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E-mail: vestnik@ssga.ru
Tel. (383)361-06-55
http://vestnik.ssga.ru

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OPTICS, OPTICAL AND ELECTRONIC DEVICES AND COMPLEXES

METROLOGY AND METROLOGICAL SUPPORT

ECOLOGY AND ENVIRONMENTAL MANAGEMENT

ECONOMICS AND MANAGEMENT OF NATIONAL ECONOMY

SOCIO-HUMANITARIAN RESEARCH

CONSTRUCTION ACCORDING TO GEODETIC DATA OF EXPECTED MODEL OF PROCESS MOVEMENTS OF THE CREST OF THE DAM OF SAYANO-SHUSHENSKAYA HYDROELECTRIC POWER STATION (AT THE STAGE OPERATION OF 2007–2009)

Natalia N. Kobeleva
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Senior Lecturer, Department of Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: n.n.kobeleva@mail.ru

Valery S. Khoroshilov
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., D. Sc., Prof. of Department of Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: Khoroshilovvs@mail.ru

In article process of creation of dynamic model on the basis of geodetic data for forecasting of process of movements of controlled points of a crest of a dam of Sayano-Shushenskaya hydroelectric power station for the purpose of studying of observed deformation processes of a construction at an operational phase of 2007–2009 is considered. The solution of the recurrent equation in the form of two first conditional moment functions of process of movements of observed points of the construction representing expected model which allows to find forecasts of movements of concrete points and precompute forecasting errors is shown. As the major influencing factors the hydrostatic pressure and temperature are chosen, and the residual part of process is presented by model noise components, i.e. by expansion of a vector of states. The sequence of performance of stages of estimation at creation of expected mathematical models depending on character of a predictive task for various temporary periods of operation is presented.

Key words: geodetic data, dynamic model, forecasting, movements of controlled points, deformations of a construction.

ANALYSIS OF GEOMETRIC PARAMETER ACCURACY OF CYLINDER FORM AGGREGATES ACCORDING TO GEODETIC MEASUREMENT RESULTS

Anatoly G. Nevolin
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Associate Professor of Department Engineering and Mining Geodesy, tel. (383)343-29-55, e-mail: agentagn@mail.ru

Tat'jana M. Medvedskaja
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Senior Lecturer of Department Engineering and Mining Geodesy, tel. (383)343-29-55, e-mail: mtm2112@yandex.ru

Geodetic control of roaster furnace and drying machines parameters is performed by various methods with the use of total stations and laser scanners, allowing to accelerate geometric parameters control and improve accuracy of geodetic measurements. It is possible to determine the geometric parameters of such machines, their form and rotation axes positions with the help of mathematical analysis of spatial data and 3D modeling. In this case the particular significance belongs to accuracy estimation parameters, obtained from mathematical processing of geodetic measurement results. The article considers the determination methods of

geometric parameters of drying machines and roaster furnaces, their forms and rotation axes position according to the geodetic measurement results, performed in static mode. The solution of this task is proposed to be performed with the help of spatial data mathematical analysis and modeling cylinder objects.

Key words: large-sized machines, drum drying machines, roaster furnaces, geometric parameters, accuracy estimation, mathematical analysis, surface model, measurement result approximation.

GEODETIC METHODS OF DETERMINING SLOPES TECHNOLOGICAL PIPELINES

Vladimir G. Demin
Sibrechenergo, 630032, Russia, Novosibirsk, 18/1 Planirovochnya St., Chief of department buildings and structures, e-mail: v.g.demin@sibte.ru

Anton V. Nikonov
Sibtechenergo, 630032, Russia, Novosibirsk, 18/1 Planirovochnaja St., engineer surveyor, e-mail: sibte@bk.ru

Yuri P. Kazankov
Sibrechenergo, 630032, Russia, Novosibirsk, 18/1 Planirovochnya St., Chief specialist of department buildings and structures

The article contains the requirements of inclination accuracy determination of high tense steampipes. It describes the methods of work with total station for determination of planned high-altitude steampipe position in reference to constructions, and also its inclination. It is stated that the inclination can be determined by total station with the error not more than 0,000 5. Steampipe (circus) section centre position can be modeled in program product AutoCAD by three points on pipe surface, the coordinates of which are determined by remote tacheometric survey.

