

## ABSTRACTS

## Section of «Metallurgy. Welding»

UDC 669.162 Kryachko G., Masterovenko O., Rak M. RESEARCH OF THE BLAST-FURNACE PROCESS CAUSED BY FREQUENCY OF CAST PRODUCTS OUTPUT IS STUDIES. The variety of blast-furnace process irregularity is found out. It is caused by the forced operation mode of alternate diametrically placed iron tap hole at an interval of transition, equal to the 24 hours. It is revealed that the periodical movement of the fusion products and coke nozzle in the furnace hearth caused by the output of the melts, has a great influence on the work of low-level air tuyere what, in its turn, causes a prerequisite for increasing the uneven movement of materials and gases.

*Keywords:* blast-furnace process, unstationary, tap hole, melt output, gas motion.

UDC 669.162.263:519.85 Dowgaljuk B. PROBLEMS OPERATION CONTROL OF THE BLAST FURNACE. Current methods of BF operation control were analyzed. Complex algorithm was developed, including loading of charge materials with optimal distribution over the BF cross section, optimization of blast volume consumption, consumption of fuel additives and steam for stabilization of the theoretical temperature of burning.

*Keywords:* blast furnace (bf), operation control algorithm, optimization, productivity, fuel additives, hydration of blast volume (bv).

UDC 669.184.244 Chernyatevich A., Masterovenko O. WAYS OF OXYGEN LANCE DESIGN IMPROVEMENT ON THE BASES OF CONTROL QUALITY METHODS. Having analyzed the drawbacks in the operation of an oxygen lance of a standard design for 160-ton converters PJSC "ArcelorMittal Kryvyi Rih" with the use of quality management methods the basic directions for improving the design of oxygen lance and applied tips in terms of improving their stability, provision of proper converter bath blowing with the prevention of intensive metal accumulation of the lance barrel and converter hollow throat are justified. The obtained results are reflected in developing and implementing a number of the proposed measures.

*Keywords:* oxygen lance tip, durability, quality management, compensator, cooling system, optimized design.

UDC 669.162.267 Sigarev E.N. OPTIMIZATION COMPOSITION OF SLAG FOR COMPLEX AFFINAGE OF IRON-CARBON FUSION. The analysis properties of slag is executed ( $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3$ ) formed at the different ways of desiliconization and desulfurization of iron-carbon fusion into ladle insufflations of powdery reagents through submerged lance. It is rotined that the offered correlations of intensity insufflations of gases, specific expense of powdery reagents and aluminium provide forming of slag with the proper physical and chemical properties during organization of simultaneous affinage of fusion on silicon and sulphur in a deluge scoop.

*Keywords:* submerged lance, ladle, slag, affinage.

UDC 612.791 Nosov D., Peremit'ko V., Gusyatsinska V. RESEARCH OF INFLUENCE OF THE MAGNETIC FIELDS ON THE MELTING COEFFICIENT OF WIRE AT ARC SURFACING UNDER A GUMBOIL (PART II). Promoting the productivity of melting of electrode wire is possible by the management of transfer of molten metal character at the action of the external magnetic fields. Investigational influence of the magnetic fields on

the coefficient of melting of wire at surfacing a ferromagnetic wire on ferromagnetic basis and ferromagnetic wire on unmagnetic basis.

*Keywords:* surfacing, magnetic field, coefficient of melting.

### **Section of «Rolling production»**

UDC 621.771.01 Maksimenko O., Romanjuk R., Loboyko D. ANALYSIS OF MAXIMUM CONDITIONS OF ROLLING WITH CONSIDERATION OF THE LONGITUDINAL FORCES OF DEFORMED METAL. In the article the force interaction of strip and rolls, longitudinal forces of plastic deformed metal are pointed out. It is shown that average resultant measure of these forces in the byte of deformation can characterize longitudinal stability of the rolling process and the limited holding capacity of rolls in the fixed operation. In the case, if this resultant is holding force, the rolling is steady, if it is equal to zero maximum conditions of deformation appear, if this force becomes tensile the process is impossible.

