### THE TEORETICAL BASICS OF ANALYTIC SYSTEM MANAGEMENT FORMATION OF INNOVATION DEVELOPMENT IN REGIONAL SYSTEMS

S.V. Novoselov

*Article presents the approach to the theoretical description for working out of an analytical system of innovative development management, which considers a complex of indicators, parameters and factors defining an estimation of success of innovative activity in regional systems. It allows authors to develop models of an innovative potential estimation of innovative activity participants. On the basis of the analysis and ordering of their comparative estimation in the set boundary conditions projects, program, and development directions are formed.*

***Keywords:*** *innovative research, development.*

### FORMING EVALUATION OF THE INNOVATIVE POTENTIAL OF THE COMPANIES AND ORGANIZATIONS IN REGIONAL SYSTEMS ON THE BASE OF THE COGNITIVE MODELING

S.V. Novoselov, L.A. Kozlov

*The basics of the cognitive approach for evaluation and research of the innovative potential of the participants and that innovative activity in the regional conditions are given in article. Such approach let us to form a conception of the innovative development and create the models for evaluation of the local constituents/components of the analytical management system for the innovative progress / development of the companies and organizations in the given (regional) systems.*

***Keywords:*** *innovative research, development.*

## ***PART 1. THE PROBLEMS OF THE ELECTROSECURIT. MODERN TECHNOLOGIES AND ELECTRIC EQUIPMENT***

### A NEW LOOK AT HUMAN IMPACTS SAFETY IN THE CONTEXT OF OPTIMIZATION THEORY AND RISK

O.K. Nikolsky, T.B. Eremina, P.I. Semichevsky

*The system methodology of an estimation of safety, as functional properties of complicated systems, based on introduction of risk index is stated.*

***Keywords:*** *optimization, risk, assessment of damage, electrical accident, information, event trees.*

### THE ACCOUNT OF DOUBT OF SOURCE DATA AT ESTIMATE EFFECTIVENESS OF ELECTRICAL INSTALLATION SAFETY SYSTEMS TASKS

O.N. Drobyazko, S.F. Nefyodov

*Articles describes the algorithms what simulate the electrical installation safety state and the electrical installation fire safety state at doubt conditions of part source data.*

***Keywords****: electrical installation safety, safety systems, estimate effectiveness, doubt conditions of source data, simulated algorithms.*

### USE OF COMPUTER SIMULATION FOR EVALUATION OF ELECTROMAGNETIC RADIATIONS

N.P. Worobev, A.A. Soshnikov, E.W. Titov

*There are the results of computer simulation and measurement of electric field from a laptop «Toshiba» in the classroom; acknowledging the usefulness of modeling in the article.*

***Keywords****: Electromagnetic radiations, radiation source, computer simulation.*

### THE QUANTITATIVE ESTIMATE OF CONDITION OF ELECTRICAL SAFETY IN EDUCATIONAL INSTITUTIONS

A.A. Soshnikov, O. N. Drobyazko

*Authors view the task of the quantitative estimate of electrical safety conditions in educational institutions; the analysis of the interaction for people and electrical installations in indicated institutions. New simulation problems were described. The simulation algorithm and software were developed, what realizes the quantitative estimate of electrical safety condition.*

***Keywords****: electrical safety, educational institution, estimates of condition of electrical safety.*

### THE FOUNDATIONS OF PROGRAM MAINTENANCE BUILDING FOR ESTIMATE EFFECTIVENESS OF ELECTRICAL INSTALLATION SAFETY SYSTEMS AT DOUBT CONDITIONS.