Key words: slope pipeline, total station, geodetic survey, leveling, accuracy, geometric parameters.

THE RESULTS OF EXPERIMENTAL DEFINITION OF COORDINATES OF GEODETIC POINTS GLONASS MEASUREMENTS

Nikolai K. Shendrik
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Head of the Laboratory of the Department Physical Geodesy and Remote Sensing, tel. (913)739-55-17, e-mail: snk_aig@mail.ru

For example, a separate item is made to determine the coordinates of satellite measurements of GLONASS. Were involved in experiment - SIGMA satellite receiver, installed on the designated item NSKN, and software GIODIS company JAVAD that allow to correctly receive and process GLONASS measurements. As the source points were used permanent base station of the Novosibirsk region and the International geodynamic network. The reference coordinates to the designated point were obtained by GPS measurements with the help of the program "Trimble Business Center". The experimental results showed that the removal of the

starting points to determine the coordinates of 500 km and heights of points on the measurement of individual separate GPS and GLONASS are comparable in accuracy.

Key words: geodesic coordinates of the point, reference coordinates, measurements GLONASS, receiver SIGMA, software GIODIS.

EVALUATION OF THE ACCURACY OF DETERMINING AREAS OF FOREST FELLING USING IMAGES FROM THE RUSSIAN SATELLITE «RESURS-P» № 1

Vladimir A. Khamedov
Ugra Research Institute of Information Technologies, 628011, Russia, Khanty-Mansiysk, 151 Mira St., Head of the Center for Space Services, tel. (3467)35-91-39, e-mail: xamedovva@uriit.ru

Boris T. Mazurov
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., D. Sc., Professor of Department Physical Geodesy and Remote Sensing, tel. (383)343-29-11, e-mail: btmazurov@mail.ru

Describes some results on the implementation of the State program «Development of forestry for 2013–2020». In the center of space services of the Khanty-Mansiysk Autonomous Okrug-Ugra developed a system of satellite monitoring of the state of forest ecosystems, focused on the justification of state control of forest areas using remote methods, including the detection and mapping of forest cuttings. Work has been done to evaluate the accuracy of the areas determined with the use of data of remote sensing medium spatial resolution based on the comparison with satellite imagery of high spatial resolution from russian satellite «Resurs-P» № 1. It is established that the assessment of determining the area of objects in various thematic applications of mapping and monitoring changes according to the data of «Landsat-8» can be carried out with sufficient accuracy when the observed objects areas over 10 ha.

Key words: remote monitoring, satellite imagery, satellite monitoring system, the area of forest cutting, «Landsat-8», «Resurs-P».

SEVERAL ASPECTS OF METRIC REALISTIC 3D MODELS CREATION REMOTE SENSING DATA

Aleksander P. Guk
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., D. Sc., professor-consultant, Department of Physical Geodesy and Remote Sensing, tel. (383)361-01-59, e-mail: guk_ssga@mail.ru

Mariya M. Shlyakhova
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10, Plakhotnogo St., Ph. D., associate professor of Department of Applied Informatics and Information Systems, tel. (960)779-62-25, e-mail: plazma_space@mail.ru

In this work the the basic principles of measuring realistic 3D models of terrain objects for different types of aerospace images; digital human and scanner images, high resolution satellite images, aerial and ground laser survey from the perspective of a unified approach to the treatment of various types of data. Is refined the term «measuring realistic 3D models of terrain objects». The

features of the present stage of technological development for constructing 3D models, associated with the use of of the UAV, development of laser survey, progress in the field of automatic identification algorithms dots together overlapping images (Global Matching и Semi Global Matching). There have been problems currently existing in the construction of the measurement of 3D models, the ways of solving them. Examples of construction of measuring realistic 3D models based on traditional technology.