*Keywords:* holding angle, maximum conditions of rolling, byte of deformation, rolls.

UDC 621.771 Shtoda M., Shtoda I., Proskurov E. ANALYSIS FORMULAS FOR A CALCULATION OF EXTENSION BY ROLLING A LOCK ANGLE CALIBER. There are considered the most common methods of engineering calculation of forming metal by rolling of rectangular billet in the first forming angular calibers. Completed calculations of relative extension for conditions of experimental research on laboratory rolling mill. For obtained results was compared analysis of the accuracy of the calculation for each of the selected methods. Recommend the most accurate mathematical model.

*Keywords:* experimental research, the relative extension, angular profile, lock caliber, rectangular billet.

UDC 621.771 Shtoda M., Shtoda I., Ustimenko R. RESEARCH DEFORMED STATE OF METAL TO THE ROLLING IN THE BOX CALIBER WITH DIFFERENT INCLINES. Experimental research deformed state of rectangular billet of lead in rolling them in box calibers with different inclines. While researches it has been used the method of nets. Found that with decreasing size of incline increases the release limitation caliber expansion. The most evenly elaboration of the metal observed in rolling in box caliber with the incline of 13,6%. When rolling in box caliber with a small incline (9,3%) on the lateral surface of the billet having deformation that spread that can lead to tearing of the metal on the side of the billet.

*Keywords:* experimental research, method nets, box caliber, deformation state, deformation field, the field displacement.

UDC 621.771.0 Maksimenko O. Izmajlova M., Chub A. RESEARCHING THE ADVANCING IN THE UNSTABLE ROLLING. The results of an experimental researching of the process of rolling strips of relatively high with a negative advancing. It is shown that the boundary conditions are not limited to the zero-rolling advancing. The value of negative advancing depends on the current angle of capture, and on the final strip thickness. The influence of the rear end of a deformable rigid metal value advancing.

*Keywords:* advancing, unstable rolling, limiting conditions of rolling, the zone of deformation.

### Section of «Engineering. Mechanics»

UDC 621.744 Mogilevtsev O., Bashenko B., Orlaty G. THE INFLUENCE OF THE “DETRIMENTAL” SPACE ON FUNCTION OF MOLDING MACHINES JAR MECHANISMS. The influence of the “detrimental” space of air cylinder on the characteristics of function of molding machines jar mechanisms has been investigated. The investigation was accomplished with computer model worked out by Dneprodzerzhinsk State Technical University. It was ascertained that maximum power of jar mechanism takes place if relative height of the detrimental space makes up: for mechanism with spool valve air distribution 0.8...1.0; with double sected valve air distribution 1.0...1.2; with piston air distribution 1.3...1.7. Minimal consumption of compression air takes place if relative height of the detrimental space makes up: for mechanism with spool valve air distribution 0.4; with double sected valve air distribution 0.7; with piston air distribution 1.1. The efficiency of function of spool valve mechanism by 25...40 per cent better then the piston one.

*Keywords:* jar mechanism, computer model, detrimental space, power, air consumption.

UDC 621.923 Molchanov V. RESEARCH OF CARRYING CAPACITY FILTRATION NETS. The losses of pressure during filtration depend arcwise on speed of filtration. Permeability of filtration element it is his ability to skip a liquid depending on an amount, sizes and configurations of the ductings. A coefficient of permeability is a size, numeral equals speed of filtration of liquid, with viscosity, to equal unit, at the overfall of pressure, to equal to unit, through a filtration partition, in thick, to equal unit. Experimental researches specify on that the coefficient of permeability in sort depends and from properties of filtration element and liquid.

*Keywords:* filtration, configurations of the ductings, a coefficient of permeability.

UDC 676.163.022 Kamel' G., Popov S., Yakovleva A. RELIABLE AND LIFE INDUSTRIAL TRANSPORT CONICAL TRIBOSYSTEM. Considered constructive, technological and operational parameters of the conical tribosystem to increase the reliability and durability of industrial transport facilities Kamyur Swedish company.

