**Abstracts**

**Drokonov A.M., Drokonov A.E.** **Increased efficiency of low pressure cylinders of steam turbines.** This article includes reduction methods of aerodynamical loss in stages with high divergence of steam turbines.

**Key words:** steam turbine, low pressure cylinder, turbine stage, efficiency, vibroacoustic activity.

**Evtukh E.S., Sakalo V.I. Influence of rail joints on contact fatigue damage accumulation in railway vehicle wheels.** The statistical data about rail joint gaps aregathered, their law of distributionis established. The improved solution for determination of impact force arising when a carriage wheel rolls over a rail joint is provided. Methodology of estimate of contact-fatigue durability of a wheel is given. Influence of rail joints on contact-fatigue damage accumulation in railway rolling stock wheels is evaluated.

**Key words:** rail joint, law of gap size distribution, impact force, damage accumulation, contact-fatigue durability.

**Keglin B.G. Kravtsov S. A. Boldyrev A.P. Development of mathematical models and calculation of the characteristics of polymer shock absorbers.** The experimental research of polymer elements is performed. The power characteristics of polymer elements of different shapes and sizes are calculated. The behavior of polymer elements of different configurations is studied. New structures of elements are developed, significantly improving efficiency and energy absorption capacity of cushioning unit.

**Key words**: railcar cushioning unit, thermoelastoplast, stress-strain state, energy absorption capacity, fullness coefficient, polymer element, initial tightness.

**Kobishanov V.V., Antipin D.Ya., Rasin D.U., Shorohov S.G. Development of structural measures to increase passive safety of domestic passenger cars.** Analysis of the safety body of the domestic passenger car accident longitudinal collisions. Proposed design solutions to improve its passive safety. Methods of mathematical modeling evaluated the effectiveness of the proposed measures.

**Key words:** passive safety, passenger car, energy absorbing element, mathematical modeling, safety system, finite element method.

**Lagerev A.V., Tolkachev E.N. Research of suspensionmotion discrete section of a special conveyor with suspended belt and distributed drive using single-mass dynamic model.** Single-mass dynamic model of discrete section of a conveyor with suspended belt is developed. The conditions at which a drive roller of suspension is moving without slipping are formulated. The design parameters of suspensions form the fulfillment of the received conditions are evaluated.

**Key words:** conveyor with suspended belt, discrete section, slipping, single-mass dynamic model, suspension.

**Lozbinev V.P., Mikhalchenko G.S., Sakalo V.I. Definition permissible length  initial processing of crack  defects in bearing elements of the car body.** Based on the theory of fracture mechanics developed a method of calculating the permissible length of the initial processing of cracks in load-bearing elements of cars. A method is proposed to ensure the survivability of car bodies.

**Key words:** crack, fracture mechanics , the allowable crack length.

**Lozbinev V.P., Lozbinev F.U. , Fedayaeva G.A., Mikhalchenko G.S. Gradient algorithm optimization method of bearing elements of body cars.** Describes thealgorithmof the gradient optimization method, convenientforparametricandstructural optimization of car bodies bearing systems. A procedure for the analysis of the optimal variantforthe global optimum.

**Key words:** carrier system optimization, the objective function, the gradient method, algorithm, global optimum.

**Makarov G.N., Malinkovich M.D., Shnyrikov I.О., Gorlenko O.A. Dynamics of cylindrical gear.** Consider the process engagement in the cylindrical gear as a process of self-oscillations, which occur under the influence of quasi-elastic dynamic forces. Fluctuating surface layer of the teeth can be viewed as a shock absorber, which appears as a result of the adaptation of teeth to the contact conditions. Make recommendations for mitigation action of forces.

**Key words:** gear transmission; superficial layer; dynamic force; engagement.

**Lozbinev V.P., Lozbinev F.U.,** **Mikhalchenko G.S., Sakalo V.I. Analysis of the convergence of the iterative process of optimal design car bodies.** The analysis of the number of iterations required to obtain the optimal variant of the support system of the car body and the complexity of evaluation of the optimization process.

**Key words:** optimization method, the iterative process, the convergence process, the number of iterations.

**Rybkin N.N., Zernin M.V. Techniques of estimation of hydrodynamics parameters of sliding bearings with the influence of the radial surface suppleness.** Describes the second version of software complex BBFEM (Bearing Builder Finite Element Method) which includes a new module of radial surface suppleness. This article presents examples of calculations of hydrodynamics parameters of sliding bearings with different models of suppleness.

# Key words: slider bearing, hydrodynamic parameters, finite element method, radial surface suppleness, Winkler’s foundation hypothesis.

**Sakalo V.I., Evtukh E.S., Agapov D.G. identification of parameters of antihunting in system «wheel-railway track».** The laboratory facility for investigation of oscillation in the system “wheel-railway track” is worked out. Stiffness of ballast bed and extinction coefficient of oscillation is determined using it. Identification of the extinction coefficient of oscillation is carried out by means of comparison of oscillation oscillogram obtained by experimental way and using computer model of facility.