Key words: 3D model, construction of realistic 3D models of measurement, algorithms for the automatic identification of points, spatial data, accuracy 3D models.

ON THEMATIC MAP DESIGN ALGORITHMIZATION: A CASE STUDY OF NATURAL RESOURCES MAP-MODELS' DEVELOPMENT FOR GENERAL PUBLIC

Olga N. Nicolaeva
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10, Plakhotnogo St., Ph. D., Assos. Prof. of Department Ecology and Environmental Management, tel. (383)361-06-86, e-mail: onixx76@mail.ru

The article deals with the questions of algorithmization of map symbolization and map coloring for the thematic maps which are designing by general public by means of web cartographic services. The interactive natural resources map-models are described as an example. The requirements to the development of symbolization for natural resources map-models are articulated. The principles of algorithmic choice of methods of thematic mapping while developing natural resources map-model are characterized and illustrated. The coloristic principles and mathematical tools for color design of natural resources map-models are given. The article concludes with the illustration of color samples and full version of forest resources map-model based on the developed coloristic principles.

Key words: thematic mapping, natural resources mapping, thematic maps, map-models, methods of thematic mapping, map coloring, algorithm, algorithmization, interactivity.

GEOGRAPHIC INFORMATION ASPECTS OF FORMING THE FUTURE SIBERIA

Irina V. Nityago
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assistant Professor of Department Management and Entrepreneurship, tel. (383)361-01-24, e-mail: Viktorija.68@mail.ru

Tatiana** V. **Stribko
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assistant Professor of Department Management and Entrepreneurship, tel. (383)361-01-24, e-mail: stribko@mail.ru

The problems of socio-economic development of Siberia and highlighted factors hindering the development of the regional economy. Isolated and grounded the main challenges and threats affecting the effectiveness of macroeconomic development of Siberia. The dynamics of the main micro and macroeconomic indicators of development of Siberian territories. The dynamics of main economic indicators of development of the territory. Analyzed the investment attractiveness of

Siberia. Grounded potential and available resources of Siberia, development indicators of innovation system. The role of Russia and, accordingly, Siberia in the global market. Priority directions of. Presented macroeconomic outlook and prospects of development of the region. The possibility of the transition of the economy to an innovative socially-oriented model of development. In conclusion presented the possible results and forecasts, after the implementation of the development strategy of Siberia until 2030.

Key words: factor of development, economic potential, development problems, prognosis, level, region, effectiveness, priorities, strategy, innovation, modernization.

OPTICAL MICROWAVE LENSES

Maxim M. Kuznetsov
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Associate Professor of the Department of Special Devices and Technologies, tel. (913)921-44-39, e-mail: a9214439@yandex.ru

Igor N. Karmanov
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Associate Professor, Head of Department of Physics, tel. (383)343-29-33

The article deals with the classification of a lens is given comparative analysis of their optical characteristics in comparison with simple optical lenses, great attention is paid to the difference between the properties of refractive media in the microwave range, based on the difference of phase velocities of waves propagating in free space compared to the waves propagating between parallel metal walls. The article describes the use of various types of microwave and microwave lenses for different fields of science and technology; provides a survey on the direction of the polarization vector normal to the surface with respect to the direction of incidence of rays, for reflecting and refracting surfaces, depending on their shape: plane, ellipse, circle, hyperbola, and so the same material – glass, metal.

Key words: a lens, wave, optics, refractive index, polarization, antenna, residual aberration, the stability of the technological process.