*Keywords:* taper, curl, body, conical tribosystem, the multiplicity of the circulation of alkali loading, unloading, the performance of the pump.

UDC 671.791.927.5 Kamel' G., Peremit'ko V., Yakovleva A. RESEARCH OF THE COMPENSATION FOR WEAR IN CONICAL TRIBOSYSTEMS OF THE INDUSTRIAL TRANSPORT. The methods of wear compensation in the rotor feeders are given. The formula for calculation of the feeder total wear is recommended. It is used for clearance compensation being formed while wearing and depended on the conicity, rotor, jacket and other jacket parts clamping.

*Keywords:* the compensation for wear, rotary feeder, the clamp of rotor.

UDC 539.4 Boyko V., Mechaninov S., Voloshin R. THE METHODS OF ANALYTICAL MODELING OF FRACTURE PROCESSES ON THE BASIS OF COMPLETE STRESS-STRAIN CURVES ( $\sigma - \varepsilon$ ). A review of the data analyzes describing the full curves  $\sigma - \varepsilon$  select the most rational method as applied to the problem of predicting the reliability and durability of construction, building materials and rocks. It is shown that the relaxation behavior of solids under load requires to take into account the real evolution process of

damage accumulation in materials at a time to reflect changing conditions and modes of loading.

*Keywords:* full curve of deformation, stress, damage, macro crack, analytical modeling.

UDC 624.074.4 Peremitko V., Raiderman U., Cherednik E., Zavadskiy A., Klochko K., Taberko L. THE CALCULATION OF SPACER BULKHEADS. When they apply the construction of cylindrical cover with the round bottom and which is charged by internal pressure they set up the bulkhead according to the constructional representation they should fulfill the value calculation in such order: to make up four condition of continuity where they can identify edge forces and changeable parts.

*Keywords:* cylindrical cover, bulkhead, stress, strength.

### **Section of «Radioelectronics»**

UDC 621.376 Kulik M., Syanov A. DEVELOPMENT AND RESEARCH OF MULTI-LEVEL CONTROL SYSTEMS INVERTERS FREQUENCY CONVERTERS. In this work the authors construct a model of multi-level stand-alone inverter voltage based on the linear frequency modulation, which allowed for a controlled transition process with the specified quality indicators, to investigate the algorithms and to develop a microcontroller inverter control system forming a two-level PWM.

*Keywords:* asynchronous motor, pulse-width modulation, self-inverter, energy converter, linear frequency modulation, the microcontroller.

UDC 621.391 Ryazantsev O., Kulik M., Syanov A. DIGITAL SIGNALS WITH PHASE BOX AND FEATURES. We propose a signal which provides a low bandwidth communication channel spectrum with the transmission of digital streams, analyzed its interaction with frequency-selective devices, designed and modeled an appropriate detector, shows the effectiveness of the proposed structure.

*Keywords:* harmonic signal, the phase inset, the support part, a return to the phase, quadrature, the relaxation parameter, selectivity, modeling, Fourier spectrum, the bandwidth of the channel.

UDC 539.216.2 Taran V., Primakova K. PECULIARITIES OF THE BLAST FURNACE STRUCTURE AND THE REPOLARIZATION OF BaTiO<sub>3</sub> MONOCRYSTALS GROWN AT VARIOUS GROWTH RATES. The paper deals with the results of the research devoted to the influence of BaTiO<sub>3</sub> monocrystals growth modes on the presence and concentration of structural defects, blast furnace structure, dielectric properties and peculiarities of the spontaneous repolarization process aimed at optimizing their characteristics for their employment when developing memory cells.

*Keywords:* ferroelectrics, crystallization, domain, repolarization, growth defects.