S.F. Nefyodov

*Author formulates the requirements of software structure what realizes an estimate effectiveness of electrical installation safety systems at doubt conditions of part source data.*

***Keywords****: electrical installation safety, safety systems, estimate effectiveness, doubt conditions of source data, software.*

### PRINCIPLES OF SECURITY IN RURAL SETTINGS

T.B. Eremina

*Methodological bases of system research of electro installations safety in agriculture for the purpose of solving modeling and optimization problems are stated.*

***Keywords****: system to ensure electrical safety, system structure and functional communication, performance indicator.*

**CHALLENGES AND KEY ISSUES FOR IMPROVING SYSTEM SAFETY DISCONNECTION IN ELECTRICAL INSTALLATIONS**

P.I. Semichevsky, T.B. Eremina

*Authors gives the result of work on the installation of protective devices within a multitude of domestic and commercial constructions that work with the main electricity network, which were held at Altai State Technical University for many years.*

***Keywords**: circuit breaker, the principles of building systems, electrical protection, regulatory framework, full-scale experiments.*

**INTEGRAL INDEX OF FIRE DANGER OF SHORT CIRCUITS IN ELECTRICAL INSTALLATIONS OF BUILDINGS**

A.A. Soshnikov, S.A. Soshnikov

*It is offered to make a choice of protection against short circuits taking into additional of fire safety.*

***Keywords**: Short-circuiting, fire danger, quantification.*

**POWER TRANSFORMERS DIAGNOSTICS RELIABILITY RISING ON THE BASIS OF SPECTRAL ANALYSIS OF ONE VOLTAGE PHASE WINDINGS TRANSIENT PROCESS PARAMETERS**

A.A. Gribanov

*This article states the simulation of damped wave processes in power transformers windings during low-voltage pulses method diagnostics. Mathematical apparatus for diagnostic parameters values analytical estimation by the configuration known parameters is presented. Diagnostics informatively and reliability advantages of spectral analysis application of the winding damped wave process curve during test signal injection are shown.*

***Keywords**: power transformer, winding, diagnostics, damped wave process, spectral analysis.*

**PROBABILISTIC ASSESSMENT OF ASYNCHRONOUS MOTORS INSULATION DIAGNOSTICS METHODS INFORMATIVITY**

T.E. Godetskaya, A.A. Gribanov, O.I. Khomutov, S.O. Khomutov

*The article shows the information theory application for asynchronous motors insulation diagnostics informativity quantitative characteristic when using various diagnostic methods and parameters. The tasks of collecting information on the whole electrical insulation system condition based on its certain element data are presented. Electrical insulation system element diagnostics possibility when measuring parameters characterizing its other element is estimated. Statistical investigations results on reliability of data received by means of various electric motors insulation diagnostics methods are given.*

***Keywords:** asynchronous motor, insulation, diagnostics.*

**MATHEMATICAL MODELS FOR ELECTRICAL EQUIPMENT INSULATION TECHNICAL CONDITION FORECASTING**

L.A. Gutuv

*Ageing of electrical equipment insulation mathematical models for its condition forecasting and common approach to their organization are stated in the article. Classification and analysis of existing models and methods for insulation reliability and technical condition forecasting are presented. The model general description, its input and output parameters are given; their selection criteria are stated.*

***Keywords**: mathematical model, forecasting, insulation, electrical equipment, classification, dynamic stochastic model.*

**SINGULAR SPECTRAL ANALYSIS AS ELECTRIC LOAD SIMUATION METHOD**

E.O.Martko, I.V.Belicyn

*Probabilistically based electric load simulation approach is suggested. Singular spectral analysis is taken as a simulation method. The article outlines its algorithm and basic features. Power consumption forecasting is performed as a practical example, forecast results comparison is made, and recommendations are given on singular spectral analysis method application for power consumption simulation and forecasting.*

***Keywords**: simulation of electric loading, Singular Spectrum Analysis, the likelihood approach, a time number, power consumption forecasting.*

**TO THE ISSUE OF TECHNICAL AND ENGINEERING EMPLOYEES TRAINING IN ELECTRICAL POWER ENGINEERING**

A.N. Popov, D.S. Aparin, V.A. Seriakov

*The article presents the electrical power engineering work efficiency in different historical periods where human factor is an indispensable characteristic. IT-simulators application is suggested for personnel training in order to avoid technological failures.*

