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S U M M A R I E S

EFFECT OF STATIC CYCLIC LOADING AND AGEING OF CONCRETE ON THE STRENGTH OF A GRAVITY DAM. *A.Motsonelidze, L.Galdava.* "Energy". №2(70). 2014. Tbilisi. p. 4-7. engl. sum geo.engl.rus.

This work focuses on a technique of static retrospective analysis of old gravity dams. An attempt is made to match the material and structural model of a dam with the actual operation history of the structure. The proposed technique consists of: a) nonlinear-elastic fracture constitutive model for concrete in the plane strain condition, b) cyclic-induced degradation of stiffness and strength for dam concrete and c) ageing-induced change of stiffness and strength for concrete (ageing of concrete). Under cyclic loading the cycles of reservoir filling up-discharge is implied, i.e. loading-runloadingl of hydrostatic pressure to the dam and bottom of a reservoir. The number of cycles depends on the type of reservoir regulation. Ill. 2, bibl. 2.

CURRENT-CARRYING CAPACITY AND LOSSES IN THE WIRES OF SUPERCONDUCTING TRANSFORMER WINDINGS IN A VARIABLE MAGNETIC FIELD. *T.Kokhreidze, K.Kokhreidze.* "Energy". №2(70). 2014. Tbilisi. p. 8-17. geo. sum geo.engl.rus.

We consider the current-carrying capacity and losses occurring in the wires of superconducting transformer windings in a variable magnetic field.

It is shown that in order to increase the current-carrying capacity of wires and to decrease losses in them, a superconducting wire must have several cores. An optimal number of superconductors in a superconducting multi-core wire of circular cross-section $N_{ж}=D_{пр.}/d_{ж}$, corresponds to the space ratio $K_{з}=d_{ж}/D_{пр}$ of a superconducting wire, where $D_{пр.}$ is the wire diameter; $d_{ж}$ is the core diameter. Such superconducting multi-core wires can have applications in the power windings of superconducting transformers, in the windings armature of electrical machines, electrical cables, power transmission lines, and so on. Ill. 2, bibl. 4.

MAINTENANCE OF THE FREQUENCY OF AN ELECTRIC SYSTEM AT A CONSTANT LEVEL AND TOPICAL PROBLEMS OF FREQUENCY REGULATIONL. *T.Kokhreidze, E.Chachkhiani.* "Energy". №2(70). 2014. Tbilisi. p. 18-27. geo. sum geo.engl.rus.

We consider the maintenance of the frequency of an electric system at a constant level and the topical problems related to frequency regulation. It is shown that the operation of an electrical system and the quality of energy transmitted by it depend in the first place on the maintenance of constant frequency. We study: the distribution of active power among systems operating in parallel, the regulation of the frequency of a leading electric power station. As an example we consider the method of virtual statism, which is used when dealing with the problem of frequency regulation in various operation modes of an electrical system. Ill. 3, tabl. 1, bibl. 1.

DISTORTION POWER AND POWER LOSSES IN ELECTRICAL NETWORKS. *T.Museliani, M.Bakhtadze, I.Katamadze, G.Museliani.* "Energy". №2(70). 2014. Tbilisi. p. 28-32. geo. sum geo.engl.rus.

Using the monitoring system of electric power consumption SCADA, which has nonlinear loads in a concrete power system, we establish the existence of distortion power in electrical networks. The distortion power quantity is determined and active power losses caused by the distortion power are calculated. Bibl. 3.

BASE ELECTRIC POWER SUPPLY TO THE ENERGY NETWORK OF GEORGIA BY USING THE NON-ALTERNATIVE TECHNOLOGY. *V.Jamarjashvili, A.Dundua, R.Pataraia.* "Energy". №2(70). 2014. Tbilisi. p. 33-40. geo. sum geo.engl.rus.

It is shown in the paper that by combining only two electric power stations of Georgia – Zhinvali HEPS and highly perspective Namokhvani HEPS with gas-turbine units – these stations are transformed from seasonal electric power stations to the sources of base electric power with an annual output of 5 billion kWt.h. Ill. 2, tabl. 7, bibl. 13.

MARINE EXPERIMENTAL INVESTIGATIONS IN THE SEA AREAS OF THE CITIES OF BATUMI AND ANAKLIA. *V.Jamarjashvili, A.Mirianashvili, M.Lordkipanidze, D.Dgebuadze, E.Tumanishvili, N.Chakhvashvili, G.Ninidze, T.Vazagashvili.* "Energy". №2(70). 2014. Tbilisi. p. 41-49. geo. sum geo.engl.rus.

The elaboration of economically effective methods of hot- and cold-water supply is one of the most important tasks on a scale of the whole country.

The objective of experimental investigations in the Black sea was to define the parameters of thermoclines in the sea areas of the cities of Batumi and Anaklia. As a result of experiments, we established the coordinates of the least distance of thermoclines from the sea coastline.