### **Section of « Electromechanics. Electrical engineering»**

UDC 681.5.03 Voliansky R., Sadovoy A. ANALYSIS OF THE CHARACTERISTIC EQUATION ELECTROMECHANICAL CONTROL SYSTEMS WITH IRRATIONAL TRANSFER FUNCTIONS. For closed-loop control speed DC electric drive with irrational transfer functions dependences roots of the characteristic equation of perturbed motion coordinates and parameters of the electromechanical system are defined. The dependences obtained show that when the system is started with the activation function irrational roots of the

characteristic equation are complex conjugates, the closer to the set point becomes negative real roots. Coordinate of the image point on the line of equilibrium, at which the root switch, defined by the parameters of the system of management.

*Keywords:* closed electromechanical system, irrational activation function, the roots of the optimal control.

UDC 62-83 Derets A., Sadovoy A. ANALYSIS OF STEADINESS OF SLIDING MODE OF FIFTH ORDER TIME-OPTIMAL CONTROL SYSTEM. In this paper was carried out analytical verification of steadiness for fifth-order sliding mode control systems, optimized in time domain with “N-i switching” method with conditions of pre-defined limitation levels of canonic coordinates for case of electric servo-drive with elastic transmission.

*Keywords:* sliding mode control, servo-drive, “N-i switching” method.

UDC 621.313.292-53 Polevoy E. CORRECTION FORCING EFFECT OF CURRENT CIRCUIT CONTROL OF THE SWITCHED RELUCTANCE MOTOR DRIVE. The paper deals with design and synthesis of discontinuous current control systems of the switched reluctance motor with correction of forcing effect in magnitude and angle turn on. Forcing effect can increase the speed of electric drive, while forming current phase of the switched reluctance motor.

*Keywords:* switched reluctance motor, forcing effect, correction, discontinuous controller.

UDC 621.313.322 Homenko V., Kolychev S., Nizimov V. AUTONOMOUS GENERATING UNIT WITH THE TIME LAG BALANCING OF EXCITATION CIRCUIT. The influence of the capacitor energy store in the excitation contour of synchronous generator with automatic regulator on stabilization process of output voltage of autonomous generating unit has been investigated in the article. It has been proved that process rate of current excitation speeding with the energy store is considerable higher in comparison with existing systems of excitation.

*Keywords:* generating unit, excitation system, capacitor energy store.

UDC 62-52 Sadovoy O., Sheremet O. METHOD OF SYNTHESIS OF THE CLOSED AUTOMATIC CONTROL SYSTEMS ON THE BASIS OF A DISCRETE TIME EQUALIZER. In this article the new method of closed automated electromechanical system synthesis on the basis of a discrete time equalizer which contains elements of traditional synthesis techniques of the continuous systems, combined with possibilities which are given by the discrete equalizer calculated on the basis of the analytical equation of discrete regulators polynomial synthesis is offered.

*Keywords:* quantization, transitive function, regulator, error.

### **Section of «Heat-power Engineering. Heat Engineering»**

UDC 536.24 Gorbunov A., Glushchenko O. CALCULATION OF COEFFICIENT OF HEAT TRANSFER IN HEAT EXCHANGER REGENERATIVE TYPE. Simple close dependences of coefficient of heat emission are got at motion of different gases in attachments of regenerators. The developed approximation dependences allow to produce a calculation without the use of tables of thermophysical properties of gases. Tables are made for determination of thermophysical descriptions of some gases and complex of proportion for the calculation of coefficient of heat emission. Checking of this method refined for adequacy, that the error of calculation of coefficient of heat emission did not exceed 1%.

*Keywords:* heat exchange, coefficient of heat emission, number of Reynolds, cell, coefficient of heat-conducting.

UDC 621.181.126 Glushchenko O. FEATURES AND ADVANTAGES of APPLICATION NEUTRALLY OXYGEN to MODE of PREPARATION of WATER ON CALDRON AGGREGATE of P-50 STALEMATE of «DNIPROENERGO» of PSP «KRIVORIZ'KA TES». The calculation of speed of formation of deposits inside the pipe is executed at application neutrally oxygen to the mode of preparation of water. The results of calculation rotined that speed of corrosion of item 20 in runback – nourishing highway is in possible limits and goes down with growth of temperature from 0,032 g/(m<sup>2</sup>·god.) on the entrance of KN-1 to 0,006 g/(m<sup>2</sup>·god.) on the entrance of SN. Growth of internal deposits of NRCH at NKVR below than at GAVR and does not exceed 4-9 g/m<sup>2</sup> for a 1000 o'clock of exploitation. Growth of temperature of metal of pipes of NRCH during the protracted exploitation on NKVR is slowed, and its value does not exceed 530-540°C.