DISPERSIVE IMAGING SPECTROMETERS OF REMOTE SENSING

George G. Gorbunov
Federal State Unitary Enterprise Scientific and Industrial Corporation «Vavilov State Optical Institute», 199053, Russia, Saint Petersburg, 5 Kadetskaja line V.O., D. Sc., Chief Researcher, tel. (812)269-24-94, e-mail: gggorbunov@mail.ru

Konstantin N. Tchikov
ITMO University, 197101, Russia, Saint Petersburg, 49 Kronverksky Pr., Associate professor of Department Computer Systems Design and Security, tel. (812)232-14-01, e-mail: otzi@mail.ifmo.ru

Viktor B. Shlishevsky
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., D. Sc., Professor of Department Nanosystems and Optical Devices, tel. (383)343-91-11, e-mail: kaf.nio@ssga.ru

The article considers the basic and specific peculiarities of schemes of dispersive imaging spectrometers with photodetector arrays, meant for solving various remote sensing tasks. The sensing scheme is analyzed by means of line-by-line scanning of area (objects) along the course from moving carrier ("pushbroom" mode). The article establishes the interrelations of geometrooptic and spectral characteristics of equipment, discusses the question of choosing the most efficient optic system, guaranteeing, while not having big dimensions, the realization of the required luminosity and resolution parameters. The conception of dispersive imaging spectrometer optic calculation is shown on the example of basic mirror-lens scheme with axial spherical components. The conception is based on strong cross correlation of aberrations of projecting and spectral parts during the passing of rays through the entire optic system. There is also the description and technical specifications of the best foreign and domestic samples of equipment.

Key words: dispersion, remote sensing, space, matrix radiation receiver, electro-optic system, polychromator, airborne and satellite imaging spectrometers, Earth observing system, specifications.

PROCESS APPROACH IN QUALITY MANAGEMENT SYSTEM DEPARTMENT OF MANAGEMENT AND BUSINESS

Oksana N. Moroz
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Head of the Department Management and Entrepreneurship, tel. (383)361-01-24, e-mail: ksenijasib@mail.ru

Oleg O. Itsenko
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., D. Sc., Prof. of the Department Management and Entrepreneurship, tel. (383)361-01-24, e-mail: eim447@gmail.com

The article covers the basics of metrological provision of quality management system of higher education in relation to the activities of the Department of Management and Entrepreneurship, Siberian State University Geosystems and Technology. In the context of modern requirements for metrological provision of higher education reveals the concept of process approach Particular attention is paid to the processes of measurement analysis and improvement of the department of management and entrepreneurship. The efficiency of the use of modern methods of evaluation of the department on the basis of the process approach.

Key words: higher education in economics, Department of Management and Entrepreneurship, the quality management system, process, process approach, SWOT-analysis, SWOT-strategy.

SOIL FERTILITY LAW – THE BASIS OF NEW PARADIGM OF AGRICULTURAL PRODUCTION

Jurij S. Larionov
Siberian State University of Geosystems and Technologies, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., D. Sc., Prof. of Department Ecology and Environmental Management, e-mail: larionov42@mail.ru

It is known that chemization in agricultural production had negative influence on soil fertility and biota and on productivity of cultivated plants. There were proposed new principles of soil fertility management, plant productivity and agrocenosis stability based on biozemledelie (biofarming) (including root rotation, edaphic epiphic process management in plant cultivation and farming) which is based on the formulated soil fertility law: «Creation, preservation and improvement of soil fertility in any agroecological conditions is carried out by means of close interrelation between root rotation and other components of biota (bacteria, fungus, water plants, soil animals), air and water circulation within alive and organic matter of ecosystems». This law allows to manage soil fertility and to purposefully enhance potential and effective resource of agricultural production and biosphere. It is based on evolutional and ecological genetic principles, and also on natural and artificial selection principles of living matter existence on the Earth. One of important things of biozemledelie and soil fertility law introduction into the agricultural production is the design of soil fertility monitoring based on GIS systems. Thus, in the nearest future (the sooner the better from the viewpoint of ecological stability of biosphere) the Human race will have to take the soil fertility function under control as it has already done with genetic diversity of plants, animals and micro organisms on the basis of genetic selection.

