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C O N T E N T S

P.

K.KAKHIANI, G.TSKHOMELIDZE. Researching and Processing Automatic Control System of Buildings' Ventilation and Heating-Cooling. 6

V.JAMARJASHVILI, *R.PATARAIA, G.GIGIBERIA, K.PATARAIA*. An Opportunity of Realizing the Energy Multiplying Power Stations On Khrami HPP I Example. 11

D.NAMGALADZE, G.GAGUA. Determination of the probabilistic characteristics of the forecasting process for supply of gas pipelines of medium pressure. 18

NAMGALADZE D.P., KIZIRIA T.I., TSIVKARASHVILI G.N. Prediction of the mechanical condition of the exploiting corroded oil pipeline using probability methods. 24

I.PIRVELI. Forecasting of formation technological risks of natural gas objects. 30

G.MAKHARADZE, I.MAKHARADZE. Questions of Optimal Hydropower Development in Georgia. 36

Z. GOBIANIDZE. Review of Left and Right Hand Regularities with the Help of Magnetic Field Interactions. 40

Z.MCHEDLISHVILI. The analysis of self-excitation of the single-phase asynchronous sequential engine with compensating. 44

YAKIR BIJAMOV. Electric generators of small power hydroelectric plants. 48

T. MUSELIANI, G. MUSELIANI, G. TSOPURASHVILI. Determination of Electrostatic Components of Electromagnetic Field with Analysis Method. 53

Z.SIMONGULASHVILI, G. KURDADZE. Optimization of silicomanganeze melting process in purpose of increasing useful use of manganeze and silica. 58

A.PAPIASHVILI, B. GOGICHAISHVILI, O.OMIADZE, T.BUCHUKURI. Researching the Possibility of Receiving Titanium Containing Multi-component Alloys Using the Ash from Coal Operated Thermal Power Plants. 63

T.JIKIA, A.KOKHTASHVILI. Reliability of calculated parameters of energy supply units in Georgian electric system. 67

G.KHACHIDZE. Analysis mode rectifier-inverter for substation of high voltage direct current. 72

A.KOKHTASHVILI. Solution of the equation of the energy system movement by analytical method. 78

G.TSKHOMELIDZE, K.KAKHIANI. Comparative analysis of methods of assessment and impact of automatic control systems and technical management on energy efficiency of buildings. 82

MEGRELISHVILI Z., DONDOLADZE N. The use of waste water of the production of cleansing agents for regeneration of Na-cation exchangers. 86

A.PRANGISHVILI,Z.GASITASHVILI, G.GOGIA, M.GELENIDZE, D.GELENIDZE, T.BERBERASHVILI. The new technology for utilization of scrap tyres. 91

S.BAKANIDZE, N.DONDOLADZE. For Selecting the Most Useful Complete Set of the Machinery for Processing Land Facilities. 94

S. BAKANIDZE, N. DONDOLADZE. For Improving Productivity Issue of Mounting Cranes. 98

R. SKHVITARIDZE, B. KESHELAVA, M. TURDZELADZE, M. ABAZADZE, D. BEDUKADZE, T. PAPUASHVILI, T.JAJANIDZE. Investigation of the Possibility of Clayey Shale Use in Road and Hydraulic Engineering Construction. 101

M.LORDKIPANIDZE, T.JOJUA, N.BOCHORISHVILI, I.SALUKVADZE, O.GIORGISHVILI. Study of Creep and Site Closure Deformation of Multiple and Pulsation Loaded Concrete. 105

R.ARVELADZE. Perspectives of Solar and Wind Energy Use for the Generation of Electric Power in Georgia. 110

GEORGIAN NATIONAL ENERGY AND WATER SUPPLY REGULATORY (GNERG). Regulatory Frameworks Fostering Renewable Energy – "Net-Metering. 117

S U M M A R I E S

RESEARCHING AND PROCESSING AUTOMATIC CONTROL SYSTEM OF BUILDINGS' VENTILATION AND HEATING-COOLING.

***K.Kakhiani, G.Tskhomelidze*. "Energy". №1(81). 2017. Tbilisi. p. 6-10. geo. sum geo. engl. rus.**

The article submission results of the development of ventilation, coupling and heating, automatic control system of buildings, based on programmable logic controllers Schneider Electric. Shown the possibility of making changes in the algorithms and control structure of the developed system. The described integration of software identification and optimization of objects belonging to the control system. Ill.2, bibl. 4.

