time over 1.5

Keywords: grinding, the technological system, the initial tightness, precision machining, cutting force, the elastic displacement allowance.

The prodactuon of nanostructures under the action of pulsed laser radiation on steel / G.I. Kostyuk, V.N. Pavlenko, Yu. V. Shirokiy // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 47-52 – Bibliogr.: 9. – ISSN 2079-004X.

We considered the problem of action the effects of ionizing radiation on materials.

We solved the problem of heat conduction and joint thermo-elasticity. For a low-carbon and high-carbon steels obtained temperature fields in the case of pulsed exposure to ionizing radiation. Estimated rate of rise of temperature. As a criterion for the formation of nanostructures were taken as follows:

– The presence of heat in the formation of nanostructures (500–1500 K);

– Ensuring the growth rate of temperature higher than 10^7 K/s;

– Small dimensions, in which the temperature exceeds the allowable 1500 for no more than 2 times 10^{-7} sec. with (a slight increase in grain as a result of high temperatures, but not sufficient to reach the values of phase transformations).

For steels 20, 40, 45, 40X, U8 and U12 are obtained depending on the maximum temperature in the spot at a depth of 1 micron, depending on the time, which made it possible to find a treatment method: heat flux density and time of the action in which is possible to obtain nanostructures for all the studied materials. The examples of construction of spatio-temporal patterns of temperature fields that allow you to estimate the size of the zone where possible to obtain nanostructures by heat flux densities from 10^{10} to $3 \cdot 10^{10}$ W/m^2 and running times with $3 \cdot 10^{-7}$. It is shown that reducing the heat flux to $10^8 – 3 \cdot 10^8$ W/m^2 and time of action with $3 \cdot 10^{-3}$ sec. Can achieve substantially the same temperatures, but in this case, as shown

in the experimental work Antropova can produce micro (1.3–2 microns) submicron structures (0.7–0.9 microns), which is associated with the fact that the growth rate of temperature is of the ≈ 10^6 K/s, which does not allow its value to more than 10^7 K/s, which once again confirms the thesis of the need to meet these criteria.

In work zones nanostructures based heat flux on the time of its action, where there are restrictions on the maximum and minimum temperature, the rate of temperature rise and the possible destruction of the thermoelastic stresses.

All this allows you to find the technological parameters of pulsed laser radiation; heat flux and its duration when ensure the production of nanostructured layers.

Keywords: nanostructure, the laser radiation, steel.

Laws of formation of thermal process parameters for grinding / O. S. Klenov // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 53-56 – Bibliogr.: 6. – ISSN 2079-004X.

Analytical dependence for determining the temperature of the cutting, the depth of penetration of heat in the core and adiabatic heating time adiabatic rods, which presented a variety of removable allowance at flat grinding. It was found that over time, taking into account the processing of traffic along the adiabatic heat source rod at a constant speed, these parameters are increased, asymptotically approaching a certain constant values. At this time, the adiabatic heating rod less time of its contact with the grinding wheel, which involves reducing the temperature in the grinding of cutting as compared with the case where there is no movement of the adiabatic heat source along the rod. The calculation of the heat in the outgoing chip formed in the surface layer of the workpiece. It is found that with increasing temperature up to 1500 0C cutting adiabatic rod requires more heat than the chip formed and the temperature increases from 1500 to cut the maximum value - 2000 0C, conversely, more heat is generated in the chips out.

Keywords: grinding process, multipass grinding, cutting temperature, the thermal process, the adiabatic rod grinding depth.

Technological maintenance of accuracy and surface roughness of the processing of holes / F.V. Novikov, R.M. Minthev // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P. 57-60 – Bibliogr.: 4. – ISSN 2079-004X.

Reasonable terms to reduce the surface roughness of the hole through the use of internal grinding circuit with the location of the axis of rotation of the circle perpendicular to the axis of rotation of the hole. Calculations revealed that in this case, repeatedly increases the number of simultaneous abrasive grains participating in the formation of surface roughness, as compared with conventional internal grinding circuit - with the location of the axis of rotation parallel to the axis of rotation of the circle of the hole, which leads to a decrease in the surface roughness of the machined hole. Revealed regularities of processing errors hole at internal grinding and honing, due to the appearance in the technological system of elastic movements. Showing considerable technological capabilities honing holes in terms of improving the accuracy of processing is achieved by creating an elastic system in the construction of an abrasive tool - hone. The effectiveness of increasing the accuracy of the processing hole by using a flexible grinding wheel for internal grinding.

Keywords: Cutting a hole, abrasion, internal grinding, honing, hone, grinding mode, error handling, surface roughness.