**Key words:** ballast bed, elastic-dissipative characteristic, stiffness, extinction coefficient of oscillation, computer model, identification of parameter.

**Sakalo A.V., Sakalo V.I., Tomashevsky S.B. Influence of temperature stresses on contact fatigue damage accumulation in locomotive wheel.** The methodology of accounting of influence of temperature stresses appearing in railway vehicle wheels in the time of shoe braking on contact fatigue damage accumulation is developed. The methodology is carried out programmatically in module Rolling Contact Fatigue of calculation complex “Universal Mechanism”. Application of the methodology is shown on calculation of damage in electric locomotive wheel.

**Key words:** temperature field, temperature stresses, contact fatigue damage, accumulation of damage, shoe braking.

**Strebkov A.S., Zhavrotskiy S.V. Assessment of electric energy production efficiency when using power potential of fuel gas.** Thermodynamic aspects of using of gas steam power potential are considered on various modes of gas consumption. It is established that energy efficiency of electricity generation is comparable to indicators of thermal plants turbine units when replacing throttle regulators with utilization turboexpander units. It is shown when seasonal change of gas consumption takes place work indicators of utilization turboexpander unit in many ways depend on an optimum choice of its nominal parameters.

**Key words:** energy efficiency, fuel gas, utilization turboexpander unit, variable operating mode, difference of pressures, Joule-Thomson effect, specific warmth expense, electricity generation.

**Tikhomirov V.P., Gorlenko O.A., Izmerov M.A., Prokofev A.N. Mechanics of contact interaction of the flat wavy surfaces.** To ensure the quality of the unmoved of disconnection mechanical seal has developed a model of leak-proofness, which includes the modeling wavy surfaces, estimation of parameters of contact and determination of percolation of the sealed environment through the gap.

**Key words:** tightness, sinuosity, leak, consolidation, mechanics of contact interaction.

**Totay A.V., Gorlenko O.A., Fedorov V.P., Prokofev A.N. Nitrogen microalloying of constructional materials surfaces at finishing techniques with cbn (cubic boron nitride) tools.** Theoretical and experimental researches of mass transfer phenomenon when processing steel and cast-iron with cutters of composite 10 have been conducted. Nitrogen saturation effect of a surface layer has been established, that expands opportunities of process management of precision friction couples early-failure period.

**Key words:** Auger spectroscopy, chemical diffusion, compositional superhard materials, surface substructure.

**Fedonin O.N., Steposhina S.V., Prokofev A.N. Assess the range of applicability of the existing dependence for calculating power provided finishing, finishing strengthening and hardening of SPD.** The experimental verification of the applicability of existing ranges to calculate the dependence of force, providing the finishing, finishing and reinforcing and strengthening processing surface plastic deformation.

**Key words:** surface plastic deformation (SPD), finishing, finishing strengthening and hardening machining [conditions](http://www.multitran.ru/c/m.exe?t=408723_1_2&s1=%F0%E5%E6%E8%EC%20%F0%E5%E7%E0%ED%E8%FF).

**Gulakov V.K., Matyushin V.N.** **The evaluation of effectiveness of performing the approximate search using metric trees based on generalized hyperplane decomposition.** This article describes three data structures based on generalized hyperplane decomposition — GH-based tree, GNAT, and mm-GNAT. Their theoretical description is followed by the experimental comparison the task of which is to determine the data structure which performs approximate search queries most effectively. The results of the experiment confirm the theoretical properties of the described data structures.

**Key words:** metric data structures, search methods, trees, high dimensions, algorithm effectiveness, approximate search, generalized hyperplane decomposition.

**Konovalova G.I. Optimal mechanisms for operations management application of computer and information technology.**The optimal mechanism designed a decision support system at the operational level management engineering company that enables the optimization of the proposed method make the best management decisions in real-world factory. In the procedure of operations management integrated planning, accounting, control and analysis of production, as the human factor is taken into account . To implement this mechanism , in practice offered information model .

**Key words:** method, a mechanism, a criterion of optimality, machine-building company, prompt Noah production management, information model.

**Korobko A.V., Prokurov M.Yu. Assessing collapsing loads for hinged and simply supported plates loaded with concentrated force in the centre by means   
of geometrical modeling of their shape.** In the article the authors determines the boundaries of the possible distribution of collapsing load values set for hingedly and simply supported plates with an arbitrary convex outline loaded with concentrated force in their centre depending on the integral geometrical characteristic of the plate shape – shape factor. The determined boundaries and the method of geometrical modeling make it possible to use interpolation technique and assess collapsing loads for plates of arbitrary shape by shape factor.

