Abstracts

V.I.Bolshakov, N.M.Mozharenko, N.G.Ivancha, G.N.Golubyh, V.N.Loginov

The technological rational reception substantiation of blast furnaces blowing-in of the big and average volumes.

The research purpose is working out of technological parameters of blast furnaces work providing their accident-free blowing-in. Generalization of intensive blowing-in methods of blast furnaces is executed, modern fundamentals, effective and blowing-in safe technology of blast furnaces are developed and systematized. It is shown, that blowing-in of the furnace demands thorough preparation and strict observance of all operations according sequence to the developed technological instruction that will provide industrial safety and prolongation of blast furnace campaign.

A.V.Borodulin, K.A.Dmitrenko, N.M.Mozharenko, S.V.Nyn, D.V.Pinchuk, A.A.Sohatsky, A.L.Chajka

Monitoring and heat engineering analysis of blast furnace blowing out with nitrogen application in the 5000 м^3 volume furnace

The work purpose is recommendations development about blast furnaces blowing out with the maximum preservation of lining elements and cooling plates of the shaft, hearth, top protection and load device. On the example of BF № 9 the program of blast furnace blowing out with nitrogen application that has provided minimization of the harmful consequences to blast furnace, applied to the lining as a result of furnace pouring by water is developed, it has lowered the explosive mix formation probability of hydrogen and oxygen. The estimation of blasting application efficiency enriched by nitrogen is given.

I.G.Tovarovsky, A.E.Merkulov, F.M.Shutylev, V.V.Lebed

The influence parameters research of outlets on the smelting operation course with the multizone mathematical model help

The work purpose is parameters influence studying of outlets on smelting operation course with mathematical model application. It is shown, that efficiency increase of blast furnace smelting by means of burden materials distribution perfection in the blast furnace should be conducted in a direction of rational distribution search of ore loadings in ring zones on tap radius, paying special attention at axial and peripheral zones.

N.A.Gladkov

The experience analysis of the combined blasting application

The work purpose is the search of optimal composition of the enriched by oxygen blasting and efficiency increasing possibility studying of natural gas application in blast furnaces. It is shown, that efficiency of natural gas use is defined by level of theoretical temperature of gas at lances, coefficient of coke

replacement by natural gas, high quality of mixing with the blasting excluding soot formation and hydrocarbons polymerization. The further optimization of the combined blasting composition, natural gas consumption and conditions of its application is necessary.

A.S.Nesterov, V.I.Bolshakov, N.M.Mozharenko

Studying of initial melted slags behaviour on the coke nozzle at coal injection.

The work purpose is studying of technological parameters changing level of burden materials and their influence on coal efficiency fuel application in the technology of blast furnace smelting. It is shown, that a defining link of replacement efficiency of coke part by the prepared coal fuel is stability of coke quality at high temperatures and rational distribution of iron-ore materials on blast furnace section.

D.N.Togobitskaya, A.F.Hamhotko, D.A.Stepanenko

The crystallizing ability estimation and mineralogical composition of final blast furnace slags in the raw and technological conditions of the Ukrainian blast furnaces work

The work purpose is the estimation of the crystallizing ability and mineralogical composition of final blast furnace slags, typical for charging and technological conditions of Ukraine blast furnaces. The slag adjustment analysis of BF №9 of the public corporation «ArselorMittal Krivoi Rog» is carried out, the maximal speed of its crystallization and the allocated firm phase quantity is investigated at cooling of blast furnace slag. According to the complex of the properties characterizing the crystallizing ability of slag, viscosity and sulfur stripping ability, its optimal composition is proved.

A.F.Shevchenko, A.M.Bashmakov, A.S.Bulahtin, B.V.Dvoskin, L.P.Kurilova, A.V.Ostapenko

The capabilities development of ladle pig-iron refinement process by the disperse magnesium

The research purpose is the further development of the Ukrainian technology of pig-iron desulfuration by granulated or granular magnesium inflation, steady decrease maintenance of sulphur content in pig-iron to 0,001–0,002 % in the conditions of large industrial steel production. Calculating and experimental parameters of system [Mg] – [S] sizes change in the conditions of magnesium granules inflation are given during deep (≤0,005 % of sulphur) and especially deep (≤0,002 %) pig-iron desulfuration. The conditions of process and its technical and economic advantages are described.

