ANNOTATION - 2014

Earth sciences

THE FEATURES OF FORMATION OF GROUNDWATER RESOURCES IN THE MOUNTAIN AREAS OF AZERBAIJAN

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The decisions have been received for rational utilization from irrigative soils, the available hydrogeological-meliorative condition has been studied and its improvement measures have been grounded under market economical condition.

Key words: hydrogeological-meliorative condition, paying use from water, Water Users Association, irrigating land.

Water Economy

MARKET ECONOMY AND HYDROGEOLOGICAL-MELIORATIVE STATE OF IRRIGATIVE SOILS UNDER NEW REFORMS CONDITION

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The decisions have been received for rational utilization from irrigative soils, the available hydrogeological-meliorative condition has been studied and its improvement measures have been grounded under market economical condition.

Key words: hydrogeological-meliorative condition, paying use from water, Water Users Association, irrigating land.

Environmental protection

LONG-WAVE BALANCE OF GRASS SURFACE AND FALLOW IN WROCŁAW-SWOJEC

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Long-wave radiation balances of surfaces with grass and without grass (fallow) in the years 1961-2014 were compared. Balance components were calculated on the base of results from continuous actinometric measurements, realized in Wrocław-Swojec Observatory in the period VIII 2007 – IV 2014. The base of calculation was hourly values of long-wave radiation from grass surface, fallow and atmosphere, registered in analyzed time. In first research stage their daily courses for particular months and daily means for following days in 7 years period (2007-2014) were compared. Year by year changes of measured radiation values and values of its balances were analyzed too. In the next stage multiple regression equations, combining values of long-wave radiation of grass surface, fallow and atmosphere with elementary meteorologic elements, mainly air temperature, humidity, vapour pressure deficit, precipitation, evaporation and insolation, were derived. On the base of these equations with very high determination index ($R2 \approx 0.99$) and relative small estimation error, there were calculated missing values from the years 1961-2007. The equation were verified with the cross-validation method (LOO version), to avoid using to many parameters in equations. Meteorologic data using in reconstruction came from standard meteorologic, evaporometric and actinometric measurements have realized in Wrocław-Swojec Observatory since 1961. Research revealed not only higher values of radiation from fallow than grass area, but also that compared; measured values of long-wave radiation from these surfaces are considerably higher than values of atmospheric long-wave back radiation. In reconstructed 54-years period were besides noticed stronger increasing trend of radiation from fallow than grass surface. It shows that in local scale, clearly buffer effect of plant cover occurs, against to contemporary taking place climate changes. In comparison with fallow, representing to large extent urban surfaces without plant cover, in analyzed climatic effects of grass radiation are observed moderating characteristics of sustained plant cover. These characteristics are favorable for agriculture and forest area topoclimate forming. Apart from biophysical qualities of grass surface it is connected with its albedo and evapotranspiration, which is stronger than transpiration of fallow.

Key words: long-wave radiation balance, long-wave radiation, grass, fallow, atmosphere, topoclimate.

Environmental protection

THE LABORATORY RESEARCH OF RESOURCE SAVING BIOENGINEERING MEASURE (GEO MAT „LUFFAEROMAT") AGAINST SOIL DEGRADATION RUNNING ON THE VULNERABILITY MOUNTAIN SLOPES

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Against soil degradation exist many measure (engineering, forest-reclamation measures, geo mats), from them distinguished geo mats with their effectively. In the world is known many geo mat against erosion degradation (Jute Mat, Covamat, Eromat and etc.), but many of them produced as a result of difficult process of plants biomass processing, making its sewing thread and knitting, which is also important restrictive factor for using geo mats.

With considering above mentioned, we propose geo mat ,,Luffaeromat", which are made easily, particularly from naturally prepared fiber-labyrinth inner of plant Luffa dry fruit, which after cutting along length, connect to each other with hemp yarn joint and create united geo mat.

For study soil protectable characteristics of geo mat ,,Luffaeromat", carried out laboratory research on it, positive results received on the base on its laboratory research show us necessity its research in the field conditions, to ultimately determine expediency of introduction of geo mat,,Luffaeromat" to achieve stabilization of vulnerability slopes.

