

ENERGY

SCIENTIFIC AND TECHNICAL JOURNAL

2(50)-II/2009

Tbilisi

SUMMARIES

TESTING OF POWER TRANSFORMERS IN HIGH-VOLTAGE SUBSTATION. *M.Kobalia, T.Kandelaki, B.Tsoapurashvili, Ch.Gugeshashvili.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 3-7. geo.sum. geo.engl.rus.

The procedures are considered, which are carried out in high-voltage substations of JSC TELASI in the process of preventive tests of power transformers. The works are carried out in accordance with acting normative documents. Simplified, fundamental schemes of transformers' testing during their operation as well as during putting into operation of new and repaired transformers are presented.

It is shown, that during the testing, are carried out the procedures for determination of transformation ration, polarity and groups of connection of windings, parameters of current and free running, short-circuit resistance of the windings, isolation of the windings etc. Scheme 1, tabl. 1, bibl. 2.

ESTIMATION OF FUEL SAVING IN POWER SYSTEM WITH STEAM-TURBINE HEAT STATIONS. *G.Chitashvili, K.Mtchedlidze, E.Pantskhava.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 8-13. rus. sum. geo.engl.rus.

A method of estimation of basic factors of energy efficiency of Steam-turbine heat stations with the turbines of KO (T and P) and KOO (PT) type. The most important factor of efficiency of cogeneration station is a relative fuel saving B_{ec} , attainable in the power system during functioning in it the heat system - as against the separate method of producing the heat (district boiler house) and el. power. Objectivity of this criteria is conditioned by the fact that its meaning does not depend upon the method of allocation of E_c combined consumption on heat stations, between the two specified kinds of energy. Estimations of B_{ec} , are carried out for cogeneration turbines with the initial parameters $p_0 = 10$ MPa, $t_0 = 550^\circ\text{C}$ and two pressures of steam in steam extraction: 0,14 and 0,26 MPa. Under the steam extraction α was changing from 0 (condensation regime) to 1 (regime of backpressure). It is determined, that with the growth of α B_{ec} is monotonically increasing and reaches maximum value (35÷37%) under $\alpha=1$. A notable influence of stem pressure in selection on B_{ec} is perceptible only at $\alpha \geq 0,4$. The results of estimations are compared with the data of other authors, obtained by using tables of thermodynamic properties of water and water steam. An influence of initial pressure of steam on B_{ec} is estimated (in the range of 10÷20 MPa, $t_0 = 550^\circ\text{C} = \text{idem}$) under the operation of the unit in the regime of backpressure ($\alpha=1$); it is determined, that with the growth of p_0 from 10 to 20 MPa it is observed notable growth of B_{ec} (up to 5%). Ill. 3, tabl. 2, bibl. 9.

CONCEPTION OF MULTI-FACTORING OF HEAT TRANSMISSION AT BOILING. *I.Shekriladze, J.Rusishvili, E.Matchavariani, G.Gigineishvili, D.Shekriladze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 14-18. geo.sum. geo.engl.rus.

A conception of multi-factoring of heat transmission at developed boiling is presented, which with heat transmission law describes for the first time united, sequential picture for analysis of multicolored spectrum of the processes of heat transmission at the boiling.

One of the conservative and at the same time basic regime of boiling – developed boiling is appraised, when the intensity of heat transmission is influenced by rather limited number of factors. At the same time, among the influencing factors there are no such essential factors as: acceleration of gravity force, geometry and orientation of heating surface, flow rate of fluid. Therewith for realization of such regime, appears as an obligatory background the existence of large quantity of approximately equal, stable centers of steam formation, short-time and isolated action of mechanism of cooling and leading hand of liquid phase in intensity of heat transmission.

Research on phenomenon of multi-factoring of heat transmission of boiling is a fundamental interest from the point of view of developing of general principles of a theory of heat and mass transfer. As regards to specific regimes of heat transmission and their regularity, their applied sense is directly connected with improvement of construction methods of technical apparatus of corresponding types. Bibl. 18.

