

## ABSTRACTS

### **Popov V. B. Forming Mathematical Models and Optimizing Some Linkage Mechanisms Structurally Identical to the Linkage Mechanism of the Multipurpose Power Unit**

The solution of the problem of formalized description of adapter mounting and silage duct rotation mechanisms is proposed based on the previously formed functional mathematical model of the linkage mechanism of a front three point lifting device of the multipurpose power unit. Based on the accepted mathematical model of the analysis the models of optimization parametric design have been formed for the above mechanisms. The results of modernizing the adapter mounting and silage duct rotation mechanisms of mounted combine harvester «Polesie» are presented. The developed method of computer aided design can be used for linkage mechanisms of farming machines having identical structure and purpose.

### **Vereschaguin M. N., Zapouskalov N. M., Agounovich I. V. Wear and Deformation of Rollers and Strip in the Process of Metal Pouring and Rolling in Two-Roll Melt Fast Hardening**

It has been established that in the process of metal pouring and rolling in the process of two-roll fast hardening wear and deformation of roll surface are observed. It is manifested in the removal of some volume of metal of the roll surface by the strip manufactured due to burn-off of micro-protrusions of the roll at the stage of its contact with the melt and also redistribution of the topography of the roll surface in hot rolling of the strip manufactured in forward creep zone when an intensive wear of roll surface occurs resulting from contact surfaces sliding and caused by micro-protrusions of outgoing strip.

### **Tarikov G. P., Bielskii A. T., Komrakov V. V. The Study of the Effect of Further Corrosion Location in a Pipeline Unit on Tension Rate Coefficient**

For the determination of pipeline carrying capacity with various operational damages it is necessary to define the tension rate coefficient. A new method of the tension rate coefficient determination is considered based on the shift of crack edges. The influence of geometrical parameters of corrosion damage and crack length on the value of the tension rate coefficient is studied. The graphs showing the relation of the tension rate coefficient to these factors are constructed. Mathematical processing of these results enabled to obtain a formula in the form of polynomial of the third power for the tension rate coefficient determination.

### **Lovshenko G. F., Khina B. B. The Model of Forming Alloys in the Process of Annealing Mechanically Alloyed Composition of Ni-Mo-Al-O System**

A mathematical model of the problem of internal oxidation within four-component system produced by reaction mechanical alloying has been developed describing diffusion controllable solution of a spherical particle of molybdenum oxide  $\text{MoO}_3$  in nickel based solid solution containing aluminum. The model enables to evaluate the time of full dissolution of  $\text{MoO}_3$  particles which are the source of oxygen in internal oxidation and also the size and spatial distribution of dispersed inclusions  $\text{Al}_2\text{O}_3$  in the matrix.

The results obtained can be used for creating new composite mechanically alloyed materials selecting optimum annealing mode, evaluating the structure (maximum size and dispersion inclusions spatial distribution) and consequently predicting the properties of the end product.

### **Andrianov D. N., Novikov M. N., Stoliarov A. I. Steel Flow Control in the Mould with the Use of Argon Blow**

Using the method of numerical simulating the influence of melt argon blow rate on hydrodynamic characteristics of the melt flows in the mould and liquid hollow of an ingot has been investigated. Critical speeds of blown-in argon are established required for directed forced melt flows formation in the mould of continuous ingot casting machine in accordance with pouring rate.

**Mikhailov M. I., Karpov A. A., Pleskachevskii Y. M. The Study of the Influence of the Components of Epoxy-Polyester Resin Based Composite Material on the Material Properties**

The influence of composite material composition on the material properties has been studied. The composition of epoxy and polyester resin has been selected as basic polymer material with the corresponding hardeners required for these resins. Abrasive material and waste after various material grinding are used as fillers. It has been established that physical and technical characteristics are influenced most of all by the kind of a filler and its amount.

**Pahuliayev M. N. Main Pipeline Protective Potential Control Device**

The paper deals with the problems of circuit implementation of the protective potential control device for main pipelines based on domestic circuit technology which is necessary for providing redundancy in signal converters of SSS/U-I/001 of CEGELEC company. Main disadvantages of the company's converters are revealed and the requirements to the protective potential control device are defined. A complete block-diagram of the protective potential control device is presented and the description of its operation principle is given. The design of the converter card is shown and the results of testing protective potential control device prototypes introduced at Unitary Enterprise «Gomeltransneft «Drouzhba» are presented.

**Matsko I. I. The Analysis of the Performance of Water Heater Connecting Circuits of Hot Water Supply Systems**

At heat stations of the buildings with water heaters for hot water supply using present day countercurrent heat exchangers it is advisable to apply a single stage heater connecting circuit for connecting to hot water supply system parallel to heating and ventilation systems that enables the hot water supply unit to operate with automatic equipment of weather regulation available. In addition heating system water discharge does not exceed the values usual for applied two stage water heaters operating as per current norms with automatic equipment of weather regulation which do not ensure required temperature level.

**Poukhalskaya O. Y. Defining the Number of De-Energizations of Agro-Industrial Complex Loads with 10 kV Automatic Units Connecting Stand-By Facilities**

The method of calculating the number of de-energization of agro-industrial complex loads with 10 kV network automatic units for connecting stand-by facilities is considered in the paper and the calculation of this reliability indicator for some users of one of the rural power network areas is presented.

According to the results of calculation the application of local automatic units for stand-by facilities connecting at 10/0.4 kV transformer substation and network automatic units for stand-by facilities connecting for 10 kV overhead lines enables to reduce the number of user's de-energizations. For this reason providing stand-by facilities should be considered as one of the major measures of for ensuring normative reliability of user's electric power supply.

**Koukharenko S. N., Lukovnikov V. I., Kozlov A. V. Control System for Active Converter Filter**

The design of a pulse duration modulated converter with ripple filter with voltage feedback is presented in the paper. The results of developing control system of active converter with reactive ripple filter at the output are presented. Following the investigation conducted a mathematical model and a controlled filter circuit for active converter have been designed. Validity of the research data is confirmed by numerical simulation of the active converter and electronic circuits.

**Loukhanin I. I. Web- and Office Technology Based Testing System**

The possibilities of program envelope for creating tests and conducting testing are presented. The program is adapted to the level of the user non-specialist in the field and enables to make a real value test using Word processor only. Testing can be conducted in a standard mode as well as in the form of a net intellectual game. A complete analysis of the test results can be conducted by means of Access data-base management system.

**Drozd S. S., Kruglakova G. V. Training Specialists as a Factor of Sustainable Innovation Development of the Economy**

Education and science in the present-day society are the factors ensuring sustainable innovation development of the economy. This stipulates the necessity of training economists of a new generation.

The problems of a «traditional type» of instructing are considered in the context of the latest thematic publications and scientific and methodic investigations conducted. The necessity of the transfer to the innovation instructing is shown : to activating and proper organizing self-educational activity of students, maximum use of student's working time etc. The development of creative potential of future specialists, providing them with extra knowledge is possible by drawing the students into research work of their instructors.