

УДК 621.922

Kiselev M. G., Drozdov A. V., Monich S. G., Bogdan P. S. The Study of the Stages of Interaction of Wire Electrode Tool with the Surface of a Workpiece during Its Electroarc Processing

The paper deals with revealing and investigating characteristic stages of electroarc processing during single interaction of wire electrode tool with the surface worked in various conditions of the process implementation. The description of the device developed and the methods of conducting experimental studies is presented. Experimental data obtained are presented and analyzed reflecting the influence of the conditions and modes of single electroarc action of wire electrode tool on the shape and dimensions of working marks obtained on the surface of a specimen. It is shown that due to variation of the parameters of electroarc action it is possible to purposely influence the shape and dimensions of working marks formed on the surface worked and consequently on microgeometry which indicates that it is promising for use in controlled modification of initial surface of workpieces with the purpose of giving it required operational characteristics.

УДК 62-82+62-85

Zhylevich M. I., Yermilov S. V., Kishkievich P. N., Biegel E. N. Dynamic Design of the Hydraulic Valve

The problems of the dynamic design of hydraulic valves are considered. A mathematical model and the software for computation in Delphi programming environment of a section of a spool valve is developed enabling to study internal dynamic processes in the valve. Control computation is performed and the influence of the valve parameters on dynamic characteristics of the system is analyzed.

УДК 62-33

Stasenko D. L., Layevskii D. V. Modeling the Processes of Fluid Flow in a Fluid-Flow Section of the Pressure Forced Hydraulic Control Valve

Present day hydraulic system requirements define the conditions of hydraulic system operation. It is known that hydraulic characteristics of spool valve deteriorate at pressures over 32 MPa while operating pressure in present day mobile equipment reaches 50 MPa. In connection with this the study of fluid flow in the fluid-flow section of a hydraulic apparatus at the pressure increase over 32 MPa is an urgent problem.

The problems connected with the processes of modeling fluid flow in the fluid-flow section of the spool valve forced by pressure are considered and also the definition of optimum shape of fluid-flow section providing minimum losses. The dependencies obtained enable to predict pressure losses during the use of hydraulic apparatuses of this type for different values of operating pressure.

УДК 62-82-112.6

Pinchouk V. V., Sheleg V. K., Andreyev S. F., Vorochkin D. G. Design Algorithm of the System of Components of Unit-Type Hydraulic Control Units of Hydraulic Drives of Technological Machines

Unit-type system of building various machines and equipment meets to the most degree the requirements of machine building development. However when designing hydraulic apparatuses mounting cases are not taken into consideration which deteriorates characteristics of hydraulic control units on the whole. The study of general criterion of optimality of the connecting-mounting block of hydraulic control units is presented which enabled to develop the algorithm of designing hydraulic control units consisting in the following. It is necessary to consider the ratio of coefficients C_3/C_4 with consideration of simultaneously operating according to principle hydraulic circuit actuator elements; to consider the value of coefficients

of significance of criteria C_1 and C_2 on the basis of the degree of significance of parameters V and S of connecting-mounting block relative to hydraulic pressure losses in horizontal and vertical channels; according to diagrams to determine the value of d/d_3 taking into account preset relation of C_3/C_4 and coefficients C_1, C_2 ; to define diameter d_3 on the basis of operating fluid output of connecting-mounting block; on the basis of dimension d_3 and relation d/d and using the dependencies of the connecting-mounting block dimensions to carry out calculations of overall dimensions and mounting dimensions of connecting-mounting block; and using the dimensions of connecting-mounting block to carry out the design of the component range of unit-type hydraulic control units.

УДК 621.941.025

Michailov M. I., Bogatski V. D. Modeling of the Process of Tooth Gear Surface Working by Hobbing Cutter

The analysis of generation of geometry of the side surface of the gear tooth by the method of rolling by gear hob is carried out. Mathematical models enabling to build the topography of worked kinematic surface of the tooth of the spur are obtained. The influence of the number of forming teeth and the number of gear cutting strips of hobbing cutter on the accuracy of the profile produced is established.