Key words: erosion, geo mat, vulnerability.

Water management

SUSTAINABLE SOIL, FERTIGATION AND WATER EFFICENCY

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Sustainable Soil and Water Efficiency are the most important issues on our planet, because our population keeps increasing and our world farm land keeps decreasing.

The solution is to improve the soil health of our farms and increase water efficiency through the use of ProBiotic nutrient and the automation of Fertigation with irrigation.

Key words: sustainable fertigation, ProBiotic nutrients, soil health, water efficiency, sustainable agriculture.

TIME IDENTIFICATION OF SOIL ABSORBING DURING THE RAIN IRRIGATION BEFORE STARTING FIELD FLOODING

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For rational use of water artificial rain should be produced with such intensity and large-size drops which will provide the depth of rainfall penetration till formation the land runoff. In the following article we'll present the method of time calculation before the beginning of field flooding in accordance to rain and soil specification.

Key words: rain, intensity, soil**,** infiltration.

INFLUENCE OF DETOXIFICATION METHODS ON THE MIGRATION OF ECOTOXICANTS TO THE SUBSURFACE WATER

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The research conducted within a lysimetric experiment aimed at studying the chemical composition of intrasoil water has shown that contaminated black soil has a high absorption capacity of heavy metals (HM). The bulk of HM brought about in a form of water-soluble salts, was adsorbed and converted by soil colloids of podzolized chernozem into relatively stable compositions. Organic and organo-mineral systems where phosphates and used in the volume of 60 kg of P_2O_5 per hectare a year, reduced intake of cadmium in the subsurface water. Mineral systems also impeded migration of zinc and copper to the ground water. On the contrary, high doses of superphosphate in the fertilizer system increased the leaching of *Cd*, *Pb* and *Cu* to the infiltration waters.

Key words: podzolized chernozem, heavy metals, intra-soil waters, lysimetric experience, system of the fertilizers.

PROBABILISTIC ASSESSMENT OF VULNERABILITY OF NATURAL RIVERSIDE

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Quantitative assessment and forecasting of one or another hydrological phenomenon is important for estimation of vulnerability of natural riverside. Mechanism of riverside destruction by water is considered in the represented work as random process, which is depended both on influence of flow speed and on riverside resistance. As the indicator of this process against such influence is taken riverside characteristic – vulnerability, for determination of which is used a well-known model of the theory of reliability, called "load-strength" model. Proceeding from this fact a result obtained via theoretical formalization in the form of represented formula is considered at this stage as approximation and time factor should be taken into account in the modeling process that will be a step forward in relation to current reality.

Key words: riverside, vulnerability, Probabilistic assessment.

AGROCHEMICAL RECLAMATION METHODS OF DEGRADED AND TECHNOGENICALLY POLLUTED SOILS

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The content of heavy metals in the soils of the Ryazan region was studied and the grading of soils according to their gross content was developed, taking into account the total index of contained pollutants. There were proposed the methods of control, protection and detoxification of technogenically polluted soils in order to produce environmentally friendly agricultural products. The most effective fertilizer system was identified. The research also covered the migratory ability of heavy metals in soils.

Key words: environmental monitoring, heavy metals, manmade load, detoxification of soils, migration.

THE ORGANISATION OF THE OBSERVATION SYSTEM IN DAMS AS THE MAIN PART OF SAFETY OF RESERVUARS EXPLOTATION (On the example of Gekhi dam)

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The Geghi dam of hydraulic complex is the highest soil dam in the Republic of Armenia. The hydraulic complex consists of the dam and auxiliary structures such as a catastrophic spillway, discharge tunnel etc.

The paper describes development of equipment location diagram and grounding of their necessity for measurement of deposits and deformations of the dam. Proceeding from specific characteristics of the structure special measurement instruments of safe operation and provide high accuracy of measurement.

Key words: dam, wastewater, diameter, dynamometer, measurement unit.

ABOUT RECULTIVATION OF LAND POLLUTED WITH OIL AND OIL PRODUCTS ON APSHERON PENINSULA

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In the article they give information of the state of polluted land and areas of its spreading on Apsheron peninsula having a long history of oil output.