OPTIMIZATION OF CONTROL, COORDINATION AND REGULATION OF UNITED ENERGY SYSTEM. *K.Vezirishvili, M.Razmadze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 19-21. geo.sum. geo.engl.rus.

Issues regarding optimization of control, coordination and regulation of united energy system are considered. Aim of a regional aspect of planning of power engineering is an optimal, interconnected development of objects of generation and power consumers. Coordination and regulation of united energy system must become determining factors of energy policy of Georgia. A method of economic analysis of the projects on growth of efficiency of energy utilization is presented. Mathematical models of optimization of development are worked out, as control of united energy system in whole, as well as in separate structures, which ensure a coordination of solution of optimization tasks on different stages on the base of available information data.

The schemes are presented, by means of which, it is possible to compute a balanced interconnection on energy consumption and supply, which is so important for normal functioning of power engineering of Georgia and for formation of optimal economy. Diagram 2, bibl.3.

CHOOSING OF CLEANSING SOLUTION FOR OPERATIONAL, CHEMICAL CLEANING OF WATER-WALL TUBES OF DRUM POWER BOILERS. *Z.Berishvili, L.Papava, N.Kalabegashvili, N. Kedjeradze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 22-25. geo.sum. geo.engl.rus.

As a result of experimental research on process of chemical cleaning of water-wall tubes of drum boilers is determined, that in the presence of deposition of mixed character, it is reasonable to use cleansing solution of the following compound: hydrochloric acid – 5%, urotropin – 0,5%, captax – 0,1%, fluorine acid – 1%, thiourea – 0,3%. During cleaning with the above mentioned solution, the best result was obtained: cleaning percentage – 99,5, un-removed deposition mass – 3,7 gr/m². Addition of fluorine acid to the cleansing solution is conditioned by high percentage of content of silicate acid in depositions – 8-12%. While cleaning the boilers by above mentioned solution, fluorine acid can be replaced by ammonium fluoride or sodium fluoride of the same concentration. Addition of thiourea to the cleansing solution is conditioned by high percentage of content of copper-oxide in depositions – 18-32%. Operational, chemical cleaning of boilers must be carried out at temperature 60-700C. Tabl. 2.

REGARDING SOME CARRIED OUT RESEARCH WORKS IN THE DIVISION OF THEO-RETICAL RESEARCHES OF THE INSTITUTE. *A.Tchrelashvili.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 26-33. geo.sum. geo.engl.rus.

In practice often are met tasks, the solution of which needs satisfaction of such conditions, carrying out of which by using analytical, and numerical methods as well, is connected with many difficulties. In this direction, a new analytical-numerical method of calculation of large-size blocks is worked out in Research Institute of Power Engineering and Energy Constructions of Georgia. For the period of 2004-2008, a research work for solution a number of tasks occurred while operation of arch dam was conducted. Specifically, as a subject of research was chosen arch dam of ENGURI hydropower station. Necessity of carrying out the research is conditioned by those circumstances that for the last decade in the body of the dam were found different kinds of anomalous phenomenon, causing deterioration of deflected mode of the body of the dam comparing with the project factors. Bibl.5.

METHODOLOGICAL ASPECTS OF PLANNING OF INVESTMENT PROJECT. *N.Samsonia, M.Lomsadze-Kutchava, M.Topuria.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 34-39. geo.sum. geo.engl.rus.

Methodological issues of optimal planning of investment project with a glance of criterions of maximin are considered. Planning of project and stages of realization are analyzed. These are: determination of purpose of investing, Analysis of investment alternatives and environment and factors acting on the object, technical-economic characteristics of the object, drawing of phased plan, prognostication of economic indexes, determination of total effect and making a decision. For successful realization of investment project are given recommendations, which should be guided by the investor, starting with planning and finishing with practical realization of investment project. Diagram 1, bibl. 3.