*Keywords:* neutrally oxygen mode, corrosion, deposits inside the pipe, radiation underbody.

UDC 621.783.24:621.1 Revun M., Gress A., Kayukov Yu., Ivanov V., Cheprasov A. ENGINEERING METHOD FOR CALCULATION OF RADIOACTIVE HEAT EXCHANGE IN HEATING FURNACES OF CHAMBER TYPE. In the given work engineering method for calculation of radioactive heat exchange at heating of steel blanks in flaming furnaces of chamber type is developed. There are offered results of computational investigations by estimate for influence of classical and pulsed charts of heating for furnace of this type at quality heating for blanks.

*Keywords:* flaming chamber furnace, radioactive heat exchange, calculation, chart of heating, quality heating.

### **Section of «Chemistry. Biotechnology»**

UDC 628.387 Nester A. RESEARCH OF ELECTRODES. The paper represents relationship between usage of electrodes and current density in electrolyzers at conducting processes for renewing water solutions or removing heavy metal ions from waste waters. It's given the comparing of usage of the flat steel stainless electrodes and the plate ones produced in solution. It represents results of usage of electrodes which are made of stainless steel net of dense and rare weaving and usage of lead anodes.

*Keywords:* carbon-fiber electrode materials, rubbered titanium.

UDC 604.4:664 Filimonenko O., Gulyaev V., Filimonenko D., Dmitrienko V., Lyubich Y. RESEARCH DEVELOPMENT OPPORTUNITIES OF SOUR-MILK DRINK BY ADDING FERMENTIZING CULTURE *LACTOBACILLUS ACIDOPHILLUS*. The production technology of sour-milk drink using whey culture of *Lactobacillus acidophilus* is considered in work. Change of product acidity and biological activity of culture in the cultivation course at different temperature conditions is investigated.

*Keywords:* Lactobacillus acidophilus, whey, acidity.

UDC 347.433.3.+347.474.3 Gulyayev V., Kornienko I., Laricheva L. BIOCONVERSION OF PRODUCTION WASTES OF RAPE OIL WITH THE USE OF BACTERIA OF THE KINDS OF *LACTOBACILLUS* AND *BIFIDUMBACTERIUM*. It has been shown that there is a possibility of obtaining ethanol from waste products – rapeseed meal and rapeseed straw. The intensification of process of producing alcogol is proposed through the of a complex seeding material produced from a symbiosis of *Lactococcus*, *Bifidumbacterium* cultures and immobilized amylase enzym.

*Keywords:* symbiosis, culture, biotechnology, inoculum, immobilizationю.

### **Section of «Information Technology»**

UDC 004.4'242 Chernomurova L., Ivanin D., Savitska K. CONSTRUCTION OF EVENTUAL AUTOMATS USING PROBABILISTIC ALGORITHMS. In this work the comparative analysis of probabilistic algorithms is conducted at the decision of different modifications of problem about the "Artificial ant". Shown advantages of method of imitation of annealing before simple and cellular genetic algorithms.

*Keywords:* imitation of annealing, genetic algorithms, eventual automats.

UDC 519.8, 004.4 Kadochnikova I., Leonov A. USING ASP.NET FOR VISUALIZATION OF OPTIMAL SET PARTITIONING PROBLEM SOLUTION. Client application with solutions visualization by ASP.NET was developed for web-service of resolving continuous optimal partitioning set problem without restrictions.

*Keywords:* optimal set partitioning, visualization, client application, ASP.NET.