Determination of the possibility of energy formation in grain receipt nanostructures in the case of existing ions of different varieties, charge and energy on structural materials / G.I. Kostyuk, A.V. Matveev, E.A. Volyak // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P.61-65. – Bibliogr.: 15. – ISSN 2079-004X.

The paper considers the possibility of estimating the energy requirements for crystallization, ie, the formation of the grain in the preparation of nanostructures in the case of actions of various kinds of ions, energy and charge. On the basis of quantum-mechanical approach, taking into account the Coulon repulsion of the ionic bond and found the energy of crystallization of the cluster. The number of particles in a cluster is calculated on the basis of joint decisions of the problem of heat conduction and thermoelasticity. It is shown that, by adopting the atomization energy equal to the energy of crystallization for light ions - this energy about energy ion current, whereas for heavy it is insignificant and can be ignored.

Keywords: energy crystallization, nanostructures, ions, nanocluster.

The productivity of magnetic-abrasive processing of end-cutting and axial tool on a rotary machines / V. Geichuk, V. Moseychuk // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P.66-72. – Bibliogr.: 20. – ISSN 2079-004X.

In the article the comparative analysis of productivity of magnetic-abrasive finishing on robotic machine tool with magnetic systems in the form of a "ring bath" of two types is given. First from them - magnetic system with a radial feeding and rotational polar tips on constant magnets, second - electromagnetic system with a face feeding and motionless polar tips. As a result of the researches it is defined, that the robotic machine tool which consists from a six-spindle rotor head and magnetic system of the second type possess the most productivity. Though magnitude of an auxiliary time is less in the robotic machine tool which consists of magnetic system of the first type and the singlex working block in a robot gripper. By the reserve of the heightening of productivity of machining is the rotor line on the basis of magnetic system with rotational polar tips and radial feeding. Preliminary studies illustrate, that the principal deficiencies of magnetic system with face feeding (in this case) is the coincidence of the motions of main cutting and transportation and also technical complexities of input-output of preforms into the ring bath.

Keywords: magnetic abrasive finishing, rotary machine, robot, tool axis, productivity.

Aspects of adsorption dryers for compressed air plasma cutting equipment./ S.S. Dobrotvorskyy, B.A. Aleksenko, L.G. Dobrovolska // Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P.73-77. – Bibliogr.: 3. – ISSN 2079-004X.

A practical experimental study of the influence of the quality of the compressed air used to form the plasma jet in the process of plasma cutting steel with an inactive gas. Due to the wide spread of technology of plasma cutting in modern industrial manufacturing technology is an indication ща needs to be improved in order to improve product quality and reduce production costs of the enterprise. The results showed the need for adsorption dryers in the process of preparing for air plasma cutting machines.

Keywords: plasma cutting, dryer, compressed air, moisture, adsorption, regeneration.

Improving the accuracy of machine tools based on numerical calculations of stiffness ellipsoids / V.B. Strutynskyi, V.M. Chupryna, O.Ia. Yurchyshyn// Bulletin of NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv : NTU «KhPI», 2015. – № 40(1149)-. – P.78-84. – Bibliogr.: 7. – ISSN 2079-004X.

Based on the tensor-geometrical approach to describe the stiffness of major machine tool subsystems the spatial rigidity model of its elastic system was made. The algorithm to find the static stiffness (compliance) of machine tool in any direction in three dimensional space was developed and the surfaces of static rigidity were built.

Keywords: metal-cutting machine tool, elastic system, subsystem, stiffness, tensor, spatial model.

Deposition of qualitative even-thickness vacuum-arc coating to hard-alloy cutting tool at treatment of large production sets / O. O. Baranov, G. I. Kostyuk // Bulletin NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv. : NTU «KhPI», 2015. - № 40 (1149). – P. 85-89. – Bibliogr.: 11. – ISSN 2079-004X.

A scheme of technological setup to deposit qualitative even-thickness vacuum-arc coating to hard-alloy cutting tool at treatment of large production sets on the large substrates with diameter up to 400 mm is described. Control of the plasma fluxes from the vacuum-arc source is provided by a set of

the plasma traps generated on a way of propagation of the plasma flux, while a magnetron discgarge is used for the ion cleaning and preliminary heating of the parts. The control magnetic fields are generated by a set of electromagnets installed under the substrate.

Key words: plasma-ion treatment, cutting tool, even-thickness coatings.

Using flow cavitation activators to improve the efficiency of coolant / A.V. Fesenko, V.D. Khytsan, N.P.Skydan // Bulletin NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv. : NTU «KhPI», 2015. - № 40 (1149). – P. 90-95. – Bibliogr.: 7. – ISSN 2079-004X.

