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СОДЕРЖАНИЕ

ABSTRACTS

UDC 622.7 (075.8)

Development of the Practice of X-ray radiometric Separation of Lump Siderite Ores

Melamud S. Gh., Dudchuck I. A., Shatsillo V. V., Yuriev B. P. // Stal'. 2015. № 2. P. 2 – 6.

The research on concentration of lumped siderite ores of shaft output at preparation them for reducing roasting were carried out, it was carried out with using of industrial X-rayradiometric separators. The technological scheme of preparation of siderite ores for metallizating roasting in shaft-furnaces was suggested. The scheme ensures obtaining the concentrate after the X-rayradiometric separation with necessary metallic properties. The obtained results present certain interest for further improvement of methods of preparation of siderite ores for metallurgical operations and increasing amounts of their using.

Key words: siderite ore, X-rayradiometric separation (X-RS), reducing burning, metallization, X-ray irradiation, analytical parameter, rattling, line of separation, tails, concentrate, quality, concentration, technology.

UDC 669.162.16

Once More on Using Power in the Blast Furnace Heat

Donskov E. Gh., Lialiuk V. P., Donskov A. D. // Stal'. 2015. № 2. P. 7 – 9.

The consumption of coke in the blast furnace is entirely determined by demand and effectiveness of the use of high-temperature of heat demand in the reduction melting effect on the process through the change of the heat demand.

Key words: blast furnace, coke consumption, the direct and indirect reduction, heat exchange, efficiency, effectiveness.

UDC 669.162.266

Results of Performance of Blast Furnace No 7 of the PJSC «ArcelorMittal Krivoy Rog» Equipped with a Calibrator

Listopadov V. S., Miroshnichenko O. N., Romanchuk A. V., Tarasov V. P., Tarasov A. V., Krivenko S. V. // Stal'. 2015. № 2. P. 10 – 12.

In April 2013 batch distributor with «Tarasov's calibrator» was mounted on BF№7 PJSC «ArcelorMittal Krivoy Rog». An uniform distribution of charge material on the upper cone and the furnace were obtained without usage of rotating batch distributor. This allowed to reduce coke consumption for 15 kg per ton of pig iron with increase of part of CO2 in the blast furnace gas from 15.8 to 18.9 %.

Key words: coke saving, calibrator, uniform distribution.

UDC 669.18.001.76

Steelmaking Production : Reserves of Development and Increase in Efficiency

Parshin V. M. // Stal'. 2015. № 2. P. 13 – 17.

Modern high-performance steelmaking scheme completed its formation in the second half of the twentieth century and used throughout the world. Its usage provides high technological parameters: the cycle of melting does not exceed 60 minutes at a yield of about 99 percent of the product. This testifies to the perfection of technology, however, does not mean achieving extremely low cost.

Key words: reserves, efficiency, substitute scrap, slag processing, intelligent control systems, ultrasonic vibrations, innovation.

UDC 621.746:51-74:62-5

Rational Parameters of Thermal Performance of the Steel Slab CCM Secondary Cooling Zone

Biriukov A. B., Ivanova A. A. // Stal'. 2015. № 2. P. 18 – 21.

Method for determining of slab CC's rational secondary cooling intensity distribution depending on casting parameters which bases on mathematical simulation of slab heat state and determining of sectors influence areas on metal temperature field is created. List of values that give full information about secondary cooling regime of continuous casting and allow spreading of results obtained with mathematical simulation for some set of conditions to other conditions is proposed. Ability of heat regimes for different slab CC's comparing on the base of proposed characteristics of secondary cooling is illustrated.

Key words: continuous casting, slab, mathematical simulation, temperature field, secondary cooling, heat regime control.

UDC 621.74

Modification of Steel Grades 08ГДНФЛ and 12ДН2ФЛ by Adding Si-Free Master Alloys

Beliaev S. V., Korovin V. A. // Stal'. 2015. № 2. P. 22 – 23.

The results of the study of the properties of alloy steels 08ГДНФЛ and 12ДН2ФЛ after modifying processing complex alloy not containing silicon. It is established that the use of complex alloy the АКЦе allows you to increase the strength properties of steels 08ГДНФЛ and 12ДН2ФЛ.

Key words: steel, alloy, modification, microalloying, microstructure, ligature.

UDC 669.046.558.6:669.89

Criteria of Quality Evaluation of Deoxidizers and Modifying Agents for Steel

Riabchikov I. V., Misin V. Gh., Usmanov R. Gh., Golubtsov V. A., Miliuts V. Gh. // Stal'. 2015. № 2. P. 24 – 27.