A.F.Shevchenko, A.V.Ostapenko, B.V.Dvoskin, S.A.Shevchenko, A.P.Tolstopyat

Predictive estimation of magnesium granules inflation parameters in liquid pig-iron through double nozzle lance

The research purpose is studying of increase intensity possibility of magnesium input in liquid pig-iron during its out-of-furnace desulfuration for increasing the process productivity. It is shown, that double nozzle application in the course of granular or granulated magnesium inflation into the ladles promotes the best distribution of blown magnesium and gas in the pre-lance zone and creates preconditions for more active dispersion. It allows reducing duration of process.

A.S.Vergun, A.F.Shevchenko, V.G.Kislyakov, A.L.Rudenko

|The role of the ladle slag at pig-iron desulfuration by magnesium

The work purpose is the on the desulfuration process during granulated magnesium injection into pig-iron through the lance. Data about ladle slag composition influence on the efficiency of magnesium interaction with sulphur are presented. It is shown, that generated oxidizing slag in a ladle basicity can make negative impact on results of pig-iron desulfuration process.

S.I.Semykin, V.F.Polyakov, S.A.Dudchenko, V.V.Vakulchuk

Features exploration of a sulphur removal in the converter, metal, with a miscellaneous the sulphur and manganese contents at use of low-voltage potentials

The research object was the establishment of the basic dependences connecting electric and purging gas-dynamic parameters in the oxygen converter. By using the methods of cold modeling the basic blast factors, connecting electric signals, removed from the sector of lance – bath and the hydrodynamic processes occurring in a bath at a purge from above are considered. It is shown, that the change character of the electric signals registered on the area lance – bath, reflects hydrodynamic modes of purging, spatters, wave formation and bath pulsation.

T.S.Kiyashko, S.I.Semykin, E.V.Semykina

The research of desulfuration features in the converter of metal with a miscellaneous sulphur and manganese content during low-voltage potentials application

The work purpose is the features investigation and the removal level estimation of sulphur in the converter at low-voltage potentials of various polarity application. Pig-irons with wide range of sulphur and manganese content were exposed to processing. The expediency of low-voltage potentials application during pig-iron processing with the low sulphur and manganese content is established. Specificity of sulphur removal domination from the metal in slag is confirmed at negative polarity potential and in gas - at positive.

I.A.Pavluchenkov*, *V.P.Piptuk, M.V.Babenko, L.A.Ignatenko, S.N.Pavlov, V.F.Polyakov

The model development and refractory additives fusion processes researching on the border of interface

The work purpose is insufficiently known questions investigation of aluminum lumpy additives fusion, ferrotitanium and ferrosilicon, charged into the ladle on fusion release on a bath surface. The mathematical model and results of a calculative estimation of refractory lumpy additives fusion duration on the border "slag-metal" in the conditions of smelt processing on the system "ladle-furnace" that will allow to predict ladle efficiency technology and to form measures concerning resource-saving is given.

V.P.Piptuk, A.F.Petrov, A.F.Hamhotko, S.N.Pavlov, S.V.Grekov, V.A.Kondrashkin

Physical and chemical properties of steel remaking refining slags

The work purpose is specification of the analytical dependences describing the basic properties of multicomponent slag systems, for real slags properties estimation of steel remaking. The modelling description of structure of refining slag melts is considered. The equations of values experimental communication of viscosity are given, density and a superficial tension of slags with their modeling parameters and corresponding settlement and experimental data are compared. A perspective of physical use and chemical methodology for an estimation of real slags properties of steel remaking is confirmed.

V.P.Korchenko, L.G.Tuboltsev, V.F.Polyakov, N.I.Padun, A.M.Shevchenko

The oxidation laws of silicon and manganese at the final stages oxygen-converter smelting with the combined purge

The work purpose is research of the final stages oxygen converter smelting features with the combined purge for metal obtaining with the low and ultra low maintenance of impurity. It is shown, that at the final stages of smelting low and ultra low maintenances of carbon, silicon, manganese, phosphorus and sulphur are reached, the oxygen maintenance in metal decreases and stabilizes. The received quantitative values of indicators can be used for an estimation of metal quality and technical and economic indicators of metal melt process with the low maintenance of silicon and manganese.