UDC 004.7 Babenko M., Alekseeva J. COMPUTER NETWORKS MODELING AS A METHOD OF LEARNING, DESIGNING AND OPTIMIZATION OF NETWORK OPERATION. This article deals with the aspects of computer networks modeling as one of the efficient means of studying, designing and optimization of networks operation. The problems related with productivity of the designed network can be solved by means of this method. Computer networks modeling is especially useful in their studying during the educational process.

*Keywords:* Simulation of computer networks, networks design, optimization of network operation.

UDC 681.3:65.014.1 Karimov G., Karimov I. WORKSTATIONS IN THE STRUCTURE OF INDUSTRIAL ENTERPRISE MANAGEMENT. Proposed options for the organizational structure of the company workstations system. The first option is related to the structure when each workstation corresponds to existing job function of administration and management, retaining existing tasks and organizational structure. Another option corresponds to the case when workstations managers are segregated into distinct group by functional features.

*Keywords:* structure of management system, workstations, Manager.

### **Section of «Life Safety»**

UDC 622.807.54 Luts I. DEFINITION AIR DUST ARGUMENTS CONTENT IN MINING FACE OF MANGANOUS MINES. The famous V.V.Djakov differential equation was a basis for calculating cul-de-sac airing. However, when carrying out industrial tests it was determined that experimental data do not correspond calculations, especially at small amount of air consumption. The equation does not take into account the particles coagulation process and their loss. This process can be considered as an equivalent of air quantity fanned into the face as a change of dust concentration under the influence of coagulation is proportional to squared air dust content.

*Keywords:* air dust content, cul-de-sac, air consumption, coagulation, a workplace of a mining machine operator.

UDK 65.011.3:004.413.4 Dranishnikov L., Kravshenko D. SOFTWARE FOR AUTOMATED SIMULATION AND EVALUATION OF THE RELIABILITY, SECURITY AND RISK OF DANGEROUS OBJECTS PROZVODSTVENNYH. Software package designed to assess the safety and the risk of dangerous industrial objects.

*Keywords:* automation, module, complex analysis, risk model.

UDC 314.48:614.86 Levchuk K. ANALYSIS OF REASONS OF DEATH RATE FROM ROAD ACCIDENT IN THE DNEPROPETROVSK AREA. The state of road accident is analysed on the Dnepropetrovsk area, so on Ukraine on the whole. Found out factors which influence on the risk of road accident. The dynamics of road accident and victims is resulted for them on the Dnepropetrovsk area for 2000-2011, and also principal reasons and types of road accident. The analysis of road accident is executed, taking into account human and technogenic factors.

*Keywords:* death rate, road accident, victims, risk, factors.

UDK 613.6.02:336.71 Levchuk K.O. PROFESSIONAL RISKS IN-PROCESS BANK WORKERS AND WAYS OF THEIR REMOVAL. The article examines the basic harmful and dangerous factors that can adversely affect the health, performance and efficiency of the employees of banking institutions, the ways of eliminating dangerous occupational hazards and protect the health and performance of employees of banks.

*Keywords:* professional risks, health, bank employees, labour protection, capacity.

#### **Section of «Education»**

UDC 004.4 Kadochnikova I., Dudnik A. INTERNET-PROGRAMMING USAGE FOR LEARNING DOM API. The main problems which students face when studying topic "Basic DOM API" were considered. Auxiliary tool was developed to simplify independent studying of DOM API by visualizing its basic functionality.

*Keywords:* features of DOM API studying, HTML-document, teaching plugin.

UDK 004.4 Dranishnikov L., Dryamov D. INTERACTIVE TRAINING SYSTEM. Designed and implemented an interactive learning system for course project discipline "Organization of data and knowledge," which offers a comprehensive approach to the study of this discipline.

*Keywords:* automation module, control, testing.

UDC 371.315.5 Shumeyko O. TEACHING DISCIPLINE „COMPUTATIONAL METHODS” IN THE INFORMATION ENVIRONMENT. In this paper the method of developing solutions in accordance with the teaching of discipline „Computational methods”. These examples and considered analysis.

*Keywords:* computational methods, methods of teaching, educational decision.