ABSTRACTS

Litvin A. V. Design and Technological Means of Providing Accuracy of Parts Clamping

A chuck analysis is proposed using analytical and CAD system methods and also an improved analysis of a chuck jaw condition is presented.

Dovgalev A. M., Sukhotskii S. A., Svirepa D. M., Ryzhankov D. M. Two-Row Magnetodynamic Tools

The information on the design of two-row magnetodynamic tools is presented in the paper that are intended for hardening outer and inner surfaces of revolution and flat surfaces of machine parts and also experimental relations of the roughness of a worked surface and the tool feed and the speed of rotation as to Ra parameter are given. The data obtained can be of use for technical staff specializing in working out finishing-and-hardening operations.

Gourskii E. P. The Evaluation of Operational Reliability of Freight Cars

The necessity of improving the organization of maintenance and repair of freight cars s is shown connected first of all with the reduction of operational reliability of rolling stock on controlled areas which in its turn is connected with car fleet ageing. Based on statistical data on the operation of controlled areas the indices of operational reliability are defined and studied and also optimum length of the controlled area is calculated as per the condition of the reliability of the car units under consideration. When calculating the length of a controlled area a probabilistic approach has been applied: the selection of the distribution law for random variable «mean time between failures» has been provided and its design values for a preset level of confidence coefficient have been obtained. The study of each controlled area of Belarus Railroad training ground enables to classify the areas allowing for possible economic losses due to car failures on those areas and also to improve territory plan of maintenance point location and in this way to improve operational reliability of freight cars on controlled areas.

Karpenko V. M., Filipenko E. V. Developing Automated System of Controlling the Properties of Forming Mix Based on Controlling Its Composition

The forming mix in general is a complex of materials selected in a specified proportion in accordance with required properties. The proportion of the components constituting the mix should be maintained within certain limits. To ensure correcting action in the process of making a mix the necessity appears to develop empirical models of the forming mix reflecting the relation of rheological properties and the mix components and to work out recommendations on forming mix composition correction using these models. Thus maintaining the properties of the forming mix at the level ensuring optimum properties enables to improve the quality of castings produced.

Bobarikin Y. L., Burenkov V. F. Stressed State of a Strain Area during Piercing Cladding

The validation of the necessity of analyzing the stressed state of the strain area during piercing cladding is presented. Using simultaneous solution of equilibrium equation and ductility condition for volume unit of the strain area the relations have been obtained for determining major stresses in the strain area characterizing its stressed state. Employing the method of experimental testing the adequacy of the relations obtained has been proved.

Mikhailov M. I., Sheibak M. R. The Study of the Influence of Varying the Shape of Brazed Cutting Tool Holder Slot on Its Stressed State

The main directions of strength analysis for the tool are summarized in the paper. The design model reflecting the characteristics of the holder and cutting element materials and the

shapes of slots for cutting tip has been built. Design load for particular modes of cutting and material machined is presented. Typical shape variations of the slots for cutting tip are developed. Dimensions of brazing solder for various slot shapes are defined. Distribution of internal stresses in the cutting tip and brazing solder are obtained depending on the shape of tool holder slot for the brazed tip of the cutting tool. The analysis results are presented and the conclusions are made.

Kieselev M. G., Drozdov A. V., Gabets V. L, Stolarov A. A. Theoretical Evaluation the Influence of Ultra Sound Vibration Imparted to the Roller along Horizontal Axis on the Parameters of its Rotational Movement when Interacting with Movable Base

A design model is proposed for theoretical description of changing the behavior of rotational movement of the roller relative to its center of mass when imparting it ultrasound vibrations, directed along its horizontal axis assuming that there is no roller slip in the area of contact with movable base. An analytical relation is presented describing the principle of changing angular velocity of the roller rotation when it is rolled relative to the movable base under ultrasound action and its qualitative analysis is conducted. It is shown that the ultrasound excitation of the knurled roller makes possible due to vibration rate and intensity change to purposely influence in the wide range the conditions of the roller contact interaction with the surface worked. This influence includes regulating angular rotation velocity as well as the direction of rotation of the knurled roller.