V.P.Piptuk, V.F.Polyakov, I.A.Pavluchenkov, S.E.Samohvalov*, *A.F.Petrov, M.V.Babenko, S.N.Pavlov, L.A.Ignatenko

Use of numerical methods in studying properties and conditions of material additives during steel manufacture

The work purpose was studying of use possibility of physical and chemical methodology in studying of ferroalloys properties, firm slag making mixes, their components and refining slag systems applied at different stages of steel remaking. Working-out necessity of the mathematical models describing fusion (dissolution) of used additives on border of metal section and slag phases taking into account a trajectory of their movement, hydrodynamics and a thermal condition metal melt is defined

L.G.Tuboltsev, V.P.Korchenko, D.N.Togobitskaya, N.I.Padun, A.M.Shevchenko

Interface technologies of steel production

The work purpose is theoretical positions perfection on working-out of interface technologies of the metal products, the defining feature of which is chain use of various steel-smelting units following one after another and reception purpose of final metal products with the set chemical compound, corresponding quality and with minimum power and material inputs. The system decision of a problem on the basis of through technology consideration as dynamically changing industrial system is used. Research is intended for working-out of offers on improvement of manufacture processes of steel with the properties complex.

S.M.Zhuchkov*, *P.V.Tokmakov*, *A.I.Leshchenko*, *S.I.Baduk

The design of three focal rolling module at its installation in a line of a continuous section mill

The work purpose is working-out of requirements and the technological concept of three focal rolling module according to technological problems, power parameters of rolling and an arrangement in a line of the continuous rolling mill. Possible schemes of three focal rolling module are considered and variants of its constructive execution are offered at its installation in a line of operating and during construction of continuous high-quality rolling mills. It is shown, that the general drive, rolling in the non-powered rolls should be kept with small back backup and a forward tension.

S.M.Zhuchkov* *M.N.Shtoda, D.G.Palamar

Estimation of technological possibility of three-start thread rolling-divisions organization with rebar № 8 on the stand 250

The work purpose is studying of technological possibility of process realization of three-start thread rolling-division with non-powered deformation-division device application during rebar manufacture. For conditions of continuous light-section mill 250–1 of Open Society «ArselorMittal Krivoi Rog» it is shown, that by rebar №8 manufacture technical possibilities of the basic process equipment of a mill allow to realize technology without essential reconstruction.

V.I.Biba, V.A.Olejnik

Working-out of universal calibration of rolls for high accuracy round profiles rolling

The work purpose is working-out of rolls calibration technique, high accuracy of the sizes providing achievement hot-rolled metal during rolling in the fair calibres. The universal method of calculation and construction of round two-and three rolled calibres with releases of the various form taking into account permissible deviations on diameter of rolled metal of any class of accuracy is stated. Application of the calibres calculated by the given technique provides reception of round profiles with the set accuracy, promotes prevention stripe formation and "moustache", and provides steady work of stands.

L.A.Shevchenko, V.V.Zelinskaya, L.T.Zhupinskaya

Research and definition of the steel surface clearing technological parameters from low temperature plasma pollution

The work purpose is research of surface cleaning method of low temperature plasma, alternative to traditional means of rolled metal steel surface cleaning from pollution. Research is carried out and technical characteristics on plasma cleaning of rolled metal from pollution are defined. It is established, that each concrete capacity of plasmatron is answered with the concrete optimum speed of its moving providing qualitative cleaning of rolled metal surface from pollution.

A.J.Putnoki, V.T.Tilik, V.G.Ivanchenko, V.Z.Kutsova, T.V.Kotova, A.A.Chernoivanenko

Structure, distribution of elements and properties of hot-rolled sheet low-carboned steel 08 semi-sielent

The purpose of the given researches is studying of elements distribution in low-carboned steels 08 semi-sielent structure, the rolling termination of which occurred in the field of ferrite structures temperatures, and its influence on formation of structure and metal property. Properties, structure and distribution of chemical elements on section of hot-rolled sheet low-carboned steel, rolled in the field of temperatures of ferrite metal conditions are studied. It is shown, that higher values of strength and fluidity are observed during rolling in the field of temperatures of ferrite condition.