Key words: soil, fertility, biota, biozemledelie, biofarming, fertility law, ecosystem, agrocenosis.

HYGIENE AND SANITARY MATTERS CONSEQUENCES OF FLOODING IN POPULATED AREAS OB RIVER BASIN (FOR ALTAI REGION IN 2014–2015)

Vyacheslav A. Khmelev
Novosibirsk Research Institute of Hygiene, Rospotrebnadzor, 630108, Russia, Novosibirsk, 7 Parkhomenko St., Ph. D., Senior Research Fellow, Department of Environmental Health and Public Health, tel. (383)343-34-01, e-mail: ngi@niig.su

Viktor V. Turbinsky
Novosibirsk Research Institute of Hygiene, Rospotrebnadzor, 630108, Russia, Novosibirsk, 7 Parkhomenko St, D. Sc., Director, tel. (383)343-34-01, e-mail: ngi@niig.su

Alina A. Samshorina
FSFEI HE «Siberian State University of Water Transport», 630099, Russia, Novosibirsk, 33 Schetinkina St., tel. (383)222-64-68, e-mail: info@nsawt.ru

Anna V. Suvorova
FSFEI HE «Siberian State University of Water Transport», 630099, Russia, Novosibirsk, 33 Schetinkina St., tel. (383)222-64-68, e-mail: info@nsawt.ru

Valentina V. Kolosnitsyna
FSFEI HE «Siberian State University of Water Transport», 630099, Russia, Novosibirsk, 33 Schetinkina St., tel. (383)222-64-68, e-mail: info@nsawt.ru

Irgit Chechek
FSFEI HE «Siberian State University of Water Transport», 630099, Russia, Novosibirsk, 33 Schetinkina St., tel. (383)222-64-68, e-mail: info@nsawt.ru

The factors of formation and development of floods and GIS technology for monitoring. An ecologo-epidemiologic characteristics of catastrophic floods on the river Ob and its tributaries in the Altai region in June 2014 and floods in 2015. Set equal to the number of colony

forming units (CFU) thermotolerant coliform bacteria in flood water and water supply of Barnaul. Given methods for estimating the size of floods and flooding according to satellite sensing. Built a card-scheme of flooding and identified areas of environmental risk on the water Fund lands and human settlements. Used methods of sanitary-hygienic assessment of the hydrological monitoring development of emergency situations of natural and technogenic character. Shows the importance of applying public health and epidemiological indicators in the evaluation of cadastral plots on water Fund lands and human settlements.

Key words: flood, emergency, sanitary-epidemiological safety, environment populated areas, rivers, water sources.

ADVANCEMENT OF ECONOMIC ESTIMATION METHOD OF HYDROCARBON RAW RESOURCES

Dmitrij A. Lamert
The Department of the Federal Service for State Registration, Cadastre and Cartography of Novosibirsk region, 630091, Russia, Novosibirsk, 28 Derzhavina St., Ph. D., Deputy Chief, e-mail: Lamert@ngs.ru
Irina V. Filimonova
Novosibirsk State University, 630090, Russia, 17 Academica Lavrentieva prospect, Ph. D., Head of Department Politic Economy Chair, tel. (383)333-28-14, факс (383)330-25-80, e-mail: FilimonovaIV@list.ru

Leontij V. Jeder
Novosibirsk State University, 630090, Russia, 17 Academica Lavrentieva prospect, Ph. D., Docent, Chief of specialization «Economics and management in energetic sector», tel. (383)333-28-14, факс (383)330-25-80, e-mail: EderLV@yandex.ru

The article points out two directions of economic estimation term definition of earth's resources. There were emphasized basic methodological and organizational problems of carrying out economic estimation in Russia, defined the purpose, tasks and objects of geologic and economic estimation of hydrocarbon resources. On the basis of stage, object and estimation purpose analysis the geologic and economic estimation directions classification was created. As the result of conveyed research the authors created and presented basic and extended scheme of methodological approach to geologic and economic resource estimation and put forward the improving proposals for geologic and economic estimation methodological basis on the state level.