AN OPPORTUNITY OF REALIZING THE ENERGY MULTIPLYING POWER STATIONS ON KHRAMI HPP I EXAMPLE.

V.Jamarjashvili, *R.Pataraia, G.Gigiberia, K.Pataraia*. "Energy". №1(81). 2017. Tbilisi. p. 11-17. geo. sum geo. engl. rus.

The progress achieved in the area of the development of wind and solar energy, in particular, introduction of flat panels of sun photovoltaics and dramatic decrease of price of the improved wind energy equipment allowed us to implement the innovative ideas which will enable us to significantly expand the field of waterpower engineering of water energy development. Particularly, it is possible to get far cheaper regulated hydropower by utilizing unregulated wind and solar energy equipment. An opportunity of practical realization of the task was identified on the example of Khrami HHP I, where not only the energy regulation became possible but its numerical increase (twice, in fact) became achievable as well. Tabl. 1, bibl. 4.

DETERMINATION OF THE PROBABILISTIC CHARACTERISTICS OF THE FORECASTING PROCESS FOR SUPPLY OF GAS PIPELINES OF MEDIUM PRESSURE.

***D.Namgaladze, G.Gagua.* "Energy". №1(81). 2017. Tbilisi. p. 18-23. geo. sum geo. engl. rus.**

Development of rational forecast for the supply of natural gas is the main task. The purpose of the abstract is to create a scientifically-grounded theory, based on natural data, which can be used to predict the supply of gas to the gas distribution network, to ensure the reliability of the process, to predict risks and develop appropriate measures to improve the economic efficiency.

The abstract considers the autocorrelation functions, which are characterized by moderate trend and sharply determined seasonality.

The obtained results are possible by using the hourly forecast of natural gas supply, which makes possible straightening of the series. Ill. 3, bibl. 10.

PREDICTION OF THE MECHANICAL CONDITION OF THE EXPLOITING CORRODED OIL PIPELINE USING PROBABILITY METHODS.

***Namgaladze D.P., Kiziria T.I., Tsivkarashvili G.N. "Energy".* №1(81). 2017. Tbilisi. p. 24-30. geo. sum geo. engl. rus.**

Some corrosion defects of inner and outer surfaces take place in underground oil pipes. Sharing and increasing of corrosion defects depend on Laws of random numbers, by natural treatment. The purpose of this work is probability methodological assessment of the pipeline, on the limit areas by the usage of the rent of the research resources and given criterias. There are used some fundamental rulings for theory of probability and mathematical statistics. It has been already defined probability of reliability of ultimate condition of the pipeline. The results of this work will be used for some power stations, particularly for the oil and gas pipelines. Ill. 1, bibl. 4.

FORECASTING OF FORMATION TECHNOLOGICAL RISKS OF NATURAL GAS OBJECTS.

***I.Pirveli. "Energy".* №1(81). 2017. Tbilisi. p. 30-35. geo. sum geo. engl. rus.**

Significant failures of natural gas objects could be caused by natural or technogenic reasons. Experience from elimination of those reasons shows that modern prognosis of failures delivers positive results in reducing scale of failures and mitigation of them. In case of a dangerous objects failure the projected risk is that there is always a probability of human or infrastructure damage.

More difficult is to project failure results, there is more willingness to reduce or mitigate risks. The work presents analytical method for defining project risks criteria developed by the author. Ill. 2, bibl. 10.

QUESTIONS OF OPTIMAL HYDROPOWER DEVELOPMENT IN GEORGIA.
***G.Makharadze, I.Makharadze. "Energy".* №1(81). 2017. Tbilisi. p. 36-39. geo. sum geo. engl. rus.**

The article touches the issues about determination of the optimal construction places and optimal installed capacity for the prospective hydropower plants on the territory of Georgia.

It is shown that with taking into the consideration an inner consumption of Georgia and increased power export to south regions (Turkey, Armenia) on the first stage construction of the new hydropower stations in the regions as : Inner Kartli (Gori, Tbilisi), Meskheti-Javakheti and Adjara-Guria is economically reasonable. Ill. 1, bibl. 7.

REVIEW OF LEFT AND RIGHT HAND REGULARITIES WITH THE HELP OF MAGNETIC FIELD INTERACTIONS
***Z. Gobianidze.* "Energy". №1(81). 2017. Tbilisi. p. 40-43. rus. sum geo. engl. rus.**

Energy conversion laws in in the manuals, auxiliary manuals, references, popular references, etc. are illustrated by means of left and right hand rule.