Since the recorded experimental values of seawater temperature in thermoclines are constant $(8^{0}C)$ throughout a year, they indicate the justified good prospects and cost-effectiveness of hot- and cold-water supply systems when deep water layers of the Black sea are used. Ill. 4, tabl. 1, bibl. 7.

DIRECT CURRENT MOTOR FORD 1BB-42 MATH MODEL COMPILATION WITH USE OF MATH CALCULATION EDITOR MATHCAD 15.0. *N. Kvrivishvili.* **"Energy". №2(70). 2014. Tbilisi. p.50-55. geo. sum geo.engl.rus.**

In this article there are performed certain experementally gained data mathematical treatment in the computer math software Mathcad 15.0. This may be very essential for the students who perform some work of similar profile, but facing difficulties with finding out some practical examples. The initial data was sourced with experimental background, which were performed by the author and published in this journal on March 2013. Ill. 10, foto 1, bibl. 2.

EXPERIMENTAL RESEARCH OF FRICTION MODIFIERS FOR THE FLANGE AND TREAD SURFACES. *G.I.Tumanishvili, M.Tedoshvili, V.Zviadauri, G.G.Tumanishvili.* **"Energy". №2(70). 2014. Tbilisi. p. 56-59. engl. sum geo.engl.rus.**

The tread and the flange and gauge surfaces of wheels and rails require to have different properties – relative higher friction factor on tread surfaces and lower friction factor on flange and gauge surfaces and they needs corresponding friction modifiers. Adjustment of wear rate of wheels and rails, energy losses on friction, environment contaminations by vibration, noise and friction modifiers are considered as main functions of friction modifiers. In the present paper the ecologically friendly friction modifiers for tread and flange and gauge surfaces are tested in laboratory conditions on the twin disc machine. Experimentally are established the ranges of variation of the friction factor of the friction modifiers accordingly for flanges 0.06 – 0.11 and for tread surfaces 0.12-0.4; The duration of the Single applied friction modifier was till 3000-12000 revolutions till its full removal from the interacting surfaces. Ill. 5, bibl. 6.

DIAGNOSING THE CONDITION OF TRACTION MOTOR ANCHOR WINDING BY THE THERMAL RESOURCE. *E.Aulov, T.Natenadze, A.Zerekidze.* **"Energy". №2(70). 2014. Tbilisi. p.60-66. geo. sum geo.engl.rus.**

Considered several methods for determining the overheating of rotating windings of traction motors. Control system for tractions motor insulation's thermal condition without increasing hardware has been designed.

Designed algorithm allows permanent control of traction motor anchor winding's temperature changes. Ill. 3, bibl. 10.

THE AIR MOVEMENT QUICKNESS DETERMINATION IN FRUITS HELIO-DRYING EQUIPMENT. *L.Papava, L.Gugulashvili, E.sadagashvili, G.Gugulashvili.* **"Energy". №2(70). 2014. Tbilisi. p. 67-72. geo. sum geo.engl.rus.**

It is described the working agent traffic provoker factors in fruits helio-drying equipment. Is perform the methodic of air movement quickness determination in drying equipment. Is showed, that the air movement quickness is depended from puller tube height, atmosphere pressure, also, from sun energy quantity, swallowed by puller tube and pore surface. Ill. 1, bibl. 4.

OUT-OF-FURNACE TREATMENT OF LIQUID STEEL AND THE ECOLOGICAL MONITORING OF EXHAUSTED GASES. *B.Gogichaishvili, T.Tsertsvadze, Z.Svanidze, N.Mkheidze.* **"Energy". №2(70). 2014. Tbilisi. p. 73-76. geo. sum geo.engl.rus.**

The aim of the work is to use the composite alloys produced from domestic and industrial waste as components of exothermic slag-forming mixtures and the ecological monitoring of exhausted gases during the treatment of liquid steel.

We studied the deoxidization capacity of an exothermic slag-forming mixture, the quantity and morphology of non-metal inclusions, and also the content of toxic substances in exhausted gases per one ton of metal when liquid steel is treated with slag.

The economical effectiveness of the suggested exothermic slags was confirmed by experimental data. Ill. 4, tabl. 1, bibl. 5.

PERSPECTIVES OF BUILDING OBJECTS OF ELECTROENERGETICS IN A NEW SOCIAL-ECONOMIC CONDITIONS IN MOUNTAINOUS REGIONS OF GEORGIA. *N.Bochorishvili, I.Gabrichidze, I.Bochorishvili, A.Neverov, D.Danelia, M.Dzidziguri.* **"Energy". №2(70). 2014. Tbilisi. p. 77-83. geo. sum geo.engl.rus.**

Problem of increasing necessity in electric power statics working with energy of sun, wind and gas both in all over the world and in Georgia is considered in this article. Perspectives, stages and principle directions of urbanization development in mountainous regions of Georgia is offered. Problem of influence of social-economic resources on possibility of improvement in this zone demographic processes and employment of population is considered.