***Keywords**: teaching, advanced training, training simulator, computer simulation.*

**ELECTRIC MOTORS RESIDUAL LIFE PREDICTION BASED ON VIBRODIAGNOSTICS**

V.A. Ribakov

*The author examines problems of used electric motors vibration diagnostics in agriculture. It is shown that each type of defect generates its own frequency of oscillations. Motors vibration measurements for the*

*4 years observed period were shown to a table. Estimates of electric motors residual life formula is derived.*

***Keywords**: vibration diagnostics, vibrating gauges, electric motor, defects in electrical motors, rotor, stator.*

**SEED PRESOWING MEANS TREATMENT METHOD USING ELLIPTIC ELECTROMAGNETIC FIELD**

R.S. Starukhin, I.V. Belicyn, O.I. Khomutov

*The article shows the problems dealing with seed presuming treatment for germination ability increase. A review is made on physical factors, modern methods and technical means enabling seed grain influence. Commercial frequency electromagnetic field created by power transmission lines application for seed grain treatment is suggested, and mathematical model for rotating electromagnetic field parameters determination is presented.*

***Keywords**: seed treatment methods, elliptic electromagnetic field, germination, crop yield, seed germination energy, seed presuming treatment, seed treatment installations, electric field polarization level.*

**METHOD OF DEFINITION OF THE RESIDUAL RESOURCE OF THE ELECTRIC MOTOR**

V.I. Stachko, A.A. Fefelov, I.U. Polomoshnov, V.O. Sitnikova

*Article is devoted to automation of diagnostics process of electric motors. The measuring device offered by authors is based on use of a method of definition of a residual resource of the electric motor. It takes temperature of the engine and counts up number of its start-up. Further the method is refers to calculation of service life of isolation of the electric motor on the basis of data about quantity of transients and temperatures of the case. In clause calculations, a circuitry of the instrument and algorithm of its work are resulted.*

***Keywords**: diagnostics, the electric motor, insulation, the measuring device, the microcontroller, a computer.*

**NEW METHODS AND TECHNICAL MEANS OF ELECTRIC MOTORS DIAGNOSIS IN AGRO-INDUSTRIAL COMPLEX**

S.O. Khomutov, J.A. Tonkih, V.S. Dronov

*Article is devoted to one of the most effective measures for the electric motors efficiency maintenance, namely the use of operated in agriculture electric motors modern methods of diagnostics. The article reflects the influence of various factors on the technical condition of electric motors stator windings insulation. At the same time it is proposed to use methods based on analysis of the electric machine magnetic field in the air gap parameters and the use of wave damping oscillations in the winding to assess the engines state. The result of the study is to create a single set of diagnostic tools, which, excluding the shortcomings of different methods allowed to evaluate the electric motor state at all stages of its life cycle. In addition, the authors proposed a system for collecting diagnostic data with online forecasting and assessing the electric motors residual life.*

***Keywords:** diagnostics, the electric motor, insulation.*

**HUMAN RESOURCES MANAGEMENT AS ONE OF THE MOST IMPORTANT COMPONENTS OF THE CORPORATE MANAGEMENT SYSTEM AT POWER ENGINEERING ENTERPRISES**

A.N. Popov, O.L. Nikitina

*The issues of labor payment rate setting at power engineering enterprises as a compulsory component of the corporate management efficient system development are considered in this article. The problems of labor motivation and human resources management in the production process, labor rate and incentive setting and labor intraindustry relations as well are investigated.*