A detail process of the conversion of the electric power into the mechanic power by means of drafts, magnetic fields, vector algebra, etc. is described in various ways. However, the reverse process of the energy conversion, particularly the process of the conversion of the mechanic power into the electric power, is not described in any manual.

The given study provides detail description of the conversion processes of the mechanic energy into the electric power by means of the interaction of the magnetic fields. Ill. 2, bibl. 5.

THE ANALYSIS OF SELF-EXCITATION OF THE SINGLE-PHASE ASYNCHRONOUS SEQUENTIAL ENGINE WITH COMPENSATING.
***Z.Mchedlishvili. "Energy".* №1(81). 2017. Tbilisi. p. 44-47. geo. sum geo. engl. rus.**

In the provided operation the principle of operation of the single-phase asynchronous electromotor with compensating is analyzed. The mathematical model describing the electromagnetic processes happening by its normal and self-excited operation using functions of complex variable is made. Ill. 1, bibl. 10.

ELECTRIC GENERATORS OF SMALL POWER HYDROELECTRIC PLANTS.
***Yakir Bijamov.* "Energy". №1(81). 2017. Tbilisi. p. 48-52. rus. sum geo. engl. rus.**

The article presents the classification of small power hydroelectric plants and reviews their existing electrical wirings operation. The positive and negative aspects of using in them an asynchronous or synchronous generator is considered. It's shown, that the economic efficiency of the use of these generators in the circuits of small hydropower plants depends on several factors, including the location and installed power of the plant, the presence or absence of a nearby electric grid network, the cost of generators and capacitor banks, the cost of electricity losses and others. Tabl. 1, bibl. 6.

DETERMINATION OF ELECTROSTATIC COMPONENTS OF ELECTROMAGNETIC FIELD WITH ANALYSIS METHODIO
***T. Museliani, G. Museliani, G. Tsopurashvili.* "Energy". №1(81). 2017. Tbilisi. p. 53-57. geo. sum geo. engl. rus.**

The images of electrostatic components effective within the facilities located in the electromagnetic fields have been obtained based on the electromagnetic field theory using the Maxwell's equation system. The images can be used for estimating the maximum permissible values of the displacement current passing in the living organisms and the electric field tension. Ill. 1, bibl. 4.

OPTIMIZATION OF SILICOMANGANEZE MELTING PROCESS IN PURPOSE OF INCREASING USEFUL USE OF MANGANEZE AND SILICA.
***Z.Simongulashvili, G. Kurdadze.* "Energy". №1(81). 2017. Tbilisi. p. 58-62. geo. sum geo. engl. rus.**

It is determined that the process of silicates production is impeded and conducted in gas phase but the speed of manganese and silica reduction is increasing.

Using alkali metals in furnace charge and partial alteration of metallurgic coke with coal lets us increase useful use of manganese and silica and improve main technical-economic indices of melting. Ill. 1, tabl. 1, bibl. 10.

RESEARCHING THE POSSIBILITY OF RECEIVING TITANIUM CONTAINING MULTI-COMPONENT ALLOYS USING THE ASH FROM COAL OPERATED THERMAL POWER PLANTS.

A.Papiashvili, B. Gogichaishvili, O.Omiadze, T.Buchukuri. **"Energy". №1(81). 2017. Tbilisi. p. 63-66. geo. sum geo. engl. rus.**

Complex alloys are widely used in the production of steel. The receipt of complex dopants by alloying pure metals with carbo-thermal and aluminum-thermal recovery method of oxide compounds is elaborated.

The work is aimed at researching the ash from the coal operated thermal power plants, used aluminum cans, titanium alloy shavings, empty polymer packaging from the household chemistry in order to get multi-component titanium containing alloy.

Rational composition of mixture to get the multi-component alloys is provided. Specific calorific power of mixture ignition is studied. Experiments for receiving the alloy have been run under the laboratory environment. The possibility of receiving the titanium containing multi-component alloy using industrial and household waste is proven. Tabl. 3, bibl. 8.

RELIABILITY OF CALCULATED PARAMETERS OF ENERGY SUPPLY UNITS IN GEORGIAN ELECTRIC SYSTEM.

T.Jikia, A.Kokhtashvili. **"Energy". №1(81). 2017. Tbilisi. p. 67-71 rus. sum geo. engl. rus.**

Georgia's geographic location gives us the ability to create a reliable electrical connections.