O.S.Kasiyan, A.I.Breskina, S.D.Adamsky

The rape oil investigation as a basis of technological lubricating cooling means for cold rolling of sheet steel

The work purpose is research of technological properties of lubricants received on the basis of vegetative raw materials renewed in the conditions of Ukrainian raw materials and which application can reduce considerably the raw materials import for manufacture of technological lubricants and lubricoolants. Ways influence of rape oil processing on thermal stability and lubricant

efficiency of technological lubricating-cooling means on their basis is investigated. The optimum fatty-acid structure crude of rape oil for reception of effective basis is defined.

S.M.Zhuchkov, M.S.Valetov, V.M.Kuzmichev, O.N.Perkov

Modelling of molding billet of the centre for a locomotive wheel on lead samples

The research objective is studying of application possibility of the centers for locomotive wheels on the existing equipment of wheel rolling shops, including the demanded length of locomotive wheels nave. Within the limits of possibilities studying of modeling billet centre naves manufacture on lead preparations is carried out. Modeling has shown basic possibility of products application with a nave in length to 345 mm. The effort at modeling did not exceed 2,5 MH, that corresponds to effort of molding of natural samples nearby 80 MH.

I.G.Uzlov, K.I.Uzlov, A.V.Knish, A.M.Hulin, Z.A.Dementeva

The analysis phase transformations kinetics of the wheel-band steel according to the hardening-microstructural analysis

The research object is studying of cooling speed influence on structurization of the wheel-band steel. Formation of steel structural condition and parameters of its formation depending on speed of cooling at thermal hardening is investigated. It is established, that thermal kinetic structurization of the wheel-band steel and, as a consequence, formation of properties, essentially differ for the wheel-band steel microalloyed by vanadium and without microalloying.

V.A.Lutsenko, M.F.Evsjukov, T.N.Panfilova, A.I.Sivak

The research of phase transformations kinetis into electrosteels 42Cr4Mo2

The work purpose is definition of cooling modes by manufacture of large size rolled metal. The laws transformation kinetics and features of formation of the microstructure in the electrosteel 42Cr4Mo2 after separate heating 850^0C with the subsequent cooling in the range of speeds 0,03 … 240^0S/s are studied. The researches results are presented in the form of the thermokinetic diagramme of austenite transformation with the description of the formed microstructures.

V.A.Lutsenko

The research of thin structural wire rod from the steel SV-10NMA after hardened out thermomechanical processing

The work purpose is research of high-temperature deformation influence and the subsequent conditions of cooling on austenite transformation kinetics and a parity of structural components which are necessary for considering by

working out and introduction of new highly effective technological processes of welding wire rod manufacture. It is shown, that after hardened out thermomechanical wire rod processing from steel Св–10НМА is forming multiphase ferrite-perlite-bainite-martensite structure, which provides high plasticity and ability of steel to deformation forming. Features of thin structure of ferrite, perlite, bainite and martensite in the island strengthening places which do not interfere into the dispositions movement are revealed.

O.P.Ostash*, *A.I.Babachenko, I.M.Andrejko, V.V.Kulyk*, *A.A.Kononenko

The structural destruction mechanics and operational reliability of railway wheels

The research purpose is working out of criteria which can serve as indicators of railway wheels reliability, especially high-strength ones. For an estimation of railway wheels reliability according to conditions of their operation necessity of fracture toughness characteristics application is proved. It is shown, that according to the indicators of cyclic fracture toughness, characterising near-liminal and medium amplitude site of the kinetic diagramme of fatigue failure, the wheels of mark КР-Т practically do not concede to similar indicators for wheels of mark КР–2.

A.J.Borisenko

About the structural heredity in greypig-irons

The work purpose is research of structural heredity in grey pig-irons as a component of the general theory of the structural heredity in metals and their alloys. The analytical review of data about the structural heredity in grey pig-irons is carried out. Necessity of general theory working out of a structural heredity in iron-carbon alloys, based on the knowledge of mechanisms of liquid and solid-phase transformations is noted.