Reviewed quality characteristics of alloys containing magnesium, alkaline earth and rare earth elements, titanium and zirconium to steel deoxidation and modification. Quality parameters of alloys – multicomponent structure, low melting temperature homogeneity of chemical and structural composition, low oxide content. Is shown that the effectiveness of multi-component alloys with microcrystalline structure associated primarily with the effects on the molten steel as barium universal modifier steel deoxiidizer.

Key words: deoxidizer, inoculant, quality, structure, steel, elements, solubility, ionization potential, solutions, enthalpy, reactions, iron, barium, lanthanum.

UDC 621.771

Research and Development of the Techniques for Stabilization of the Thickness of the Hub of Rough Wheels Rolled after Long and Short Downtimes

Tarasova V. A., Sevastianov A. A. // Stal'. 2015. № 2. P. 28 – 33.

UDC 621.771.073

Analysis of Service Durability of Two-Layer Iron Cast Rolls

Scoblo T. S., Avtukhov A. K., Sokolov R. Gh. // Stal'. 2015. № 2. P. 34 – 37.

Generalized information about the influence of the chemical composition of the alloy hardness and structure of a working layer of centrifugal casting sheet rolls performances ЛПХНМд-71 and ЛПХНМд-73 on their operational durability.

Key words: mill rolls, working layer, electron probe microanalysis, regression equation, structure, hardness, coercive force.

UDC 621.774.35

Implementation of the Techniques of Screw Broaching and Radial Forging of Seamless Pipes of Steel Grade ЧС68-ИД

Egorov M. V., Mitroshenkov A. V., Prokhorenkov K. V., Loghinov Yu. V., Budanov Yu. P. // Stal'. 2015. № 2. P. 38 – 41.

Each year, an increasing demand for high accuracy austenitic pipes of fuel assemblies for fast reactors . Under these conditions, the most important task is to find possible ways to reduce production costs while maintaining the existing high level of quality and ensure its performance , mainly resistance to radiation swelling . In order to optimize the production process the complex of works for the introduction of a screw firmware and radial forging technology instead of deep drilling with necessary procedures for the qualification and launch of new products .

Ключевые слова: radial forging, cross-helical rolling, extra thin-walled tubes, fast reactor, method of deep drilling.

UDC 621.778

Evaluation of the Basic Indicators of the Hydrodynamic Friction Regime in Drawing Thin Wire

Gurianov Gh. N. // Stal'. 2015. № 2. P. 42 – 48.

Based on the proposed equations the calculation of basic indicators of hydrodynamic friction during wire drawing, depending on its diameter, lubricant consumption and geometrical parameters of the pressure

sleeve. Voltage protivostaianie from the grease when drawing a thin wire significantly affects the hydrodynamic friction.

Key words: drawing, wire, pressure bushing, liquid lubrication, hydrodynamic friction, calculation methodology, the thickness of the layer of grease plot of velocity, shear stress, yield stress.

UDC 669.02/.09:658.58

Causes of Accelerated Wear of the Supporting Ring of the Turning Mechanism of the EAF Vault

Sidorov V. A. // Stal'. 2015. № 2. P. 49 – 54.

Causes of unplanned shutdowns and failures for one of the most common design of roof turning mechanism of electric arc furnace (turning shaft, mounted on a support ring driven by a hydraulic cylinder) are identified. Parameters and causes of abrasive wear, causes of pitting wear due to the dynamic forces arising due to the electric arc during melting are considered in research.

Key words: electric arc furnace, roof turning mechanism, support ring, types of mechanical wear, vibration parameters.

UDC 621.771.06.5

Controlling the Main Drive Dynamics of the Pipe Cold Rolling Mill

Rakhmanov S. R., Vyshinsky V. T. // Stal'. 2015. № 2. P. 55 – 60.

Research of model of the main drive of a camp of HPT in which the technique of the dynamic analysis including a combination of known receptions and further development of methods of calculation of dynamics of cyclic cars and mechanisms is applied is given. Justification of constructive decisions on modernization of a camp of HPT and stabilization of its dynamics is carried out. The mechanism of realization of optimum control is offered by fluctuations of the line of the main drive of a camp of HPT. The mathematical model of system of optimum control is developed by dynamic processes of the line of the drive of a camp of HPT. For the chosen structures of optimum control fluctuations of the line of the drive and area of desirable conditions of a camp of HPT determined parameters of optimum active managing directors of influences.