The article provides a method for the activation of the coolant flow in the hydrodynamic devices, allowing to carry out intensive mixing and processing kvitantsionnuyu emulsions, both at the stage of its prigotov-tion, and during recovery. The analysis of the processes taking place during the passage of the flow through the left-shte kvitantsionnye mixers and attachments. Designed stand for the experimental study of steam-flow meters at constant energy input. An experimental study of flow faucets and kvitantsionnyh baits on the basis of which the installation is designed for cylindrical grinding machines, providing the production of homogeneous and fine emulsion.

Keywords: grinder, mixer, activation, pressure, flow rate, Kavitation, the hydrodynamic effect of coolant.

Analysis of modern layouts transfer machines with rotary-drum unit / A.A.Permyakov, Yu.V.Timofeev, I.E.Yakovenko // Bulletin NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv. : NTU «KhPI», 2015. - № 40 (1149). – P. 96-101. – Bibliogr.: 7. – ISSN 2079-004X.

In industrialized countries, the basis of production of highly technological equipment produced by aggregate-modular. The creation of high-performance multi-position modular machines involved a number of leading machine-tool companies, promising layout some of them are discussed in this article. A review of modern multi-position rotary indexing machines with horizontal axis of the workpiece transport during processing. Considered specifications, technological capabilities and features of the layout.

Keywords: rotary transfer machine, machine layout, rotary-drum unit.

Technological maintenance of rolling friction and sliding friction in gear boxes / A. A. Klochko, M. I. Gasanov, E.V. Basova // Bulletin NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv. : NTU «KhPI», 2015. - № 40 (1149). – P. 102-107. – Bibliogr.: 8. – ISSN 2079-004X.

The article considers the conditions of contacting spur gear and technological methods vozdeystviya in the formation of the involute surfaces of the teeth at which the slippage of the teeth of one gear relative to the tooth profile of the mating wheels and of the force of friction-slip. Loss of energy to friction in gears comes to 10% of the total energy loss to overcome friction. From gears energy loss occurs in the teeth due to their friction with the discrepancy of the accuracy of manufacturing gears according to the norms of kinematic precision, smoothness of norms, standards lateral clearance according to the requirements GOST-81 and feature of the tribological contact of involute mating surfaces. It is shown that for strength calculations of cylindrical gear wheels is necessary to consider in addition to dynamic loading and effort of rolling friction-slip in gears. In toothed cylindrical gears rolling friction much less than sliding friction, therefore, one of revolyuysii scientific fields is to reduce and minimize the phase slip of the mating involute profiles of gear wheels taking into account the changes of parameters of surface layer condition of teeth: roughness, waviness, hardness, physical and mechanical properties of material of gear wheels.

Keywords: tribology, contact, gear, technological vozdeystvie, formoobrazovanie, rolling friction-slip.

Performance and reliability research unit assembly "hydraulic units" in a computer-aided manufacturing / O.M. Shelkovoy, M.S. Martynov, O.V. Naboka // Bulletin NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv. : NTU «KhPI», 2015. - № 40 (1149). – P. 108-1012. – Bibliogr.: 7. – ISSN 2079-004X.

The analysis of existing problems and methods to increase productivity assembly units. To wit forgiveness productivity and automation units assembling the mathematical model of IMI-mutation modeling manufacturing systems assembly units. Forecast to increase productivity glass of providing units to 20% using a mathematical model of simulation modeling of manufacturing systems.

Keywords: drawing nodes, increasing productivity, mathematical model, simulation modeling of manufacturing systems.

Study of structural transformations and their effect on the surface layer when the grinding / M. S. Stepanov, A. A. Klochko, O. A. Antsiferova // Bulletin NTU «KhPI». Series: Technologies in mechanical engineering. – Kharkiv. : NTU «KhPI», 2015. - № 40 (1149). – P. 113-1016. – Bibliogr.: 8. – ISSN 2079-004X.

A fundamental factor of high durability hardened toothed wheels are an investigation of the stresses in the surface layer, is determined by the type and conditions of technological impact in the process of zabolevania. The influence of residual stresses on durability of gears depending on heat generated in the cutting zone and leads to the formation of tensile stresses, the change of hardness and structure. Cause structural stresses are volume changes in the cross section of the material caused by the transformation of austenite to smaller specific volume in the structure of the higher specific volume. Structural residual stresses in the surface layer of the toothed wheels with different schemes of zabolevaniya always appear in conjunction with thermal stress and causes the tensile stress, and at the core of compressive stress.

Keywords: soborovanie, the surface layer, technological exposure, tempered gear.