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SUMMARY. KEYWORDS

MECHANICAL AND THEORETICAL ENGINEERING

Yu. A. Buryan, D. D. Chernyavskaya, D. I. Chernyavskiy
The law of conservation of energy in central impact of two bodies

The article is devoted to the determination of coupling equations of conservation laws of energy, momentum and the recovery factor at the central impact of two bodies. Recommendations for optimizing the parameters of the shock machine in the design process are given.

Keywords: central impact, the ratio of mass of the bodies, the ratio of velocities of the bodies before impact.

V. N. Kostyukov, E. V. Tarasov, V. N. Tarasov, I. V. Boyarkina
Methodology of formation of efficient parameters of centrifugal pump units

The proposed new analytical dependence is to determine the coefficient of specific speed of the pump unit, specified conditions of design and analysis parameters of centrifugal pumps.

Keywords: centrifugal pumps, flow, pressure, ratio of specific speed, the fluid density, the net power efficiency.

V. I. Kuznetsov, V. V. Makarov
Optimization of parameters of centrifugal fan with straight blades

There are examined parameters of optimization of centrifugal fan with straight blades. The dependency to determine the optimal angle of β_2 at the outlet of the fan is developed, which made it possible to optimize other parameters of centrifugal fan.

Keywords: optimization, centrifugal fan, straight blades, corner of β_2, angle blade.

S. N. Litunov, Yu. D. Toshchakova, N. V. Erkovich, E. V. Yakovleva
Determination of technological parameters of asymmetrical stream of thixotropic liquid

Natural experiment by determination of temperature as technological parameter in an asymmetrical stream of thixotropic liquid on the example of a colourful box of the offset printing machine with the activator of passive type is made. As changeable parameters influencing temperature there is considered viscosity of paint, diameter of the activator and amount of paint in a colourful box. Dependences of temperature on changeable parameters are obtained.

Keywords: tiksotropny liquid, offset printing, colourful box, paint hashing, activator.

A. Yu. Popov, I. A. Bugay, A. A. Ezhov, Yu. V. Titov, M. A. Peskov, A. V. Eliseeva
Providing secondary resource by multifacet carbide inserts

This article presents one of the most promising methods of increasing the economic efficiency of use of replaceable carbide inserts and selects the basic geometrical parameters of cutting inserts. The analysis of carbide inserts on the type of wear is done.

Keywords: cutting tool inserts, the types of wear, regrinding, renovation.

V. N. Tarasov, I. V. Boyarkina
The method of determining the coefficient of viscous friction and the coefficient of kinematic viscosity for wheels of vehicles

A method is developed for determining the coefficient of viscous friction of the tires of vehicles. The analytical dependencies for calculating of the coefficient of viscous friction and the coefficient of kinematic viscosity of the tyre are obtained.

Keywords: the tire, deformation, amplitude, quality factor, damping of oscillations, frequency, stiffness, coefficient of viscous friction.

A. V. Zubarev, S. P. Bobrov, E. S. Anikin, Yu. P. Komarov, V. A. Shepetkov
About statics loading characteristic additivity of pneumatic shock-absorber with rubber-cord cushion

It is offered the method based on the loading property such as additive function permitting the statics loading characteristic as the sum up according to the results of the experiments fulfilling the test requirements while the loading excess is over the test equipment possibilities.

Keywords: rubber-cord cushion, pneumatic shock-absorber, loading, additive function.

A. G. Koltsov, D. A. Blokhin, A. S. Serkov, V. V. Baranov
Development of mobile device for repair rails of metal-cutting machine-tool

In the article the question of recovery of the longitudinal rails of large lathes, as presented by the construction and operation of a mobile device designed to allow for disassembly without grinding longitudinal rails slide lathes, boring machines, including large sizes. The novelty of the developed structure is to use laser interferometer for rapid precision alignment of a rigid frame-beam structure to be mounted on a support surface around the machine to be repaired with high accuracy.

Keywords: lathes, recovery guide, repair machines, laser interferometer.

A. Yu. Kondyurin, V. E. Shcherba, E. A. Lysenko, I. S. Nesterenko, A. N. Zimnickiy
To the question making profile of gap seal for piston hybrid energy machine of volumetric action

The paper describes the main features of design and manufacturing of slotted sealing piston hybrid energy machine volumetric action (PHEMVA). On the basis of calculations using mathematical models of the optimal size according to which the cylinder-piston group PHEMVA is made.

Keywords: compressor, pump, piston, seal.

I. E. Lobov, V. E. Shcherba, A. V. Grigoriev
The analysis of the working processes in piston hybrid power machine using fluctuations of pressure of gas in pressure line

In the work the new effective design of the piston hybrid power machine using fluctuations of pressure of gas in a pressure line is offered. On the basis of the developed mathematical model the computing experiment is to open physical aspects about the working processes proceeding in cavities and pipelines of the studied machine is made.

Keywords: compressor, pump, piston, working processes, cooling.

V. A. Shepetkov, E. S. Anikin, S. P. Bobrov, A. A. Gorbatyuk
Analitical calcultion of initial undeformed state of rubber-cord cushion of rubber-metal spring

It is considered the calculation of an initial undeformed state of the air-spring with the rubber-cord cushion (RCC) for metro wagons. It is found the classical polynomial with the constant factors that give the possibility to obtain the analytic formula for performing the calculations to evaluate the initial undeformed state of the RCC geometric configuration.

Keywords: rubber-cord cushion, rubber-metal spring.