УДК 629.114.2-182.8

Popov V. B., Rekhlytskii O. V. The Study of Characteristics of Mounted Lifting Device Built-In Into the Test Stand

The analysis of the process of lifting mounted combine harvester KNK-500 by UES-350 mounted lifting device introduced in the design of the test stand is proposed. The methods of the analysis of lifting process of a mounted machine and evaluation of lifting capacity of UES-350 mounted lifting device enable to carry out calculations and comparison of output parameters of the mounted lifting device during unitizing UES-350 with various mounted machines. Analytical expression for determining loading capacity reserve of the mounted lifting device enables to study boundary possibilities of unitizing the mounted lifting device with mounted machines and tools.

УДК 621.002.6:669.14

Dudetskaya L. R., Glushakov A. N. The Study of the Influence of Microalloying with Molybdenum and Niobium on Hardenability and Mechanical Properties of Constructional Carburizing Steels 20XH3A and 20XГНМ

The influence of niobium and molybdenum microalloying on mechanical properties, hardened layer structure and hardenability of carburizing steels 20XH3A and 20XГНМ is considered. The studies carried out enabled to obtain steel 20XH3МБ with stable fine-grained structure and increased core durability. In spite of the steel advantages revealed it has a significant disadvantage – higher rolling cost which limits its use in mass production.

Based on further search of constructional carburizing steels the steel 20XГНМ additionally niobium alloyed was selected as basic one. The results of the study of mechanical properties, the structure of diffuse layer and hardenability of this steel enable to predict the durability increase of tooth gears manufactured of the new steel.

УДК 539.3

Ostrikov O. M. Probabilistic-Statistical Model of Forming a Group of Wedge Twins at Indentation during Local Proportioned Deformation of the Surface of Twinning Monocrystal

Based on the principles of the probability theory and mathematical statistics a model of monocrystal twinning at indentation of their surface is developed. The model can be used also during describing the formation and evolution of shear zones appearing during indentation

of amorphous materials. It is shown that for mathematical description of non-homogenous plastic deformation of indented amorphous materials it is necessary to use composite two-dimensional normal distribution, of twinning monocrystals – three-dimensional distribution. Distribution of the twins by lengths is advisable to describe by superposition of normal distributions. The method of predicting the location of twin nucleation or shear zones at the indentation is proposed.

УДК 621.791

Maximenko A. V., Myshkovets V. N., Bayevich G. A. The Influence of Duration of Laser Radiation Pulses on the Properties of Welded High-Strength Steels

Experimental studies of the influence of the duration of laser radiation pulses at constant power density on the properties of welded high-strength steels are carried out.

The influence of energy and time parameters of pulsed laser radiation on the formation of structures and the nature of microhardness distribution in welded metals and foundation is determined.

The dependence of microhardness of high strength steels in the zone of welding and the zone of thermal action on duration of laser radiation pulses is defined.

УДК 621.316.1.015.3

Krotenok V. V., Bokhan A. N. Experimental Study of Dynamic Characteristics of Nonlinear Overvoltage Limiters

The experimental unit requirements are defined. To study the characteristics of the nonlinear overvoltage limiter the unit is developed and its function circuit is presented. Experimental studies of the nonlinear overvoltage limiter are carried out and presented under the effect of voltage of 50 Hz, high frequency and also under combined effect. The analysis of experimental studies is carried out showing that under the action of voltages exceeding limiting level on the nonlinear overvoltage limiter, transfer of varistors to conducting state is performed with delayed reaction. Delayed reaction of overvoltage limiter to overvoltage becomes more evident with the increase of actuating voltage frequency. Experimental unit enables to study statistic and dynamic characteristics of overvoltage limiters and also discharge voltage on the overvoltage limiter at transient processes characteristic for internal overvoltages in distribution networks. The experimental unit developed enables to provide the overvoltage limiter diagnostics. This contributes to optimization of the selection of parameters of the overvoltage limiter installed in a complete distribution device and improving the quality of the products.