They analyse methods and technology of recultivation work to renew land polluted with oil and oil product in the Azerbaijan (specifically on Apsheron peninsula) comparing with the experience of developed countries.

Besides, they present the data of criteria (norms) of evaluating pollution in order to use optimum way of recultivation.

Key words: polluted land, criteria of pollution, oil product, recultivation.

Earth sciences

COMPOSING METHODS OF THE MAP OF ANTHROPOGENIC TRANSFORMATION OF NATURAL LANDSCAPES OF THE AZERBAIJAN REPUBLIC

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The present Landscapes of the republic are the naturally–anthropogenic complexes, which are being regulated and managed by men. Constantly or periodically controlled their structural-functional specificities and the productivity. The systematic way of these complexes analysis plays major role in socio-economical progress of our country. At the made up by us the maps the Landscapes, being functioned with in the participation of a man and regulated by him one can notice various natural complex on their backgrounds.

Key words: landscape, anthropogenic transformation, natural landscapes, socio-economical progress, indication elements, landscape categories.

Environmental Protection

EVALUATION AND ANALYSIS OF THE ENVIRONMENTAL PROJECT ON THE EREKLE II STREET IN THE CITY OF SIGHNAGHI (GEORGIA)

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The environmental project in Erekle II Street in the city of Sighnaghi envisages developing the storm-water and anti-landslide measures. For this purpose, the landslide section in Erekle II Street in the city of Sighnaghi was subject to the topographic survey. With the purpose of the engineering-geological evaluation

of the object, 3 boreholes with the total length of 20 m were made. Ground and water samples were taken from the boreholes and were subject to the laboratory analysis. In addition, the hydrogeological and hydrological evaluation and hydraulic calculations of the area were done.

In order to ensure the stability of the landslide slope in Erekle II Street in the city of Sighnaghi, a drainage system to discharge the ground waters was designed, and a ditch by considering the calculations of the relevant hydrological and hydraulic properties was also designed.

Key words: landslide area, drainage system, storm channel, ditch, branch pipe.

Environmental Protection

EVALUATION OF THE ECOLOGICAL PROCESSES IN THE CATCHMENT BASINS OF THE RIVERS INGURI (GEORGIA) AND YANGTZE (CHINA) AND NEW ENVIRONMENTAL PROTECTION MEASURES

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The article gives the evaluation of the ecological processes in the catch basins of the rivers Inguri (Georgia) and Yangtze (China) and new environmental protection measures to regulate the natural disasters (erosion, mudflow) with these rivers.

It is established that the ecological problems in the catch basins of the rivers Inguri and Yangtze, in the upstream wall of their dams, at their estuaries with the Black and Yellow Seas are almost similar and differ with their scales only.

The evaluation of the ecological problems in the catch basins of the rivers Inguri and Yangtze is proposed to do with the methods for carrying out the field and laboratory experiments in Georgia and China. These methods allow accurately predicting the erosive-mudflow and landslide processes.

By using the data gained through the experiments, the calculation methods to design the new environmental protective structures will be developed.

Key words: the rivers Inguri and Yangtze, catch basin, dam, environmental protective structures, erosion, mudflow.

Reclamation

RESEARCH OF NEW ALTERNATIVE MEASURES OF DRAINAGE SYSTEMS FOR COLCHIS WETLAND SOILS ON THE THREE TIER DRAINAGE EXAMPLE

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In the article is considered issues of Colchis lowland problems and alternative ways for its solving. There is presented new three tier drainage systems installation works carried out by us in the village Didi Jikhaishi (Samtredia district). We continue observation and results analysis.

Key words: tier drainage.

Environmental protection

ON RESEARCH ASPECTS OF A NEW-TYPE FLOATING WAVE DAMPING HYDRO-TECHNICAL COMPLEX FOR PROTECTION OF COASTAL LINE AND OPEN PORTS FROM STORM WAVES

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The main research aspects of the problem which is connected with the floating new type coast-protection. Breakwater (damper) functioning is presented.

Based on the Gvelesiani's analytical solution of the proper 2D boundary value problem and the processing of the obtained numerical results the relation between the damping degree of the wave maximum amplitude and the damper (barrier) submergence depth for the varied progressive wave length is developed.