***Keywords:** corporative management, labor motivation, human recourses management, electric power industry.*

**THE MODEL OF THE INTERACTION OF ACOUSTIC SIGNAL AND THE ISOLATION TO AGING OF IMMOVABLE PART OF ELECTRIC MACHINE**

G.V. Sukhankin, N.T. Gertsen

*It is known, what model of object, process or phenomenon presents mathematical regularities, with the help of which the main characteristics of modeled object, of process or phenomena are described. The purpose of the model creation is the simplification of real object or phenomena, accentuation main, not being called on parts. In this article foreground is distinguished and the connection of the attenuation of acoustic wave and the degrees of aging of the isolation of electric machine (EM) is investigated. That simplification is lawful presented, because truth results go along with experimental data.*

***Keywords:** model, isolation, acoustic wave, electric machine, the coefficient of transfer.*

## ***PART 2. MECHANICAL ENGINEERING***

**LIKELIHOOD METHODS OF DURABILITY CALCULATION OF EQUIPMENT'S DETAILS**

V.S. Popovich, T.P. Savchenko

*The algorithm of calculation method is presented. Here are the Results of processing oscillogram, received at extensometer of cranked shaft of a six-cylinder diesel engine. The analysis of intensity of elements of a cranked shaft at use of the given method is resulted .*

***Keywords:** a cranked shaft, the engine.*

## MATHEMATICAL MODELLING OF DYNAMIC PROCESSES OF CRANKSHAFT OF THE INTERNAL COMBUSTION ENGINE

V.S. Popovich, I.B. Alievskaya

*The mathematical model for the description of dynamic processes of torsion fluctuations of cranked shaft of engines is offered. Authors give the Examples of the received models and settlement parameters results of elastic equivalent torsion systems.*

***Keywords**: a cranked shaft, the engine, shafting.*

## EXPERIMENTAL RESEARCHES OF COVERINGS DETERIORATION FROM COMPOSITE CERAMIC MATERIALS

A.A. Sitnikov, M.E. Tatarkin, D.M. Skakov

*Use for sputtering composite powders allows receiving a wide spectrum of coverings with various properties. For coverings with various percentage the contents of a metal matrix models for calculation of the weight deterioration, considering district speed are received at friction, loading and structure of a covering.*

***Keywords:** coverings, weight deterioration*

## ELASTIC CONTACT DISPLACEMENT IN RIVETS CONNECTIONS AT DINAMIC LOADING

A.A. Maksimenko, A.D. Perfileva

*Research of contact interaction between conventionally immobile junctions in dynamic operation conditions has been called forth by ever growing demands for combating against economic losses incurred by friction. The objective of the present report is examination of the regularities in conduct of an elastic contact under compound shock loading and vibration loads. The examination is orientated towards refinement of the processes of contact deformation in the given state as well as towards getting calculating formulas to describe the phenomenon in question.*

*So we suggest evaluating normal and tangential contact rigidities of the joints in dynamic operation conditions. All these magnitudes determine by means of method, described at the beginning report.*

***Keywords:** elastic contact, dissipation mechanical energy, contacts normal and tangential oscillation, conditionally nonmoving area.*

## DYNAMICS OF SOLID INTERACTION WITH THE PRESENCE OF LOCAL PLASTIC DEFORMATION IN THE CONTACT ZONE

H.V. Koteneva, A.A. Maksimenko, H.V. Perfileva

*Article presents the physical and mathematical model of rigid smooth sphere introduction in a homogeneous elastic-plastic strengthened solid at influence a dynamic loadings in a normal direction.*

***Keywords:** contact durability, loading.*

## THE DETERMINATION OF A GLOBAL KINETICS OF DIESEL FUEL BY A NUMERICAL SOLUTION OF INVERSE TASK OF THE DYNAMICS OF SPONTANEOUS IGNITION IN DIESEL

A.P. Senachin, A.A. Korzhavin, P.K. Senachin

*The article presents the results of the study of a global kinetics of a model diesel fuel on the basis of the mixture of n-hexadecane and 1-methylnaphthalene by a numerical solution of inverse task of the dynamics of spontaneous ignition of fuel-aerial diesel torch. The analysis is based on the experimental data on the delay of fuel ignition obtained at laboratory single-cylinder plant and physics-chemical model of spontaneous ignition of a local volume containing some amount volume containing some amount of fuel steam during ad pressure in the conditions of diesel and in the limits of the task of a dynamic thermal explosion.*