MELTING OF COMPOSITE ALLOY FROM WASTE OF METALLURGICAL PRODUCTION AND ITS APPLICATION FOR DEOXIDATION AND DESULFURIZATION OF STEEL. *O.Mikadze, T.Buchukuri, B.Gogichaishvili.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 44-48. rus.sum. geo.engl.rus.

Information, regarding half-industrial and laboratory experiments on obtaining composite alloys from waste of metallurgical production and application of obtained alloy for deoxidation and desulfurization of steel is given. Charge makeup for producing of manganous composite steel is estimated.

The obtained steel is applied for out-of-furnace processing of fluid steel for the purpose of its deoxidation and desulphuration. Laboratory experiments were carried out in high-temperature furnace of Tamman. Comparative melting by using mechanical mixture of clean components is carried out. Rational outlay of alloy for obtaining the highest results on refining of steel is determined.

Content analysis of nonmetallic inclusion in steel after its processing by composite alloy and mixture of clean elements showed that their quantity at 15-20% is less, than during processing by proposed alloy. Ill. 2, bibl. 5.

SELF-COAGULATING EXOTHERMAL BRIQUETTES FOR DOPING AND DEOXIDATION OF STEEL. *O. Mikadze, B.Gogichaishvili, T.Buchukuri.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 49-54. rus.sum. geo.engl.rus.

Aim of the work – obtaining agglomerate, containing manganese for doping and deoxidation of steel.

For agglomerate of highly dispersed charge materials is used briquetting. It was carried out on mechanical double rolling briquette press at pressure 20 MPa.

In briquettes, containing carbonate manganese ore, spinning, lime and sulfite-yeasty mash in the capacity of connecting, after completing of processing of briquetting, the processes of interaction of components with pronounced exothermal effect is developed.

The briquettes are intended for application in steelmaking in the capacity of deoxidizing agents and alloy additions. With this purpose was carried out an experiment for dissolution of obtained briquettes in steel, melted in induction furnace with graphite crucible.

As a rational outlay of briquettes on melting should be considered 2,4% from mass of metal – at this outlay, there occurs maximum growth of temperature of pool and maximum decline of oxygen content in steel, high sense of degree of changing manganese from the briquette into steel. Ill. 5, tabl.1, bibl. 3.

QUANTUM-MECHANICAL CALCULATION OF THERMODYNAMIC FUNCTIONS OF STEAMS OF 3D-TRANSITIONAL ELEMENTS. *G.Lomtatidze, O.Mikadze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 55-57. rus.sum. geo.engl.rus.

Low-temperature plasma, applied in metallurgy secures obtaining of 5000C. In such conditions not only 3d-transitional elements are vaporized, but also graphite (4500C), having the highest temperature of boiling and even tungsten (5930C).

For providing plasma metallurgy with calculation apparatus it is necessary to calculate thermodynamic functions at ultrahigh for common metallurgy temperature. Such calculations can be done by using background materials and classical thermodynamic apparatus. It is considerably easy to calculate basic thermodynamic functions by quantum-mechanical method.

During calculations, it is acceptable that most of the evaporated metals are monatomic, particles do not differ from each other and characterized by progressive motion only. By using sum of condition, an absolute value of entropy, enthalpy and energy of Gibbs are calculated.

Calculated value of entropy definitely differs from calculated by classical method and from literary data. It can be explained by rather free extrapolation of reference data and classical calculations.

Preference of quantum-mechanical method of calculation of thermodynamic functions should be acknowledged as compared with classical method. Tabl.1, bibl. 6.

CALCULATION OF CROSS BRACED FOUNDATIONS. *T.Kikava.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 58-60. geo.sum. geo.engl.rus.

For the purpose of supporting uniform outflanking in constructions, erected on soft and heterogeneous ground, in most cases, their foundations are founded from mutually transversal beams.