**Key words:** plates, hinged supports, simply supports, concentrated force, collapsing load, shape factor, geometrical modeling.

**Rytov M.Yu., Megaev K.A. Simulation model of communication within a corporate portal with aggregated traffic.** The paper proposes a simulation model of communication among corporate portal, based on event-driven method of reproducing the logic of its operation and system parameters, and characterized to analyze aggregated traffic.

**Key words:** simulation, delay, jitter, voice traffic aggregation.

**Fedayaeva G.A., Mikhalchenko G.S., Kobishanov V.V., Komyazko E.A. Application interface UM MATLAB IMPORT when modeling of electromechanical system with each axle regulation locomotive.** Presents the methods and results of modeling of electromechanical system with each axle regulation of mainline freight locomotives based on the combination of software complexes of the Matlab/Simulink and Universal mechanism with the use of the interface UM Matlab Import.

**Key words:** software, Matlab, UM, UM Matlab Import, electromechanical system, freight mainline diesel locomotive, each axle regulation, modeling of dynamics.

**Fedayaeva G.A., Tarasov A.N., Mikhalchenko G.S., Sidorova N.N. Mathematical model of the mechanical subsystem traction power transmission of freight locomotive ТЭМ9Н.** Presented settlement scheme and a mathematical model of a mechanical part of the traction power transmission hybrid locomotive with support-axial suspension of traction engines and elastic wheel gearbox.

**Key words:** shunting diesel locomotive, traction power transmission, mechanical subsystem, elastic gear, mathematical model, design scheme.

**Shkaberin V.A., Averchenkov V.I. Development of principles of creation of the automated system for monitoring of water level in open water.** The article describes the basic specifications for the design of the laser sensor to measure the water level. Presents the basic principles of creation and block diagram of the automated system for monitoring of water level in open waters.

**Key words:** monitoring of water level, the automated system block diagram, water level sensor, wireless communication.

**Babich O.V. Features of procedures for restructuring of industrial enterprises.** The article provides a definition of the term «restructuring of the company» a scheme of restructuring procedures of the industrial enterprise in strategic management.

**Key words:** strategic management, strategy, restructuring of the company, the stages of restructuring.

**Gorlenko O.A., Miroshnikov V. V. Quality management methodology development.** The ways to development of modern quality management that includes: implementation of new ISO 9000 standards, management systems integration, using the Bayesian networks mathematical modeling tools for modeling and optimization, knowledge management systems, advanced FMEA and professional standards development are described in the article.

**Keywords:** quality management, integration, modeling, optimization, knowledge management, FMEA, professional standards.

**Yevenko V.V., ZevakoA.V., Podvesovskiy A. G. Innovations in training managers for housing and communal services and assessment of their intellectual capital.** Considered are the problems of professional training of management personnel in the sphere of housing and utilities of the Russian Federation. Studied foreign experience in training specialists in the industry. Grounded necessity of introducing in Russia the educational programmes for managers of the criminal code and the HOA. The model of evaluation of intellectual potential of the leaders of the criminal code and the HOA.

**Key words:** housing and communal services, the management company, partnership of housing owners, managers, innovation, training, education, intellectual potential.

**Mozhaeva T.P., Erokhina V.A., Gorlenko O.A.** **The development of a subsystem of management of quality personnel in the QMS of the enterprise.** In the article we consider a model of a subsystem of management of quality personnel in the system of quality management of the enterprise in the context of the paradigm of human resource management. Expediency of formation of the human resource of the enterprise on the basis of the proposed approach.

**Key words:** monitoring, quality, measuring tool, algorithm of evaluation, validity, reliability, statistical justification.

**Gorlenko O.A., Miroshnikov V. V. Assessment and certification of qualifications of graduates of professional education in the field of quality management, standardization and metrology.** Questions of creation in our country systems professional standards and independent assessment of quality of vocational education are described in the article. The problems of implementation of these systems in terms of quality management, standardization and metrology are analyzed. The methodology is the development of professional standards and the project of the regional center of personnel certification in the industries introduced.

**Keywords:** professional standards, certification of qualifications, quality management, standardization and metrology.

**Miroshnikov V.V., Mankiewicz I.G., Gorlenko O.A.Methods ofstructuralanalysis ofcompetenceof students.** Questions ofcompetence of students are considered. The methods ofstructural analysis ofcompetences are proposed, on the basis ofwhich to judge theprovision ofskillsdisciplineschosenfield of study. The example ofexperimental verification ofthe described technique is shown.

**Key words:** competence, competency, structural analysis, didacticanalysis.

**Khanipova L.Ju. Information and communication technologies in the management activities of modern university.** Explained that the introduction of organizational and management innovations, is an adequate response of the University to changes in both internal and external milieu of the University.

**Key words:** education, management, quality, business process, quality management, business management, innovation, information and communication technologies.