Mikhnevich A. V., Mikhnevich N. N. The Study of Liquid Dynamics in Piston Pairs of Displacement Hydraulic Machines

The results of studying the flow of hydraulic fluids in radial clearances of piston pairs on an experimental unit simulating static as well as dynamic conditions of piston pair operation are presented.

It has been established that at a pressure increase in excess of preset limit (20–50 MPa) in the clearance with immovable rod a considerable reduction of leakage values takes place and also the following their slow growth with another regularity occurs. When radial clearance in the piston pair is increased the maximum value of leakages from which their abrupt reduction starts shifts to higher values of operating pressure.

At the oscillation of the rod there are no anomalous changes of values of fluid leakage through the clearances of piston pairs observed. It is established that at pressure value approximately corresponding to anomalous change of leakage value in static conditions vibrator power requirements sharply increase.

The phenomena revealed during liquid flow in small clearances of piston pairs are explained by obliteration of small clearance.

Artamonov V. V., Grishkova E. I., Poddenezhny E. N., Shablowskii Y. O. Novel Foamglass Made Based on Factory Waste

A novel method of manufacturing ecologically safe foamglass made based on factory and domestic waste (broken glass) featuring low thermal conductivity, improved physical-mechanical characteristics (reduced brittleness) and high waterproofness is developed. Foam glass in the form of blocks, plates and granules can be applied in civil engineering, heat power engineering, mechanical engineering as heat and sound insulating material in operation in the range of 50 to 600 °C.

Popov V. B. Mathematical Simulation of Three-Point Lifting Device of a Lift Truck with a Drop Side Turn «Amkodor 208 B»

The methods of forming a functional mathematical model for calculating output parameters of the three-point lifting device of the small-size lift truck «Amkodor 208 B» are presented in the paper. Analytical expressions for load carrying capacity have been obtained enabling to

evaluate the possibilities of building-block designing for «Amkodor 208 B» with various working machines and equipment. The functional mathematical model presented can be used for the designing three-point lifting devices of lift trucks and road-building machines of similar structure.

Grabovskii A. P. The Study of The Influence of Elastoplastic Strain on the Properties of Construction Materials

The results of studying the kinetics of accumulation of damages during elastoplastic stress loading which leads to loosening material and consequently to the degradation of modulus of elasticity E (axial strain) and G (torsion) and resistivity are considered which defining can be used to evaluate accumulation of damages of the unit operation reliability. Experimental data of studying the kinetics of accumulation of damages with the samples of high-plastic steel 12X18H10T and low – plastic material – aluminum alloy D16T is presented.

Lukovnikov V. I., Pohulayev M. N., Roudchenko Y. A. Samovendiuk N. V. Oscillating Motion of Electric Drive in Impact Operation Mode

The analysis of asynchronous electric drive with impact load in the form of a bell is conducted. The diagram of mechanical part and a mathematical model of electric drive and also asynchronous motor winding connection for its operation in self-oscillating mode are developed. Analytical study of a mathematical model is conducted and motion time diagrams are plotted.

Shirokov O. G., Lymar O. V. The Study of Frequency Characteristics of NOM-6 Model Voltage Transformers

Standard requirements to frequency characteristics of voltage instrument transformers used in controlling and analyzing electric power quality are proposed. The results of studying frequency characteristics of the voltage instrument transformers of NOM-6 model are presented and the analysis of the possibilities of their use for controlling and analyzing electric power quality is conducted.

Shirokov O. G., Los D. M. Thermal Model of a Power Dry –Type Transformer

The model of the power dry-type transformer is considered in the paper including in contrast to existing models a number of homogeneous bodies: magnetic core, winding, insulation, internal cooling agent and external cooling agent. In addition to this the model describes thermal processes in an unprotected power dry-type transformer and power dry-type transformer placed in the protective housing. Experimental studies confirm the adequacy of the thermal model proposed.

Man Tsin-Soun. The Method of Simplifying Models for Simulating Control Systems

On the base of real Shur decomposition mathematical models for linear and multidimensional systems are simplified using approximation of transfer function so that the simplified model could be approximated to the initial system model as to the transition and steady values as close as possible. Approximation is effected by means of approximation in the transfer function matrixes between the simplified and initial models of the systems. Simplification is effected as a result of truncation of weak parts of controlled and observed conditions.