Today topical, which means exports from Georgia and transit through Georgia to Turkey, One solution to this task is a factor in the reliability of the electricity transmission network, which one is function of coefficients of transmission lines preparedness.

Lines preparedness are calculated on base of multi-years observations on this lines according to the statiscicts of emergency and non-emergency disconnections.

Network of Georgia's transmission lines function of preparedness are ა pproved by the last three years (2011-2015) on the basis of statistical data. These options will determine the possibility of power supply reliability of the network nodes. Tabl. 2, bibl. 4.

ANALYSIS MODE RECTIFIER-INVERTER FOR SUBSTATION OF HIGH VOLTAGE DIRECT CURRENT.

G.Khachidze. **"Energy". №1(81). 2017. Tbilisi. p. 72-77. geo. sum geo. engl. rus.**

The analysis of the modes high voltage direct current. The insert comprises a rectifier and inverter.

Found the instantaneous values of the inverter circuits current branches. Determine the mean value. The experimental data in the form of waveforms of currents during short circuit on the line connection between two power systems. Ill. 3, bibl. 1.

SOLUTION OF THE EQUATION OF THE ENERGY SYSTEM MOVEMENT BY ANALYTICAL METHOD.

A.Kokhtashvili. **"Energy". №1(81). 2017. Tbilisi. p. 78-81. geo. sum geo. engl. rus.**

The analytical solving of motion equation of power system is a one of the challenging task, solving of which allows to define the dependence between the frequency, active power balance and inertia constant of generator (power system).

In the article was elaborated the approach, using of which allows to solve the motion equation regarding the frequency. It was obtained that the amplitude of the frequency deviation is proportional of power unbalance and inverse-proportional of the effects speed governor and load characteristics, also the gradient of frequency is inverse-proportional of the inertia constant of power system. Bibl. 2.

COMPARATIVE ANALYSIS OF METHODS OF ASSESSMENT AND IMPACT OF AUTOMATIC CONTROL SYSTEMS AND TECHNICAL MANAGEMENT ON ENERGY EFFICIENCY OF BUILDINGS.

G.Tskhomelidze, K.Kakhiani. **"Energy". №1(81). 2017. Tbilisi. p. 82-85. geo. sum geo. engl. rus.**

The article presents the buildings, automatic control and technical management systems, evaluation methods for comparative analysis. Building energy efficiency was determined by the growth of the priorities for the implementation of systems and their improvement. Given the automation level of the European standard for classification of buildings. Determined to be in the workshop, the newly constructed buildings with automatic management and management systems evaluation and certification. Ill. 2, bibl. 5.

THE USE OF WASTE WATER OF THE PRODUCTION OF CLEANSING AGENTS FOR REGENERATION OF NA-CATION EXCHANGERS.

Megrelishvili Z., Dondoladze N. **"Energy". №1(81). 2017. Tbilisi. p. 86-90. geo. sum geo. engl. rus.**

Considered is the possibility of using sulphate waste water of the production installation of cleansing agent "Progress" for regeneration of Na-cation exchangers. Given are the dependences which allow to calculate the remain content of surfactant in the water flowing into boilers. By using the sulphate discharge, more than 25 filter cycles were carried out which showed that the working capacity of the charge is kept completely and makes up 270-300 g-equ/m^3. Ill.2, tabl. 3, bibl. 7.

THE NEW TECHNOLOGY FOR UTILIZATION OF SCRAP TYRES. ***A.Prangishvili, Z.Gasitashvili , G.Gogia , M.Gelenidze, D.Gelenidze, T.Berberashvili.*** **"Energy". №1(81). 2017. Tbilisi. p. 91-93. engl. sum geo. engl. rus.**

In Georgia each year at least 2 million tyres, not suitable for exploitation, are discarded, which is associated with serious environmental problems.

In furnace, created by us, it is possible to include scrap tires in the new technological cycle, in which all the metal parts are separated from the tire, and also, what is very important, is obtained liquid fuel. The process is environmentally friendly and fuel is approximately equal to the amount of oil extracted in Georgia.

Besides all of this, received heating value of fuel is almost equal to the heating value of crude oil. Ill. 1.

FOR SELECTING THE MOST USEFUL COMPLETE SET OF THE MACHINERY FOR PROCESSING LAND FACILITIES.

S. Bakanidze, N. Dondoladze. **"Energy". №1(81). 2017. Tbilisi. p. 94-97. geo. sum geo. engl. rus.**

Conducting land works with the complete machinery sets, from mechanical and economical viewpoint, has significant privilege over the conduct of the works with particular machinery. Therefore, when conducting the land works mechanically, it is necessary to do their optional design considering the possible machinery complete sets with their most useful selection.