A method of calculation of cross foundation is suggested. A system of linear equation is made for determining unknown forces, occurred in knots of crossing of beams in the direction of axes “x” and “z”. After this each beam with applied on it forces is considered and calculated independently as the beam, lying on the linear-deformable foundation. Specific example of calculation is considered. Reactive pressure profiles of ground and bending moment are drawn up. Ill. 1, bibl.4.

SYSTEM OF MEASURING-TRANSMISSION DEVICES OF POWER AND DIRECTION OF WAVES ARISEN ON THE SURFACE OF WATER RESERVOIR WITH HIGH DAMS. *I.Gabrighidze, G.Kharabadze, V.Gabrighidze, G.Tchumburidze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 61-65. geo.sum. geo.engl.rus.

A system of measuring-transmission devices are presented, which ensures the registration of wave powers, arisen by different reasons on the surface of water in water reservoirs with high dam, and transmission of results of measuring to the personnel of hydropower station for timely completion of corresponding operation. This will promote the prevention of hit of wave blow on the wall of the dam and spillway shield. Consequently, unimpeded pass of storm waves in tail water is ensured, which in turn will give a possibility to eliminate a phenomenon, representing danger towards rigidity of the dam.

A construction of measuring-transmission device and principle of its action are considered. Functional-structural schemes of send-recvie device are worked out. Ill. 4, bibl. 2.

URBANIZATIONAL SOLUTION OF ADDITIONAL GENERATING OBJECTS ON RIVER MTKVARI BY CONSTRUCTING PERSPECTIVE HYDROPOWER STATIONS WITHIN THE RANGE OF TBILISI. *T. Lortkipanidze, V.Jamarjashvili, G.Gigiberia.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 66-69. geo.sum. geo.engl.rus.

In development of previously considered (m. “Energy”, №1(49), 2009) project designing is suggested a version of more complete application of potential hydraulic power of river Mtkvari.

According to the suggested idea, on Ortachala Hydropower station and on four hydropower stations, considered in above mentioned article, additionally can be created capacity of 52 megawatt. This can be realized by water transmission through tunnel from head waters in “Hydropower station-ship”, located in tail waters. Hydro aggregates and corresponding electromechanical equipment will be installed on them. Excess of river flow will be used, exceeding estimated flow of hydropower station. “Hydropower station-ship” (5 units) can generate additionally 97 million kilowatt/h of el. power in three months flowage and their total generated energy during a year will be equal to 314 million kilowatt/h.

From the urbanizational point of view, suggestion can be fulfilled by using floating means with creating on them public (including entertaining) infrastructure. Together with this a real illusion of navigability will be created on rivet Mtkvari. Ill. 2, tabl.2, bibl. 2.

INTENSIFICATION OF FLOTATION PROCESS FOR ENRICHMENT OF BARITE-POLIMETAL ORES BY INCREASING DEPRESSING REAGENTS FEATURES. *D.Talakhadze, A.Gigineishvili, D.Tevzadze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 70-72. geo.sum. geo.engl.rus.

There is discussed works existed in the sphere of enrichment of barite-polimetal ores in the article. There is established perspective ways for improvement of enrichment technologies there. There is grounded inevitability of isolated flotation of sulphid minerals there. There is given the mechanism of mutual action of acetylene and lime through barite flotation on sulphid minerals. On the base of study of the mechanism increasing depressing features of lime by acetylene there was grounded the advantage of usage of calcium carbide there. For the first time there was received barite concentrate with 84.8% of BaSO₄, 1% iron and more than 75% of whiteness from stocked barite-polimetal ores. Tabl.1, bibl. 4.

CALORIMETRIC SENSOR FOR MEASURING SPEED OF GAS STEAM ON THE BASIS OF THERMISTORS OF METAL-POLYMER STRUCTURE. *T.Khachidze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 73-75. geo.sum. geo.engl.rus.