Key words: floating damper, progressive wave, damping degree of wave amplitude, damper submergence depth, wave length, water basin depth.

ON ASSESSMENT OF A DAM OVERTOPPING PROCESS DURATION CAUSED BY SEISMOGENIC WAVES IN RESERVOIRS

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The generation of long-period tsunami like impulse waves in a mountain reservoir of hydraulic works may be stipulated by a strong earthquake accompanying by seism tectonic (residual) deformations at the earth surface of the reservoir zone. The possible prolonged and repeated overtopping the embankment dam by these waves may cause the partial or complete scouring (failure) of the dam and catastrophic consequences at the downstream region.

The analysis of the computed cycle results based on the proper 2D hydrodynamic boundary value problem solution for the reservoir represented schematically as the rectangle, allowed to predict the possible dam overtopping accident and to assess the parameters of the wave oscillation process at dam site in particular such as the possible duration of the wave overtopping process.

Key words: wave maximum run-up height, water level rise, wave amplitude, wave length, duration of wave.

QUALITY OF LIFE AND ENVIRONMENT

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The article considers the environmental economics as a synthesis of traditional neoclassical and Resource Economics in combination with an assessment of the environmental impact, on the one hand and environmental economics and traditional environment, on the other. It's shown that triune concept of sustainable development appeared as a result combining three main points of view: economic, social and environmental. It's shown that ecological economics gives us the key to change not only the mankind, but also the whole world, including inanimate, vegetable and animal nature. People – consumers are seen as an important component of the economic and environmental integrity of the system and not as a dominant and

central force. Humanity is adopted as a part of the biosphere and affirms the need to transform the nature for the benefit of a person, there appears a number of new ideas that how people develop to a large extent under the influence of the environmental impact.

Key words: ecological economics, ecosystems, quality of life, human development.

Hydrology and meteorology

ASSESSMENT OF CURRENT CHANGES IN THE ANNUAL DISTRIBUTION OF RUN-OFF OF THE AZERBAIJAN RIVERS

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The article describes the particularity of annual run-of distribution of rivers of Azerbaijan Republic. On the example of 20 main river located in different natural regions of the republic main particularities of change of monthly and seasonal run-off have been defined.

It was established that during the period of 1975-2012 compared to previous years flow in winter has increased and in summer reduced for majority of the assessed rivers. Possible reasons of these regularities have been described in the article.

Key words: monthly flow, seasonal flow, climate change, anthropogenic factors.

Safety and risk of hydraulic structures

MODELING PROCEDURE OF COASTAL PROTECTION SHAPED BLOCKS WITH HIGH WAVE SUPPRESSING AND INTERLOCKING CAPACITY

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On the basis of analysis of wave suppression efficiency and stability on the slope of more than one hundred existing shaped massives the new type of coast protecting reinforced concrete blocks – so called "Hexablock" characterized with higher wave suppression properties, interlocking capacity, stability on the slope and longer life time is proposed. The procedure of "Hexablock" modeling is worked out by the laboratory of the Institute of Water Management of Georgian Technical University.

Key words: shaped blocks, new type of coast protection "Hexablock".

Environmental protection

ANTHROPOGENIC AND GEOCHEMISTRY OF BIOSPHERE

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The problem about anthropogenic impact of human society on geochemistry of biosphere is discussed in this article. It also shows the vigorous natural geochemical flows on the surface of the ground causing dangerous rotation of components.

Key words: biosphere, techno genesis, geochemical processes, intensity, ecology.

Water management

DETERMINATION OF THE COORDINATES OF THE STABILIZED SURFACE OF THE CHANNEL FORMATION IN MOUNTAIN WATERCOURSES OF TRAPEZOIDAL CROSS SHAPE

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The existing methods for calculating the parameters of channel formation process often give results significantly different from the reality, as the mathematical models underlying on its basis not accurately describe the actual physical picture of the problem being investigated. The aim of this work is to develop analytical solutions for determining the coordinates of the bottom of the channel and its planned outlines formed during the stabilization period, the completion of the channel formation process in mountain culverts. Meantime it has been used a new universal theory developed by the authors which could be applied to the investigated process, rolling on the stage of damping.