***Keywords:** diesel; dynamics of spontaneous ignition; delay of fuel ignition; global kinetics; numerical solution; of inverse task.*

## DOUBLE FUEL INJECTION IN THE DIESEL ENGINE WITH DIRECT ACTION FUEL SYSTEM OF DIVIDED TYPE

A.E. Svistula, G.D. Matievsky

*The results of experimental research of two-single fuel injection in the diesel engine with direct action fuel system of divided type are given. Optimum parameters of two-phase fuel injection are determined, it is attained a reduction of the fuel consumption - 4 %, speed of cylinder pressure increase - 25 %, the maximal combustion pressure -10%, emission of nitric oxides - 40 %, soot - 30 %.*

***Keywords:** diesel engine, double fuel injection, fuel system, carburetion, working process, nitric oxides, soot.*

# ***PART 3. PERSPECTIVE MATERIALS AND TECHNOLOGIES IN THE FIELD OF MATERIALS TECHNOLOGY***

## NEW CATALYTIC SYSTEMS FOR SYNTHESIS-GAS PRODUCTION WITH CARBON DIOXIDEREFORMING OF METHANE

L.A. Arkatova

*Dry reforming of methane was carried out over $Ni_3Al$-containing catalysts. A series of catalysts are prepared by self-propagating high temperature synthesis was investigated using a wide variation of constituent contents. The catalysts were obtained with combustion method at the highest burning velocities. It was found that they have the highest activity (conversion of $CH_4$ and $C0_2$ achieved 98-99%). Formation of carbon deposition and their morphological features in the process of methane dry reforming on a $Ni_3Al$ catalyst were studied. It was shown that the initial structure of a sample was retained during the reac-*

*tion, and the formation of carbon deposits did not significantly decrease the catalytic activity of $Ni_3Al$-system for 24 hours. The intermetallides on the base of nickel are active catalysts for dry reforming of methane.*

***Keywords:*** *$CH_4$-$C0_2$ reforming, Self-propagating High Temperature Synthesis, Intermetallides, Synthesis gas, Carbon Deposition.*

## PHASE COMPOSITION OF THE CATALYST BASED ON NIKEL ALUMINIDE SELFPROPAGATING THERMOSYNTHESIS AND ITS MODIFICATION WITH TEMPERATURE

L.A. Arkatova, A.N. Shmakov, M.R. Sharafutdinov

*X-ray diffraction experiments on phase composition of carbon dioxide methane reforming catalyst based on nickel aluminide self-propagating thermo synthesis product and its modification with temperature under reaction conditions were carried out. The catalysts were found to consist of phase mixture of intermetallic compound, solid solution of aluminum in nickel and metallic nickel. During the reaction the phase composition of catalysts does not change essentially. With long time of reaction the samples are saturated with carbon and graphite appears on the catalyst surface leading to its deactivation.*

***Keywords:*** *catalyst, intermediate constituent.*

## APPLICATION NANODIAMONDS IN LUBRICANT COMPOSITIONS- THE EFFECTIVE WAY OF INCREASE OF CONTACT DURABILITY OF BEARINGS

L.N. Obraztsov

*Probe on influence studying nanodiamonds, containing in bearing lubricant, on its contact durability is conducted. It is shown that addition nanodiamonds in base lubricant of bearings in small concentration reduces a roughness of paths bearings by 30 %, and quantity of defects - on 40 % that allows to increase considerably durability of bearings качения. It is established that use nanodiamonds as additives probably not only to plastic lubricants but as to oils and coolant that does their application multiple-purpose for many kinds interface.*