Main deficiency of calorimetric sensors for measuring speed of gas steam is a bad operating speed (time of reaction of sensor no less than 4 s). This deficiency is conditioned by availability of metal pipes of big heat capacity in constructions of measuring channel of these sensors. Measuring channel of new type is worked out and studied on the basis of metal-polymeric thermistors. Metal-polymeric thermistors possess sufficiently high mechanical resistance, flexibility, speed and hostile environment, high processibility at low cost.

Study of a new construction of sensor showed that operating speed increased almost in 2 times. Ill.2, bibl.5.

STATIC BEHAVIOR OF INDUCTION MOTOR WITH BUILT-IN SEMI-CONDUCTING SWITCH BOARD. *E.Kutateladze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 76-77. geo.sum. geo.engl.rus.

It is demonstrated, that if in induction motor will be built in a semi-conducting switch board, a switching frequency, which is in definite connection with a speed of rotational velocity of rotor, then static behavior of such motor is similar to the behavior of the motor of direct current with series excitation. Types of mentioned behaviors are presented for two senses of absolute slip and stress rate at input in switch board.

In accordance with the abovementioned behaviors, the motor can be applied for operation in such hostile environment, in which it is impossible to apply the motor of direct current due to its effervescence. Ill.4, bibl.1.

IMPULSIVE SENSOR OF SPEED. *E.Kutateladze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 78-79. geo.sum. geo.engl.rus.

Principle electric circuit of impulsive sensor of speed is presented. It contains two amplifying stages, trigger of Shmitt, vibrator and magnetic system. The latter represents small-size, telephone magnetic system. On the shaft of the motor is fixed a tooth gear, having teeth of rectangular form. While rotation it is moving along the magnetic system, as a result of which in winding occurs an electromotive force of sinusoidal form. The electromotive force is delivered to the entrance of electrical circuit, as a result of which rectangular impulses are formed on the exit.

The worked out scheme is successfully applied in outline of feedback for the purpose of regulation of frequency at switching the switch board. Ill. 1.

OPTIMAL TECHNOLOGICAL SOLUTIONS OF CONSTRUCTION PROCESS. *Sh.Bakanidze.* “Energy”. Tbilisi. 2009. №2(50), part 2. p. 80-83. geo.sum. geo.engl.rus.

Manufacturability of buildings and constructions in most cases depends on separate construction processes. Options of technological solutions of some construction processes are studied and optimal ones are revealed.

Technical-economic calculations are carried out in the form of local-resort outlays.

Whereas there is no interest towards the whole estimated value of the options, but towards their mutual proportion, the local-resort outlays are carried out in accordance with direct costs.

Construction processes and options of their completion, local-resort outlays, comparison of technical-economic options and optimal technological solutions of construction processes are presented on the form of tables. Tabl. 4, bibl. 2.

DEPENDENCE OF MANUFACTURABILITY OF STEEL FRAMEWORK OF SINGLE-FLOOR INDUSTRIAL BUILDING FROM ITS CONSTRUCTIONAL SOLUTION. *Sh.Bakanidze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 84-87. geo.sum. geo.engl.rus.

An issue regarding determination of level of manufacturability of building structures of constructions is considered by means of generalized criteria of manufacturability. It is noted, that the manufacturability of buildings and constructions depends to a large extent on their constructional solution. On the basis of worked out local-resort outlays and on an example of single-floor industrial building with steel framework is given an analysis of relation of criteria of manufacturability to a constructibility of solution of building.

The second version is turned out more manufacturable, as its generalized criteria of manufacturability turned out maximum among compared versions (K=1,26). General economy as compared with the first version makes 26 and as compared with the third – 17%. Tabl.4, bibl.5.

FAVORABLE ARRANGEMENTS FOR DEVELOPING OF SMALL HYDROPOWER ENGINEERING. *G.Meskhia, G.Koridze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 88-91. geo.sum. geo.engl.rus.