Key words: bed formation, channel stabilization, flow, sediment movement.

Environmental protection

APPLICATION OF ALTERNATIVE TREATMENT TECHNOLOGIES FOR DOMESTIC WASTEWATER TREATMENT IN ARMENIA

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The article presents the biological lagoon system of domestic wastewater treatment in Paraqar community, which is the first biological treatment plant in Armenia. The main preconditions and results of the project; justification of using water hyacinth are presented.

Key words: domestic wastewater, wastewater treatment plant (WWTP), biological treatment, aeration, biochemical oxygen demand (BOD_5), water hyacinth.

Environmental protection

ANTI-EROSION NON-TRADITIONAL ARRANGEMENTS AND THEIR UTILIZATION TECHNOLOGY

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With the purpose of the effective regulation of the erosion processes at the mountain slopes at the Water Management institute the resource-saving non-traditional constructions are developed, the priorities of the scientific novelty of which are confirmed with the patent certificates of Georgia. For drafting of the anti-erosion constructions, the constructions utilization technology is proposed as well as its installing scheme.

Key words: erosion, mount slopes, anti-erosion construction.

Construction

APPLICATION OF IMMERSION METHOD TO CALCULATION OF LINEARLY DEFORMED PLATES WITH STIFFNESS RIBS

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Let's consider the method of calculation of linearly deformed plates with stiffness ribs. Are derived the general conditions of adequacy of plates with shifted median surfaces of variable stiffness thin rib. From this conditions, in particular, are concluded the condition of joint deforming of plates with small depth extrudes, plates with variable cross-section ribs are applied at solution number of analysis tasks in rational design of thin-walled structures.

Key words: linearly deformed plates, deformation, thin-walled structures.

Construction

NON-LINEAR BOUNDARY VALUE PROBLEM MODELING ELASTIC EQUILIBRUM OF SHELLS

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Let's consider the non-linear boundary value problem modeling, in particular, the elastic equilibriums of thin shells. The thin shells are modeling by two point building ordinary value problems for ordinary simultaneous second order differential equations. The reduction of these tasks to Cauchy problem makes some advantages in comparison with terms of computations. In the work such reduction is stated grounded on immersion.

Key words: modeling, elastic equilibriums, thin shells, Cauchy problem.

Hydraulic Structures

HYDRAULIC CALCULATION METHOD FOR SEA BOTTOM SPILLWAY SEWERS

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Key words: spillway, collector, halosol, waste water, adjacent conditions. Within the scope of the present article the problem of interaction of sea and waste water at inflow reaches is considered and formulae to calculate the maximum dimensions of salinity wedge intrusion into bottom spillways are established. These formulae foresee end slopes of spillway bottoms which must be necessarily considered in hydraulic engineering construction, especially in the Black Sea regions of Georgia.

Hydrology and meteorology

RECOMENDATIONS ON CALCULATION OF BEDLOAD TRANSPORT IN MOUNTAIN-PIEDMONT RIVERS

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Based on the special experimental and theoretical studies made by the authors of the present paper, using as well findings of Russian and foreign investigators recommendations are established on calculation of bed material incipient motion and bedload discharge in mountain-piedmont rivers in case of structural (dune) and nonstructural forms of bedload transport.

Relationships $V_0'' = 1{,}26\sqrt{gd}\left(\frac{H}{d}\right)^{0{,}30}$ and $\bar{V}_0 = 1{,}02\sqrt{gd}\left(\frac{H}{d}\right)^{0{,}30}$ are recommended to calculate critical velocities for bedload material incipient motion.

In case of bedload structural (dune) motion equation $\frac{q_t}{q} = \left(0.0008\frac{V}{V_0} + 0.0002\right)Fr^3$ is established to calculate bedload discharge whilst the formulae of Gvelesiani (1946), Levi (1957) and Shamov (1952) movement are recommended to calculate bedload discharge in case of bed material nonstructural.

Key words: mountain-piedmont rivers, incipient motion, laboratory and field studies, dunes, bedload discharge.