Taking in to consideration strategic and economic factors the project of „Sunny tower" mine building is offered in which the temperature of air can reach 200-500^{0}C and the power of electric power station can increase twice as much. Ill. 3, foto 2, bibl. 3.

SECURING EMPLOYEES LABOUR SAFETY AND HEALTH BY THE DETERMINATION OF METHODES OF RISKS ESTIMATION. *N.Bochorishvili, A.Bezhanishvili, I.Bochorishvili, N.Razmadze, N.Ratiani, A.Neverov, S.Gigauri.* **"Energy". №2(70). 2014. Tbilisi. p. 84-87. geo. sum geo.engl.rus.**

The problems, dealing with the methodes of risks estimation for employees labour safety and health securing are considered in this article. It is noted, that creation of healthy work environment, ca be provided with dangers exposure during work process, by its value and arised risks importance determination. Risks estimation is most important preventive measure. During the risks estimation it's necessary to take into consideration not only the previous accidents, but the possible dangers, which in case of creation of new and modification of old work places are not still the causes of undesirable results. Psychological factors the possible forms of respond of men against these factors must be taken in account. Ill. 1, bibl. 8.

REQUIRES OF TECHNICAL SAFETY FOR BLASTING OPERATIONS IN UNDERGROUND WORKINGS. *A.Bezhanishvili, N.Bochorishvili, N.Kukuladze.* **"Energy". №2(70). 2014. Tbilisi. p. 88-92. geo. sum geo.engl.rus.**

Requires of technical safety for blasting operations in underground workings are considered in this article, in particular: near of blasting materials storage, in stopes, for carrying out parallel workings and workings with counter faces. Additional requires for blasting operations in mines, dangerous by gas and dust explosion, by outburst of rock and gas, as well as in seams (rocks), dangerous by rock bumps are given. The problems, connected with selection and delivery of explosive materials are considered. Bibl. 1.

THE THEORY OF PHYSICAL TRANSFORMATIONS IN PRAZEODIM ALUMINATE. *Z.Chachkhiani, E.Zeragia, LDarchiashvili.* **"Energy". №2(70). 2014. Tbilisi. p. 93-95. geo. sum geo.engl.rus.**

An accurately solved model with thermodynamic potential of the eighth order on displacements of oxygen octahedron fully describing the character of change of all phases in PrAlO$_3$, as well as anomalies of measurable characteristics in case of the series of successive transitions is proposed. A complete model describing the effect of displacement of oxygen octahedron on splitting of basic (E_g) and excited (T_{2g}) terms of P^{3+} ion is proposed. Analytical expressions for splitting of T_{2g} term in orthorhombic and monoclinic phases are obtained through the values of parameter component. Bibl. 5.

FEATURES OF DRY MORTAR PREPARATION. *Z.Karumidze, M.Turdzeladze.* **"Energy". №2(70). 2014. Tbilisi. p. 96-98. geo. sum geo.engl.rus.**

The article discusses and explains some aspects of preparation of mortar mixes, namely dry cement – sand mixes. Basic combinations of dry mixes are given. Advantages of production and use of dry mortar mixes in our country are presented. Are as of use of such mortar mixes are given. Some new generation chemical additives and their efficiency in preparation of dry cement – sand mixes are described. Ill.1, tabl. 1, bibl. 3.

APPLICATION OF THE ZEOLITES IN THE NANOTECHNOLOGY OF THE COMPOSITE BUILDING MATERIALS. *B.Keshelava, G.Tsintskaladze, L.Okujava, L.Loladze, M.Abazadze, N.Eremadze.* **"Energy". №2(70). 2014. Tbilisi. p. 99-101. rus. sum geo.engl.rus.**

Zeolites possess the significant catalytic activity, ability of the selective sorption and ion exchange. There is shown that the introduction of the thermo-nano-modified zeolite into the cement composition (10 %) leads to the sharp increasing 44,5%) of the concrete strength. Tabl. 1, bibl. 6.

CONSTRUCTION OF AN INVARIANT SYSTEM OF AUTOMATION OF STRENGTH CALCULATIONS OF MULTI-LAYER SHELLS. *Z.Gubeladze.* **"Energy". №2(70). 2014. Tbilisi. p. 102-108. rus. sum geo.engl.rus.**

An automation system has been developed for strength calculations of multi-layer shells. This system enables us to construct a finite-element model of a shell in the dialogue mode with the aid of personal IBM computers; to carry out effective geometrical and physical calculations of the nonlinear stressed-deformed state; to perform a quick analysis of calculated results; to create a package of project documentation. Ill. 7, tabl. 1, bibl. 3.