***Keywords:*** *nanomaterial, rolling bearing*

## FEATURES OF INITIATION SVS BY DISPATCH-WAVE IMPACT

I.V. Saikov, I.B. Pervuhin, A.S. Rogachev, O.I. Pervuhina, A.E. Grigirjan

*The questions linked with features of initiation of self-spreaded high-temperature synthesis (CBC) by is shock-wave effect, and perspectives of joint application of these techniques for deriving of ceramic- metal composite materials, and also in the technician of a special purpose are examined. Criteria of steady initiation CBC in system on the basis of Ti+B are determined at explosive effect on flat and cylindrical ampoules of preservation with an estimation of degree of completeness of response of synthesis on structure and structure of finite products. The expediency of use of mechanical activation of svs-structures for simplification of shock initiation of chemical interaction is displayed.*

***Keywords:*** *High-temperature synthesis, burning reaction.*

## ESTIMATION AND FORECASTING OF STRUCTURE AND PROPERTIES OF WELDED JOINING FROM HIGH-STRENGTH BAINITE CLASS STEELS

M.N. Seidurov, E.A. Ivanaiskii, A.A. Ivanaiskii

*Article presents the technique of an estimation and forecasting of structure and properties of high-temperature sites of thermal influence zone of welded joining from high-strength binate class. It is shown that on formation of cold cracks important influence is rendered by features of course of intermediate transformation at which in the conditions of thermo deformation influence on metal occurs origin of the centers of the slowed down destruction.*

***Keywords:*** *high-strength steels, weeded joining.*

## FORMATION AND DESIGN OF $Zr0_2$ INTERPHASE FOR SiC/SiC COMPOSITES

A.V. Utkin, A.A. Matvienko, N.I. Baklanova, N.Z. Lyahov

*The aim of this work was the research and development of the tetragonal zirconium dioxide interfacial coating on silicon carbide fiber, the study of effect of interphase on properties both fibers and composites; the optimization of interphase properties in composite.*

*It is shown that bonding between fiber and a matrix in SiC/SiC composite can be controlled by tailoring of the interfacial layer quantity. The developed approach allows optimizing the mechanical properties of a composite, so it can be used for the development of various ceramic composites. Owing to possibility of scaling and continuous carrying out of the process, the given way can be included to existing technological schemes of composite manufacture without severe changes.*

***Keywords:*** *composite, front-end coverings.*

## THE DEVELOPMENT OF TECHNOLOGICAL DEMANDS FOR THE GAS POWDER CLADDING PROCESS FOR THE SPESIAL BOILERS

M.V. Radchenko, Yu.O. Shevtsov, V.G. Radchenko, S.G. Uvarova

*The results of coatings properties investigations, made by gas powder cladding process and technological demands as well, are presented in the article.*

***Keywords:*** *Subsonic gas powder deposition, operational properties of sheeting's, coppers with «a boiling layer».*

**PROPERTY PREDICTIONS OF COATINGS, MADE BY GAS POWDER CLADDING PROCESS, BASED ON REGRESSION ANALYSIS**

Yu.O. Shevtsov, M.V. Radchenko, S.A. Mankovsky, S.G. Uvarova, T.B. Radchenko

*Optimum technological parameters of supersonic gas powder cladding process were obtained due to regression analysis. It was used for improving of coatings quality for the special boilers.*

***Keywords:*** *Mathematical modeling, regression analysis, a method of the least squares, subsonic gas powder deposition, operational properties of sheeting's, coppers with «a boiling layer».*

**THE PROCESSES DURING FORMATION WELDED WITH-UNIFICATION AT WELDING BY EXPLOSION**

A. A. Berdichenko

*Authors study the processes occurring at formation of structural multifocal uptake welded connection " titanium+ titanium", received welding by explosion. It is revealed that for formation of qualitative connection it is necessary to create a condition at which course of process dynamic the recrystallizationis possible. Welding on the raised modes leads to occurrence in welded connection to chemical heterogeneity which reduces plastic properties welded with-unification. Which reason of occurrence is saturation of metal of vertical zones by oxygen and air nitrogen.*