Hydrology and meteorology

THE INFLUENCE OF BED CROSS SECTION ON THE HIDRAULIC ELEMENTS OF FLOW

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The privisions allow to determine discharge and average speed in bed for Newton and non-Newton fluids, in the difference cross section prismatic bedsin condition of equal and non-equal motion.

Key words: Newton and non Newton fluids, speed of flow, equal and unequal motion.

GLOBAL CLIMATE CHANGES AND SOME ANOMALOUS HYDROMETEOROLOGICAL EVENTS IN AZERBAIJAN

R.N. MAHMUDOV

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In the article there have been discussed global climate changes and natural hazards for their influence. Also there have been analyzed some anomalous hydrometeorological processes occurred in Azerbaijan over last years.

Key words: climate changes, storms, hydrometeorological events, extreme temperatures, natural hazards.

COMBINED WATER INTAKE-PURIFICATION FACILITIES FOR MOUNTAIN RIVERS

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The article provides comprehensive description of new design solutions for combined water intake-purification facilities aimed at collecting and using highly turbid river from Mountain Rivers for water supply. The intake facility proposed in this article allows water collection from riverbed thereby ensuring its filtration and sedimentation process. The article also contains a layout of the extended purification plant with new design accompanied with appropriate hydraulic calculations.

Key words: water intake-purification facilities, filtration, sedimentation, hydraulic calculations.

"GLYPHOS.ARM" WSP – NEW ECOLOGICALLY SAFE HERBICIDAL COMPOSITION FOR PROTECTION OF ARCHITECTURAL BUILDINGS

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On the base of glyphosate large usage as the system type herbicide and with the composition of ionic and none-ionic surfactants and stabilizers it was elaborated a new herbicidal preparative form "GLIFOS.ARM" 77% WSP and there were epitomized some experiments on vineyards and fruit orchards. In this paper it will be discussed the possibility of application of this new compositional preparative form for protection of architectural buildings and memorials from unregulated growth of weeds with the maximal ecological safeness.

Key words: glyphosate, herbicide, ecological protection, architectural buildings, weed control.

THE IMPACT OF METEOROLOGICAL CONDITIONS ON DRAINAGE RUNOFF IN DIFFERENT SEASONS

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The activity of drainage during various seasons and the impact of meteorological conditions on drainage runoff in different seasons (winter, spring, summer and autumn) during the period of 1970-2009 are reviewed. Particularly important indicator of drainage activity – dynamics of water runoff. The present article analyzes the change of climatic conditions in the object, Central Lithuania, following the data of Kaunas Meteorological Station; and it is determined that during the period of 1970-2009 the lowest quantity of precipitation is during spring and winter, and the highest – during summer and autumn in the territory under research. While analyzing the temperature in decades, it is found that it has been constantly increasing during spring, and in the past decade (2000-2009) was 1.13°C higher, compared to the average temperature of 1970-2009. Following the data of four decades, drainage runoff is the highest in spring and the lowest – in

summer. While examining the impact of meteorological conditions on dynamics of drainage runoff in the presence of changing climatic conditions, it is determined that the relationship between drainage runoff and precipitation during different seasons was weak (spring and summer) and the average one during winter and autumn. The analysis of relation between drainage runoff and average air temperature during different seasons revealed the average relation during winter and very weak relation during other seasons.

Key words: drainage, drainage runoff, air temperature, precipitation, water runoff.

Environmental protection

NUMERICAL CALCULATION OF UNEVEN TRAFFIC FLOW OF HYPER-CONCENTRATED SEDIMENT LOADED MUDFLOW WITH VARIABLE EXPENDITURES ALONG ITS TRAFFIC

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The reference image of the free surface curve for hyper concentrated debris-flow is proposed, in which, the sustainability of mudflow toward erosion hub has been taken into consideration, as well as its motion and dynamics in water plumbing.

Key words: mudflow, sediment, loaded.

Earth sciences

THE ROLE OF GEOGRAPHICAL TERMS IN THE FORMING OF RIVER NAMES OF THE AZERBAIJAN REPUBLIC

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The majority of river names in the investigated region are Azerbaijani names. Geographical appellatives such as chay, kashka, boom, ar, daba, tap and others play an active role in the formation of river names.