M.F.Evsjukov, I.A.Krivosheeva

The kinetics of beinite transformation in the medium-carbon steel alloyed by molybdenum

The work purpose is studying transformation kinetics of overcooled austenite in the big interval of cooling speeds of steel 32ХМА–3. It is established, that alloying by molybdenum of the medium-carbon steels are raised sharply by austenite stability at it diffusion disintegration, shifting disintegration area on perlite and ferrite towards small speeds of cooling. It is shown, that the disintegration area on bainite is separated from disintegration area on perlite. Bainite transformation is realised in a very big interval of cooling speeds in the range of temperatures 530^0 – 335^0C with formation, basically, products of disintegration of granular structure.

L.A.Shevchenko,? .VV..Zelinskaja, L.T.Zhupnskajai

Research and determination of technological parameters of cleaning of surface

became low temperature plasma from contaminations

Research of surface cleaning method is the purpose of work by low temperature plasma, alternative to traditional facilities of surface cleaning of steel rental from contaminations. Research is conducted and technological descriptions of the plasma cleaning of rental from contaminations are certain. It is set that concrete optimum speed of his moving answers every concrete power of plazmotrona, providing the high-quality cleaning of surface of rental from contaminations.

V.F.Moroz, E.V.Prihodko, O.V.Kuksa

Parametres influence of internuclear interaction on steels and alloys snowflake sensitivity

The purpose of the present work was studying of internuclear interaction parametres influence on snowflake sensitivity of steels with application of physical and chemical model of metal melts with axel centrical crystal –like structure. Interconnection of snowflake sensitivity of steels of various structure with integrated parametres of internuclear interaction is studied. It is established, that with a chemical equivalent of structures Z^Y <1,3 e became inclined, and with Z^Y> 1,5 e are not inclined to formation of flakes.

O.G.Sidorenko, I.P.Fedorova, A.P.Suhoj

The new methodical approach to researches of phase transformations

The work purpose was revealing of power influences nature under which influence in processed steels and other materials phase transformations develop, and studying of possibilities of the new methodical approach to their researches. It is shown, that further theory development of phase transformations can be provided under condition of the account of development dependence of phase transformations from (absorption) of the warmth necessary generating for restoration of thermodynamic balance.

V.I.Bolshakov, V.V.Butsukin

Estimation of pulsation development possibility in the rotating system of an electromechanical drive

The work purpose is development research of pulsation in a two-mass electromechanical drive of heavy metallurgical cars at the expense of an exchange of energy between electric and mechanical systems. On the basis of mathematical modeling pulsation occurrence in similar systems is shown if the parity of elastic-mass and electric parameters is in limits of an adverse range. It is shown, that at introduction of positive feedback frequency increases, dispersion of energy of fluctuations decreases, stability of the drive decreases and, as a rule, at fluctuations interaction of electric and mechanical systems of a drive amplifies.

V.I.Bolshakov, I.B.Listopadov

Features of feeding device work at unstable rolling

The work purpose is unstable modes research of rolling on pilger rolling mill in the conditions of emergency operation possible development of feeding device work. Influence researches of rolling sleeve diameter increase on kinematics of the feeding device working are carried out, the results of which create preconditions for management system engineering by the feeding device during pipes rolling, allow to make changes into design procedures of constructive and energy-power parametres of its work.

A.M.Bashmakov

The complex equipment of pig-iron desulphuration by the granulated magnesium

The work purpose is working out of requirements and layout decisions of pig-iron desulfuration complexes by the granulated magnesium, considering the organisation operated or projected manufacture individually from each customer. For the cardinal improvement problem decision of a melted steel quality, including the expense of low-sulphur manufacture and especially pure from sulphur grades of steel, with simultaneous reduction of expenses for their reception, at many large metallurgical enterprises one has found technology application of out of furnace pig-iron desulfuration directed to steel-smelting manufacture.

B.N.Majmur, K.V.Baiul, A.T.Lebed, V.I.Petrenko, S.V.Vashchenko, A.G.Soja

Working out and control devices tests of pressing effort in roll processes

The work purpose is working out of control devices for regulation and the control of technological operating modes of rolling briquette presses. The measuring instrument description of a new design pressing effort for rolling briquette presses, its tests are given. On the basis of experimental data interrelations between size of pressing effort and other parametres characterising modes of briquetting process are established and analysed.