***Keywords:*** *welding, metal.*

**THE DEFECTS ARISING AT CLADDING OF LARGE-SIZED SHEETS OF THE TITAN, THE REASONS OF THEIR OCCURRENCE AND THE WAY OF ELIMINATION**

A. A. Berdichenko, L.B. Pervuchin, O.L. Pervuhina

*Article gives the reasons of quality instability of large-sized sheets of bimetal «steel + titanium», received by explosion welding. It is shown that decrease in durability of titanic layer welding with steel removal from the beginning of process of welding occurs in connection with interaction warmed shock wave, moving before a line formation welded connections on volume between welded surfaces, the titan with oxygen and air nitrogen. Application as atmosphere of welding of inert gases of argon or helium allows to receive sheets of bimetal of the industrial sizes with permanent high quality on all area of sheets.*

***Keywords:*** *explosion welding, bimetal sheets.*

**PLASMACHEMICAL UPDATING OF THE SURFACE CARBON FIBRE**

E.S. Ananiva, S.V. Ananin

*Research of components adhesion in coal-plastic, depending on various methods of surface updating at manufacturing and operation PKM promotes the decision of creation of high-strength constructional appointment composites. The major problem in the field of creation and application of the reinforced plastics, is perfection of methods of surface processing fibrous stuff, studying of a finding of possibilities correlated dependences of durability of KM at most adhesive interaction on the regularity basis physical and chemical interaction of components of plastic.*

***Keywords:*** *fibrous stuff, plastic, coal-plastic, carbon fibers.*

**PROSPECTS OF coal-plastic APPLICATION OF THE COMBINED FILLING IN THE AEROSPACE TECHNICS**

E.S. Ananiva, V.B. Markin

*The combination in a material binding, modified carbon nanoelements and carbon fibers with the processed surface, allows increasing durability of fibrous composites. Creation of composites with combined stuff is a perspective direction of workings out of the new filled polymeric materials. Composites of the combined filling can be applied as bases of constructional elements in aircraft construction to the military aviation technics and for civil aircraft, i.e. in those areas where the optimum combination of durability is required, to firmness to destruction and weight.*

*At introduction carbon nanoelements in a range of the mass maintenance from 0,1 to 0,25 following characteristics of epoxy binding: durability at compression (on 11-55 %), shock durability (on 30-50 %), the dynamic module of shift (on 27-48 %). The Clodbinirovannoe filling (black-reinforced plastic on a basis epoxy binding is modified thy carbon nonsolid's and carbon fibers leads to increase in properties of a composite: durability's black-reinforced plastic on a stretching in 1,5 times, shock durability on 18 %, shift durability to 40 %. Change of the dynamic module of shift, rate structural uniformity and dissipative characteristics composite a composite material is observed.*

***Keywords:*** *nanoelements, composite materials.*

## ***PART 3. ECOLOGY***

**THE RADIO CAESIUM MAINTENANCE IN THE BASIC FOODSTUFF IN THE REPUBLIC ALTAI POPULATION'S MENU**

E.V. Valtseva, N.A. Meshkov

*Gornui Altai directly borders to Kazakhstan and China – the countries where tests of nuclear devices were conducted. The radioactive products formed as a result of explosions, with a stream of air weights, which were introduced on highland territory repeatedly. The long-living isotopes of radioactive elements found out now, in particular, caesium-137 can be acknowledgement of radioactive pollution of territory of region.*

*Authors carried our the research of ways of caesium-137 receipt in an inhabitants organism of territories, which were influenced of radioactive pollution to nuclear tests for Semipalatinsk range. It is established that in Republic Altai and in Altay territory specific*

*activity in bread decreased gradually to 0,07-0,11 Bk/kg. Average specific activity 137Cs in a potato in the studied period is 0,04-0,11 Bk/kg. The first place under the contribution to annual receipt 137Cs in an organism of adult inhabitants of Republic Altai occupied meat (60 %), on the second place – milk (22 %). The receipt of radionuclide's in an organism on a chain "soil – plants – an organism of animals – a human body" has essentially decreased or in general is absent.*