From 82 billion kilowatt/hour of potential el. power 26 thousand rivers of Georgia only 10% is developed. 67% of hydro resources is concentrated in Western Georgia. Reasonability of speedup of construction of small hydropower stations in Georgia is grounded. Energy potential of the rivers is studied, which is ascertained by various organizations in different period. On the base of existing materials is determined technically and economically confirmed (perspective) total quantity of capacity of mini hydropower station (0,1-1,0) megawatt and small hydropower station (1-10) megawatt compile 26,5 and 218 megawatt.

A list of conceptual arrangements for the purpose of developing of small hydro energy in Georgia is presented. Main emphasis are made on improvement of legislative base, effective and objective fulfillment of privatization of energy objects, stipulation of tax privileges in "Tax Code of Georgia" on small power engineering, establishing in the Ministry of Energy, a department of small power engineering development and center for development of power engineering on World Standard level.

REGARDING CONSUMER TARIFFS OF EL. POWER. *G.Meskhia, G.Koridze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 92-95. geo.sum. geo.engl.rus.

During 1994-2006 was performed raise of el. power tariffs. In authors' opinion, tariff raise contributed raise of value of main funds in energy sector, growth of amortized charge etc. Factors are presented, contributing the tariff raise. A form of payment of el. power cost is suggested – $C=CE+A$ where C – cost of el. power supplied to the population during 1 month; C – coefficient, taking into account a social security of the population and progressive tax on el. power; E – electric energy input for 1 month, kilowatt/h. A consideration is stated – in order to protect consumers' rights, State must take an obligation to assist socially unprotected population regarding covering part of expenses on el. power.

A METHOD OF MANUFACTURING INTEGRATED CIRCUIT RESISTORS WITH A FIXED VALUE OF HIGH ACCURACY. *G.Kutchava, A.Muchiauri, I.Jikhvadze.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 96-99. geo.sum. geo.engl.rus.

In order to form resistors with a fixed nominal value of chips, properties of the base, emitter and collector transistor structures allowing to form resistors with an access of more than $\beta \geq \pm 20\%$ are used. In order to improve the accuracy, a method of adjusting resistors is frequently used. This significantly increases the cost and complicates the technological process of forming resistors.

As in analog chips the signals received at the outlet represent a continuous function of the input signal, passive components of the chips (resistors, in particular) must have high accuracy.

In this paper a method of forming high-precision resistors, without using a measuring-control system is being discussed. Ill.4, bibl. 4.

BASIC ASPECTS OF A NEW METHOD OF REAL-TIME FORECAST OF BACKING (RISE OF LEVEL) IN RIVER BED DURING FLOOD. *T.Gvelesiani.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 100-101. rus.sum. geo.engl.rus.

By designing dams and cleaning of natural riverbeds of the rivers, it is necessary to curve construction of free surface of the rivers, which in its turn means to determine distribution of water depth along length of river bed. This acquires an important value at estimation of flood.

In case of natural riverbeds, an integration of differential equation at non-uniform motion of fluid flow is impossible: special approximate methods require using of additional diagrams and tables and that is why they are quite labor-intensive. Besides, solution of above mentioned equation by using numerical (differential) methods needs considerable time for developing special complex program. Therefore, on definite (widened) sections, with the purpose of forecasting a size of brace, it is needed to be developed a new operative method.

Basic aspects of developing such method, results of obtained, preliminary calculations and perspectives of more effective and complete application in the future are considered. Bibl.4.

DETERMINATION OF INCREMENTAL RATES OF WAVE AT THE END OF ANGLED WALL IN ACCORDANCE WITH FROUDE NUMBER AND SLOPE ANGLE OF THE WALL. *Ts.Buchukuri, G.Nadaraia, T.Buchukuri.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 102-104. geo.sum. geo.engl.rus.

Movement of water stream between head and tail waters are considered. An aim of the research is to study a necessity of damping of raised kinetic energy of the stream. It is necessary to ensure protection of tail water from significant local wash-out with the purpose of exception of demolition of construction. Experiments are carried out on the model of surface spillway of Enguri arch dam.