V.I.Bolshakov, J.I.Cherevik, A.M.Bashmakov

Working capacity estimation and modernisation of desulfuration pig-iron installations equipment of the first GENERATION

The work purpose is equipment modernisation of pig-iron desulfuration installations for decreasing in breakdown susceptibility, reliability and durability increasing, maintenance of deep steady pig-iron desulfuration. The working capacity estimation of installations equipment of the first generation pig-iron desulfuration in which tuyere device plunged into a ladle with the melt by gravity is executed. The modernisation of this equipment which has raised its reliability and durability is carried out.

A.V.Borodulin, A.V.Vorontsov, M.V.Temlyantsev, A.L.Chajka

The dynamics macroanalysis of power consumption of the metallurgical enterprise production by full power balance method

The research objective is the further development of the thermodynamic analysis methods with construction of the full power balance used for an estimation of potential energy saving of the metallurgical enterprise. On a concrete example the expediency and efficiency of application of full power balance of the prof. V.S.Stepanov using concept «exenergy», for the analysis of power consumption of metal products in various economic conditions of functioning of the enterprise is shown.

V.G.Chernichenko, M.D.Kutsygin, V.K.Spinjakov

Ultrasonic quality assurance of preparations in the metallurgical enterprise conditions

The work purpose of not destroying quality assurance application possibility studying of metal products by means of ultrasonic apparatus in the conditions of the modern metallurgical enterprise. Application of an echo-impulse method for test of billet with the section 150x150 mm allows to reveal well enough defects of slag inclusions type, a pipe, internal cracks and ruptures, stratifications. The analysis of results of the ultrasonic control allows to estimate a technological level of manufacture and quality of rolled metal, to define a number of the technical and organizational measures providing competitiveness of production.

V.A.Gorohova, L.G.Tuboltsev, V.P.Korchenko, N.I.Padun

Manufacture modernisation problems and ecological situation in iron and steel metallurgy of Ukraine

The work purpose is the ecological situation analysis in metallurgy of Ukraine. It is shown, that during measures implementation directed on improvement of the ecological situation, to 2012 year it is possible to count on decrease of emissions of hotbed gases and dumps of a toxic waste in reservoirs, and also on positive results of energy saving.

V.I.Bolshakov, E.V.Prihodko, I.G.Muraveva

Labour and a career of A.F.Shevchenko

Data about the life and the creative activity of the Doctor of Engineering A.F.Shevchenko who is the pupil and the continuer of scientific school about the out of furnace pig-iron desulfuration of prof. N.A.Voronova.

V.I.Bolshakov, E.V.Prihodko

To 75 anniversary of engineering science doctor, professor *V.F.Polyakov*

Data about the life and the creative activity of the Doctor of Engineering,

the prof. V.F.Poljakov who is the prominent scientist in the field of steel-smelting manufacture are given.

V.I.Bolshakov, G.V.Levchenko

To the 70 anniversary of engineering science doctor, professor V.V.Parusova

Data about the life and the creative activity of the Doctor of Engineering, prof. V.V.Parusov who is theprominent scientist in the field of materials technology and thermal processing of the rolled metal are given.

V.I.Bolshakov, G.V.Levchenko

To the 90th anniversary from the date of Vadim Demjanovich Chehranov's birthday

Data about the life and the creative activity of the Candidate of Engineering, the laureate of the USSR state award, the former deputy director of the Institute of Iron and Steel, who was the prominent scientist in the field of rolling manufacture are given.

A.M.Junakov, V.I.Bolshakov

In honour to Igor Ivanovich Leepa

Data about the life and the creative activity of the Doctor of Engineering I.I.Leepa who was the pupil of the corresponding member of USSR S.N.Kozhevnikov and the prominent scientist in the field of metallurgical machine science, theory of mechanisms and cars, dynamics of large cars are given.

M.S.Valetov, V.M.Kuzmichov

100 years of M.J.Shifrin (1909-2001)

The article is devoted to 100 anniversary from the day of birth of the known scientist, specialist in area of the rolling production of Doctor of Engineering M.J.Shifrin.