Key words: pipe, drive, spindle, dynamics, vibration, fluctuations, mathematical model, dynamic stability, critical condition, device, moment of elastic forces, optimum control, area of desirable states, deformable system.

UDC 621.774:622.23/24]:621.039

Innovation Developments Aimed at Increasing the Service Reliability of Pipes of Ferrite-Austenite Steel Grades

Panchenko S. A.. // Stal'. 2015. № 2. P. 61 – 67.

Innovative technology to produce ferritic-austenitic tubes is developed based on the results of comprehensive studies and principles of grain boundary design allowing significant improvement of tubes resistance to intergranular, pitting corrosion, corrosion cracking and sulfide stress corrosion cracking. Improved corrosion testing methods and new non-destructive testing method for intermetallic phases are developed and applied for in-process and acceptance inspection. Developed technology and extension of acceptance inspection scope ensure improvement of tubes operating reliability produced by CENTRAVIS PRODUCTION UKRAINE PJSC.

Key words: corrosion-resistant ferritic-austenitic steels, tubes production technology, hot-extruded and cold-rolled tubes, structure, grain-boundary design, corrosion characteristics, corrosion testing methods, new non-destructive testing method for intermetallic phases.

UDC 620.178.38

Fatigue Endurance of the Bevel Pinion of the Gas-Turbine Engine of Steel Grade 16Х3НВФМБ

Morozova L. V., Orlov M. R. // Stal'. 2015. № 2. P. 68 – 71.

Operational destruction of the leader of conic gear wheel of reducer of the high-maneuverable gas turbine engine from steel 16Х3НВФМБ is investigated. It is established that destruction of gear wheel arises and develops on the mechanism of multicyclic fatigue in interface place working tooth surfaces, hollow between teeth and facets of end surface of toothed wreath from the small module. The center of fatigue failure is located on edge in zone of bilateral saturation of surface carbon in the course of the chemist of thermal processing.

Key words: destruction, martensite, chemical and thermal processing, multicyclic fatigue, trans-crystalline quasichip.

UDC 669.14.018.256-179

Modelling of the Method of Increasing the Wear Resistance of the Excavating Machine Crowns at the Expense of Dispersing Hardening by Titanium Carbide

Anikeev A. N., Chumanov I. V., Sementinov I. A. // Stal'. 2015. № 2. P. 72 – 74.

The wear resistance of accessory crowns of excavators provides uninterrupted operation of mining excavators. Outlined an experienced technology hardening crowns excavators particulate titanium carbide, developed «South-Ural State University» (National Research University) in Zlatoust and tested on enterprise «Uralpromdetal.» The results of examination of microstructures by optical and scanning electron microscopy, as well as the results of mechanical tests of crowns samples.

Key words: Hadfield steel, hardening, hardening phase, particulate titanium carbide, cast on gasified models, crown of excavator, structure, hardness and wear resistance.

UDC 658.32+65.015.25

Labour Productivity and Wages : Correlation and Necessity of Growth

Kotliar B. A. // Stal'. 2015. № 2. P. 75 – 81.

The article contains the analysis of the problem of correlation between workforce productivity and labor remuneration and the necessity to increase these rates to ensure competitiveness of industry. Disadvantages of the current structure of labor remuneration are identified based on the mining and smelting industry statistics and brief analysis of labor remuneration valuation methods is provided.

Key words: workforce productivity, GDP deflator, salary, consumer price index, investments.

UDC 621.928.6:669.046.58

Recycling of Metallurgical Slag by Means of Pneumatic Separation

Ponomaryov V. B. // Stal'. 2015. № 2. P. 82 – 83.

The article discusses the use of pneumatic separation of slag in the production of abrasive powders for sandblasting. The developed technology allows through recycling processes metallurgical slags getting popular and useful materials in the industry.

Key words: separation, metallurgical slag, abrasive powders, dumps, industry.

UDC 669.181

Determination of the Ammonia Water Solution Analysis in Sludge of Direct Iron Reduction Shaft Furnaces

Timofeeva A. S., Chichvarin A. V., Nikitchenko T. V., Fedina V. V. // Stal'. 2015. № 2. P. 83 – 85.

The article deals with methods of detection of ammonium compounds contained in slurry of a metallization furnace. The presented results were obtained through the use of Nessler gravimetric analysis; potentiometric analysis based on the modified Kjeldahl technique. We have come to the conclusion that the use of Kjeldahl technique is more efficient.

Key words: shaft furnace, HYL process, slurry, ammonium compounds, ammonia, Nessler method, Kjeldahl method.