Benefits of such computations both for the developers and construction companies have been justified based on a numerical example. Tabl. 1, bibl. 2.

FOR IMPROVING PRODUCTIVITY ISSUE OF MOUNTING CRANES

S. Bakanidze, N. Dondoladze. **"Energy". №1(81). 2017. Tbilisi. p. 98-100. geo. sum geo. engl. rus.**

Efficiency level of the mounting cranes is estimated by their productivity, i.e. the amount of the mounted construction structures within the time unit (usually in one shift), which, from its side, relates to the duration of mounting one structure (duration of one complete cycle).

The following operations should be performed in installing the mounting cranes: horizontal displacement; tripping and rotating arm. Reduction of the time consumed on each such operation reduces the cycle duration thus improving the efficiency level of the mounting crane use.

The above view is justified based on numerical example. Bibil. 2.

INVESTIGATION OF THE POSSIBILITY OF CLAYEY SHALE USE IN ROAD AND HYDRAULIC ENGINEERING CONSTRUCTION

R. Skhvitaridze, B. Keshelava, M. Turdzeladze, M. Abazadze, D. Bedukadze, T. Papuashvili, T.Jajanidze. **"Energy". №1(81). 2017. Tbilisi. p. 101-104. geo. sum geo. engl. rus.**

For the purpose of determination of possibility of clayey shale usein road and hydraulic engineering, the crushability, wear resistance and frost resistance of the clayey shale, accumulated in gorge of the Duruji river, are investigated. Investigations are executed according the GOST standards.

Using the thermic nano treatment, the additive for the concrete modification – the meta clayey shale has been obtained. Bibl. 4.

STUDY OF CREEP AND SITE CLOSURE DEFORMATION OF MULTIPLE AND PULSATION LOADED CONCRETE.

M. Lordkipanidze, T. Jojua, N. Bochorishvili, I.Salukvadze, O.Giorgishvili. **"Energy". №1(81). 2017. Tbilisi. p. 105-109. rus. sum geo. engl. rus.**

The study site closure and creep deformation on multiple and pulsation preloaded concrete prisms and cubes was conducted. As a result of the experiment it was determined that the concrete creep deformation curves that had been multiply and pulse loaded in advance, are approximately of equal value, and when estimating the creep deformation values, it does not matter what type the preloading is – multiple or pulsation. The same applies to the site closure deformation. In this case the type of preloading does not change the site closure value. The creep and site closure deformations of the preprocessed concrete are far less than the values of the unprocessed base concretes. Ill. 1, bibl. 5.

PERSPECTIVES OF SOLAR AND WIND ENERGY USE FOR THE GENERATION OF ELECTRIC POWER IN GEORGIA.

R.Arveladze**. "Energy". №1(81). 2017. Tbilisi. p. 110-116. geo. sum geo. engl. rus.**

The article is aimed at promoting the factors that need to be considered in constructing the power container based power plants in Georgia in future.

The article shows that, over the nearest 15-20 years, the Georgian energy system should develop primarily by using the water power resources.

Large-scale construction of wind and solar power stations in Georgia should commence approximately in 15-20 years time, when Georgian power system is far stronger, the efficiency of the wind and solar energy equipment are significantly improved and their wide-scale introduction does not affect sustainable operation of the power systems.

REGULATORY FRAMEWORKS FOSTERING RENEWABLE ENERGY – "NET-METERING". Georgian National Energy and Water Supply Regulatory (GNERG). "Energy". №1(81). 2017. Tbilisi. p. 117-119. geo. engl.

Satisfaction of self-consumption demands of customers and development of micro generation power plants has been internationally fostered through various incentive-based policies. Incentive-based policy may be aggressive or relatively moderate. Aggressive policy is applied in countries where amount of electricity generated from fossil fuels is high and therefore, strict obligations of increasing renewable energy share exist. In such cases small renewable energy generators are mainly offered high tariffs (so called Feed-in Tariffs, etc.). It shall be also mentioned that such policy increases pressure on household tariffs and requires certain kind of resistence of implementing country. Moderate incentive-based policy is oriented towards ensuring conventional conditions through simplified way, by eradicating administrative or other types of bureaucratic barriers and incentivizing customers to develop their own electricity sources for full/partial satisfaction of electricity demand. This kind of policy does not significantly affect tariff processes and is based on more generous origins.