Data of these experiments are processed according to the scheme of Eitkin, Lagrange polynomial. The results, obtained by using metallic apparatus, agree with the data, given in the table. In processing conditions, it is possible to reach economy of time and expenses. Ill.1, tabl. 2, bibl. 2.

ALTERNATIVE TO WALLPAPER – PLASTER. *M.Javakhishvili, I.Garibashvili, R.Jgenti.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 105-107. geo.sum. geo.engl.rus.

Generally, plaster – this is a mixture of brownish color, spread on the wall. Before carrying out the face works (before coloring) of cottage and bathhouse, it is advisable to plaster the walls. Different variants are considered for flats. One of them is decorative solution. This material is distinguished by simplicity of spreading (it is easier to work with it comparing with tipping the wallpaper) and good aesthetic behavior.

Specification of decorative plaster is – ensuring of structural composition. This is a plastic mixture, in which are added different solid elements, small stones, pieces of marble etc.

As opposed to ordinary plaster, Venetian plaster deserves special attention. Simple spreading of the material on the wall is not enough, it needs special knowledge.

MODERN MOUNTING FOAM AND SEALANTS – RELIABLE BOOSTERS AT REPAIRING. *M. Javakhishvili, I. Garibashvili, R. Jgenti.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 108-111. geo.sum. geo.engl.rus.

In construction field and industry are known various variants of application of modern mounting foams. They occupied that part of consumers' market, where before them were "reigning" such traditional materials as: concrete, bitumen, silicate cottons, plaster etc. The mounting foam is an universal isolation material and is applied for elimination of cracks and openings. Behaviors of the mounting foam give a possibility of its wide application for growth of leak-tightness and sound insulation of building. In cold buildings during elimination of cracks and openings on the roof, the building is heated. By means of foam is possible to fill cavities in window and door openings.

With the purpose of sealing, the foam is used in places of breakings and pipe junctions of heating and water supply systems. It gives possibility to decrease noise in buildings, occurred at work of water supply system, air conditioning and heating system.

ROLE OF URBAN PLANNING IN RECREATION UNITY AND ASPECTS OF URBANI-ZATION ECOLOGY SUBJECT TO APPLICATION OF RULES OF NATURE PRE-SERVATION. *R.Jgenti, M.Javakhishvili, I.Garibashvili.* "Energy". Tbilisi. 2009. №2(50), part 2. p. 112-114. geo.sum. geo.engl.rus.

On modern stage of development of productive force in Georgia one of the main problems is a growth of biosocial reliability of personality. Growing rhythm of modern life increases stress on people and that is why recovering of their health is of main importance today. This is connected to the necessity of creating different types and perspective forms of recreation activity and creating of progressively designed recreation zone by using modern apparatus of numerical analysis.

In current conditions, a problem of ecology became particularly urgent in the system of "recreation activities – recreation - resources". It is essential to foresee the fact that developing of productive forces more and more complicates connections in social super-system "productive and non-productive fields" and in its separate blocks (recreation, relaxation, rest, tourism etc). Because of this reason, one of the main tasks of solution of existing problem is ecological optimization of recreation systems by means of modeling, the methodological base of which is a system analysis.

ANALITICAL IMAGE OF DISCHARGE CURVE. T.Ambroladze, A.Akhvlediani. "Energy". Tbilisi. 2009. №2(50), part 2. p. 115-117. geo.sum. geo.engl.rus.

In case if the schedule of dependence between river water level and discharge – the discharge curve is one-valued, it may be depicted analytically as square parabola, exponential function, power function and logarithmic function. Systems of normal equations have been made and solved for defining the parameters of these images by method of the smallest squares. Analytical images of discharge curve have been made through received parameters for the above functions.

Approximation quality of each curve has been estimated by medium square deviation. Based on results received, depiction of discharge curve is recommended by square parabola and power function. Tabl.2, bibl.2.