***Keywords:*** *radiation, radio cesium, an inhabitant's organism.*

**HYGIENIC ESTIMATION OF CONSEQUENCES OF RADIOACTIVE ENVIRONMENTAL CONTAMINATION FOR POPULATION HEALTH**

N.A. Meshkov, E.A. Valtseva, A.V. Puzanov, S.I. Ivanov

*The problem of an estimation of ways of receipt of radioactive substances in a human body and their contribution to a total dose of an irradiation to regions, subject to radiating influence owing to nuclear tests and radiating failures is revealed, continues to remain actual. The comparative hygienic estimation of consequences of radiating influence in territories, subject to radioactive pollution owing to failures, accidents or other incidents which included an estimation of a dose of an external and internal irradiation (at the expense of receipt in an organism radionuclide's, containing in foodstuff and an inhaled dust), and also calculation of risks of the remote consequences for population health is spent.*

***Keywords:*** *radiation, a human body, environment.*

**THE INFLUENCE OF FIRM PRODUCTION WASTES ON THE MAINTENANCE OF TOXIC COMPONENTS IN UNDERGROUND WATERS**

M.I. Panina

*Research of waters of underground chinks is carried out in the areas of industrial wastes stores on the maintenance of chemical elements, correlation communication between chemical elements of water is investigated and its ecological estimation is given.*

***Keywords:*** *underground waters, firm production wastes.*

**THE COMPLEX DEVICE FOR FERMENTATION, DISINFECTING AND DEHYDRATION OF DEPOSITS OF SEWAGE**

P.V. Stepanova, V.M. Ivanov

*Researches about possibility of processes fermentation (stabilization) combination, dehydration and disinfecting of deposits of city sewage are conducted. Installation is developed for complex processing of deposits and optimum working parametres are picked up. The processed deposits can be utilised in agriculture as ecologically safe effective organic-mineral fertilizers.*

***Keywords:*** *a crude deposit, superfluous active silt, stabilisation, fermentation, dehydration, disinfecting, the automated device, the first fermentation reactor, a electrified latch, complex processing of deposits, gelmints, ovicid preparation, a flocculant, biogas, organic-mineral fertilizers.*

**METHOD OF CALCULATION OF FLOWING PART OF AXIAL GIDROTURBINE NEW ORIGINAL CONSTRUCTION**

V.M. Ivanov, T.U. Ivanova, E.P. Zhdanov, G.O. Kleyn, V.N. Urenkov

*The method of calculation of flowing part of axial (by a propeller) hydroturbine, basic concepts, determinations and description of axial (by a propeller) hydroturbine, is in-process resulted.*

***Keywords:*** *axial hydraulic turbines, design, methodology, calculation.*

***NEW PERSPECTIVE QUALITY MONITORING OF QUALITY***

**OPTICAL MEASUREMENT METHOD OF THE OBJECTS' QUALITY BASED ON DECOMPOSITION OF THE IMAGE IN THE BRIGHTNESS HISTOGRAM WITH USE A PRINCIPLE OF RECEPTIVE FIELDS**

Y.A. Zrumov, S.P. Pronin, A.A. Dorenskii

*Article presents the universal decomposition in the histogram of brightness with use a receptor. The received method is used for devices of optical quality assurance of objects on the conveyor.*

***Keywords:*** *opto-electronic systems of quality control, brightness histogram, receptive fields, image processing.*

**ABOUT DEFORMATION OF THREADED CONNECTION OF AXIAL ITERATIVE LOADING**

V.I. Maksak, Ed.B. Tskhai

*On the basis of experimental researches with the use of original gauges the results of deformations of threaded connection including the mechanism of self-unscrewing are given in the paper.*

***Keywords:*** *carving connection, the size of a nut, bolt.*