ELECTRICAL ENGINEERING. POWER ENGINEERING

E. V. Ptitsyna, D. V. Ptitsyn, A. B. Kuvaldin
To the question of improving efficiency of gas-discharge low-pressure emitters are powered by current complex form

There are experimentally investigated electrical parameters, emission spectra and their integral characteristics of facilities operating on the phenomenon of electrical discharge in gases or vapors for example, gas discharge emitters low pressure. The efficiency of using the current complex forms to power such systems is depicted.

Keywords: the emitter discharge low pressure, electric operation, power consumption, current complex form.

V. P. Beloglazov, L. V. Beloglazova
Features of mathematical model for experiments with dispersed flow

The purpose of this work is to verify the mathematical model for calculating the flow of dusty on the example of the cyclone SCN-40-640 for later use in the calculation model, IVAC (inertial vacuum ash collector). The importance of the development of

IVAC defined the requirements for the protection of European standards environment. An article in the examples shows and explains the complexity of the choice of the boundary conditions. If necessary agreement between the results of numerical experiments and verification of passport data of the cyclone may be executed correctly.

Keywords: ash collection, inertial-vacuum ash collector, design, and verification.

D. Yu. Belan
Application of thermochemical treatments in technological process of repair traction motors

This article describes a technique of saturation of carbon copper plate collector traction motor by chemical and thermal processing using heat gun to improve its performance.

Keywords: traction motor, the collector-brush unit, heat treatment, chemical-thermal method hardening, wear resistance.

D. A. Elizarov
The analysis of methods for determining harmonious component of voltage in electric power systems

The paper has analyzed methods for determining the harmonious component of the voltage at natural experiment. The accuracy of the received results by fast method of correlation functions and modernized method of correlation functions is comparable.

Keywords: power quality, spectral estimation, harmonious components, method of correlation functions.

A. G. Mikhailov, E. E. Novikova, E. N. Slobodina, S. V. Terebilov
Numerical simulation of heat and mass transfer processes during turbulent combustion of gas fuel in furnace volume

The features of types of furnaces-tube boilers are considered. The results of numerical calculations using the k- model of turbulent combustion of thermal processes in reverse and flow furnaces for gas fuel are given. The maximum values of the temperature of the gas mixture in the amount and concentration of nitrogen oxides are correspond to flow of furnace.

Keywords: fire-tube boiler, reversible furnace, combustion, temperature, nitrogen oxides.

A. P. Starikov, D. Yu. Kuzmenko
Development of criteria for evaluating effectiveness of heat preservation enclosing structures of passenger cars

The article presents the basic methods of thermal calculation of the body of the passenger car. But these methods are not enough to determine in the effectiveness of the thermal insulation material during the operation of a passenger car. The main purpose of the article is an adaptation of the methods of calculation of heat-resistance used in the construction of buildings for the cars, which will determine the effectiveness of the car building envelope to keep warm.

Keywords: car, thermal calculation, thermal stability, thermal conductivity.

I. A. Yanvaryov, A. V. Krupnikov
Features of thermal calculation of storage tanks of liquefied gas as separate elements and as heat exchange system with complex structure

The decision of problems economy of fuel and energy for the oil-extracting and gas companies it is connected to development of technologies of the liquefied petroleum gas. The increase of efficiency of operation of storehouses of the liquefied products assumes carrying out of the corresponding topological and functional analysis of tank Park as the heat exchange system of complex structure.

Keywords: the tank Park, heat exchange system, liquefied gas, economy of fuel and energy.

INSTRUMENT ENGINEERING, METROLOGY AND INFORMATION MEASURING EQUIPMENT AND SYSTEMS

I. A. Kirovskaya, L. V. Novgorodtseva, S. N. Pogodin, E. N. Eremin, S. A. Korneyev, Yu. A. Matyash
Mechanical and chemical activation of the surface of semiconductor materials – transducers sensors based on GaSb, ZnTe

By the developed technique there is performed mechanochemical systems research «reaction medium (H_2O, iso-C_3H_7OH) — dispersible semiconductor system GaSb-ZnTe». There is found increased activity of the new made surface, a series of intermediate compounds that occur in partially hydrated real semiconductor surfaces and in conditions of water absorption, adsorption and catalytic decomposition of isopropyl alcohol. There is installed enrichment of the new surface coordination unsaturated atoms and their crucial role as active centers in adsorption molecules H_2O, iso-C_3H_7OH. Practical recommendations for the use of solid solution $(GaSb)_x(ZnTe)_{1-x}$ with excess content in GaSb semiconductor gas analysis are given.

Keywords: semiconductors, solid solutions, mechanochemistry, IR – spectra, the fresh a surface, active centers.

INFORMATION TECHNOLOGY

V. N. Zadorozhnyi
Growing network: the dynamic of degree distribution related nodes

Numerical method for calculation of the degree distribution (DD) of related nodes in growing networks is developed. The problem is solved on the basis of random graphs, growing with the nonlinear rule preferential binding and stochastic increments. There is deducted asymptotically exact equations for quickly calculate the dynamics of the formation of DD of related nodes. It determines the final DD adjacency. These results extend the capabilities of an adequate description configuration characteristics of real growing networks (social and financial networks, telecommunications, transportation, terroristic networks, etc.).

Keywords: growing network, random graphs, degree distribution of nodes.

V. N. Zadorozhnyi, V. A. Badryzlov, E. B. Yudin
Growing networks with losses of connections

The model of growing networks (social, telecommunication, transportation, terrorism, financial, etc.) on the basis of the theory of random graphs with nonlinear preferential binding rule taking into account the random loss of network connections between participants in the course of its evolution are formulated and studied.

Keywords: growing networks, random graphs, stationary and transient random processes.