УДК 536.24

Ovsiannik A. V., Shapovalov A. V., Bolotin V. V. Gas-Turbine Units Based on Converted Aircraft Engines

The results of the study of gas-turbine units on the base of converted aircraft engines, possibilities of their applying at heat power plant as the major source of thermal and electric energy as backup source, and also in cases of power shortage or as a part of medium and large heat power plants for applying at peak loads are presented. A new way of developing generating capacities in power supply system of the Republic of Belarus is proposed which has a number of advantages. The results of calculation of technical-economic and economic characteristics are presented. The analysis and the comparison of technical and economic characteristics of gas engine units operating at the enterprises of the Republic of Belarus an gas turbine units based on converted aircraft engines are performed. It is shown that maneuverability of the unit under study is higher than maneuverability characteristics for other gas-turbine units which enables it with the shortest possible delay to assume additional power system load.

УДК 537.874.7

Nasonova N. V., Pulko T. A., Al-Ademi Y. T. A., Ahmed A. A., Lynkov L. M. The Influence of Water Presence on Shielding Effectiveness of Radio Absorbing Materials

Shielding characteristics of composite radio absorbing materials based on ferrites are obtained for a frequency range of 2–17 GHz. It is shown that the increase of water content of such materials to 54 % mas. results in EMR attenuation growth. A specific combination of structural and electrophysical parameters of fillers causes the extension of operating frequency band into the region of low frequencies up to 3 GHz and the decrease of reflection coefficient to –8– –16 db due to matching of frequency dispersion characteristics of permittivity and permeability of the material obtained.

УДК 65.015.12

Kovalev M. N. Managing Interplant Supplies in the Logistic System of the Enterprise

Specific features of the logistic system (LS) of the machine building enterprise are defined. Purchasing, manufacturing, distribution and servicing logistics are defined as functional subsystems. Manufacturing logistics role in the logistic system of the enterprise is specified. Reserve logistics, stock logistics, transport logistics, information logistics and financial logistics are referred to as support subsystems. A mathematical model is stated and the algorithm of operation control of the chains of component supply in mainline production is developed.

УДК 338.244.47:338.28

Rychter V. O. Reforming of Russian Power Engineering in the Light of Foreign Experience

Historic and technological prerequisites of reforming power engineering system with the USA and Great Britain taken as the examples are considered. The results of the reforms implemented are assumed as a basis for the Russian model of electric power engineering re-structurization. In addition the contradictions are revealed referring to the state of the economy at the moment of making a decision on reform implementing and also to the readiness of infrastructure and legislation. The prospects for improving the system of macrochange management with the purpose of avoiding short term approach to the development of electric power engineering are revealed. The urgency of the paper is substantiated by the necessity of keeping the balance of the interests of the economic entities of the industry, the state and the consumers. Thus the need for a profound complex approach for defining the role of power engineering in the economy and the attitude to the power system taking into account its industry-wise, market and infrastructure character still exists.

УДК 657.1

Ivanova L. B. The Concept of Debtor's Property Preservation and the Assessment of Debtor's Indebtedness in "Interested" Transactions in the Ukraine

Theoretical issues of assessment in accounting the entity of a real sector of economy in the conditions of crisis management are studied.

Specific features of property assessment at different stages of bankruptcy are considered. The conditions of occurring suspicious transactions called "interested" in the Ukraine preconditioning inadequate amounts of debts of the debtor entity affecting its financial condition are characterized. Detailing the types of suspicious transaction depending on period of limitation and information awareness of contractors applied in Belarus and Russia is advisable for application in the Ukraine which would improve the level of information awareness of the participants of the bankruptcy.

Taking into account the debtor's property preservation with the purpose of revealing and analyzing "interested" transactions the use of the methods of assessment at fair value

of the amounts of compensation for the property to the debtor is substantiated. For real assessment of the cost of such assets taking into consideration inflation and other market change conditions it is proposed to apply the assessment formed not for the date of transaction but for the moment of qualifying such a transaction as “interested”.

In case the enterprise does not provide reporting in accordance with international standards to avoid “interested” transactions it is proposed during primary assessment of debtor’s indebtedness to apply the methods of fair value with the characteristic of the market as the addition to the national standard.