Key words: oil, gas, resources, oil and gas complex, geologic and economic estimation of hydrocarbons.

DEVELOPMENT OF A SYSTEM FOR ENVIRONMENTAL AND ECONOMIC ASSESSMENT OF AGRICULTURAL LANDS

Valery P. Anufriev
Ural Federal University, 620002, Russia, Ekaterinburg, 19 Mira St., D. Sc., Professor of Department Economics of Industrial and Energy Systems, tel. (343)374-15-74, e-mail: mail@ucee.ru

Victoriya A. Yurlova

Siberian State University of Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Assistant Lecturer, Department of Business Process Management, tel. (383)210-95-87, e-mail: yurlova_vika@mail.ru

Results of development of the system for environmental and economic assessment of agricultural lands are presented. Three methods were used as a base for the assessment system: ground rent capitalization method, evaluation by profitability per unit of soil-environmental index, evaluation by land substitution/ restoration costs. The basis for introduction of the three methods into the system of assessment is provided. Interconnection of the underlying mathematical models is shown. Different tasks which can be accomplished using the system are considered. Particularly, the assessment system can be applied for reconciliation of goals of land relations participants and also for decision-making support to improve efficiency of agricultural land use and land protection.

Key words: agricultural lands, environmental and economic assessment, development of assessment system, soil-environmental index, ecological damage, ground rent, capitalization, land use regulation, mathematical model.

FOREST LOCUS IN SASHA CHORNY'S «GERMAN» RHYMES

Sergey S. Zhdanov
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Assoc. Prof., Head of Foreign Languages and Intercultural Communications Department, tel. (383)343-29-33, e-mail: fstud2008@yandex.ru

The article deals with an image of forest presented in Sasha Chorny's rhymes which belong to the time of poet's visiting Germany in the pre-emigration and emigration periods of his work. The forest locus in the artist's "German" texts has two main incarnations. There is firstly a forest-asylum where the dreaming persona finds a hiding place from vanity of the human world and secondly a forest-desert, space of meditation, contemplation and meeting the Divine. The image of forest changes besides in various periods of the poet's work. During the emigration it gets more tragically and is connected with a motif of the lost homeland. It's worth mentioning that forest is also marked as a children and animal space, i. e. a locus of naturalness which is confronted with civilization.

Key words: Russian literature of the XX century, Silver Age of Russian poetry, Sasha Chorny, chronotope, forest, idyll, narrator, traveller.

ABOUT THE PROBLEMS OF SOVIET INDUSTRY DEVELOPMENT FROM THE VIEWPOINT OF POLITICAL AND ECONOMY LEADERS OF USSR

Pavel V. Petrov
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Docent of Department Metrology and Optic Production Technology, tel. (383)361-07-45, e-mail: krasko.petroff@yandex.ru

Valerija A. Pavlenko
Siberian State University Geosystems and Technology, 630108, Russia, Novosibirsk, 10 Plakhotnogo St., Ph. D., Docent of Department Management and Entrepreneurship, tel. (383)361-01-24, e-mail: lera-pavlenko1@yandex.ru

The article sets and discusses from the modern viewpoint the quotations from the speeches of the USSR party and government leaders in party congresses and conferences of 20 -30-th., and also – the quotations from industrial issue of 1934, concerning the questions of technics, technologies and industrial production development in the USSR. The quotations are taken from official verbatim report issues of party forums, published at the time they were held. The taken as basic historical period is limited by years from 1923 to 1934 as it was the time of the most inner-party democracy and the start of explosive development of industrial production in soviet Russia. The article shows controversial spirit of the epoch of building Socialism in the USSR, and those difficulties and problems that the country faced during the first years of creating new society.

Key words: world market, soviet industry, technics, labour productivity, product quality, staff, the Bolshviks' Communist Party Congress, party conference.