Comprehensive study of river names in this region is of great importance for the development of Azerbaijan toponymy.

Key words: river, su, ar, boom, saddle, gudab.

Water analysis

SKALAR YOUR PARTNER IN CHEMISTRY AUTOMATION FOR WATER ANALYSIS

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The article gives an overview about modern analytical equipment for water analysis. Important role in routine analysis plays automatization. It helps to avoid operator error, get precise results, saves reagents and time.

Key words: automatization, COD, BOD, TOC, water analysis, robotics.

Environmental protection

MODULAR BUILDINGS FOR TREATMENT OF WASTE WATER: REALITY AND PERSPECTIVE

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Submitted Modular construction for treatment of waste water is a complex of cylindrical and rectangular vessels through which water flows dying series. In the process of transition through the courts dissolved substances in water face down mechanically and biologically degraded, so that the output of the construction of water has the specified parameters.

This modular structure provides the following benefits:

- Working with a constant biological filtration with a very short interval of arrest (4.7 hours)
- Do not use electricity (100% economy)
- Installation of cleaner not expensive (40-66% saving construction sites, 20-30% economy)
- During the operation does not require highly qualified staff - requires only weekly monitoring.
- Purified water can be used for watering lawns and green areas, in toilet tank, etc.
- Rainfall in these cleaners in 5-10 times less than in aerobic cleaners. Residue can be used as fertilizer
- Certain parts of the installation can be prepared off-site construction, which allows for construction and installation work for 3-5 days
- Do not threaten odor, insects and biological infections
- Construction cleaner aesthetic appearance does not violate the neighborhood - all of its principal parts are located under the ground.

Key words: waste water, mechanically and biologically degradation.

ADMISSIBLE NORMS OF EROSION AND THEIR ROLE IN PLANNING SOME EROSION-PREVENTIVE MEASURES

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The definition of the term "depth of soil" and three ways to determine the admissible norms of erosion are given in the present article which also provides a formula of admissible irrigation erosion to be used in planning some erosion-preventive measures.

Key words: erosion, soil, depth, time resource, intensity.

THE ARPA RIVER NATURAL FLOW ASSESSMENT

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Investigation of the Arpa river factual outlet has been implemented and according to the results the natural outlet values of Jermouk and Areni water metering observatory of Arpa river have been restored taking into consideration the values of water intake from the basin in various economic purposes. Their intra-annual and seasonal distribution was implemented based on the monthly natural outlets. Here there are presented the Arpa river water flow decreasing trends within the last 50 years. The drawn trend lines equations are suggested to apply for the performing of projections of Jermouk and Areni observatory's average annual outlets over the next 15 years. The assessed natural flow results are suggested to apply in Arpa basin water demand planning and water use permissions application processes.

Key words: water regime, natural outlet, water flow intra-annual distribution, water intake, trend line, climatic change.

THE EVALUATION OF EROSION PROCESSES INTENSIVELY RUNNING ON THE RESORT TSAGVERI BURNT MOUNTAIN SLOPES ON THE BASE OF DETERMINATION OF CLIMATIC, PHYSICAL-MECHANIC AND CHEMICAL CHARACTERISTIC OF SOIL-GROUND

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Have been implemented determination of climate indicators, soil physical-mechanical and chemical characteristics which caused soil erosion processes running on the burnt mountain slopes of resort Tsagveri. On the base of the research may be tell that geo-ecological investigation, implemented in 2012-2013 show us a number changes occurred on the Rusi stream section of the Tsagveri.

Key words: erosion, geologic process, humus.

USE OF COMBINED DRAINAGE FOR DEHYDRATION OF EXCESSIVELY MOIST LANDS ON KOLKHETI PLAIN

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The article is about the problems of taking modern draining measures for perfecting the structure of agricultural lands on hard excessively moist soils located in the central part of Kolkheti Plain.

Until the recent years (until the 1990s), a complex technological method of arranging Kvali of cultivation of excessively moist soils and tube drainage was elaborated for subtropical perennial cultures, though it was not able to create a proper hydrological regime.

Combined (two-tier) drainage has been offered. Its technology envisages the creation of an optimal water-air regime for yearling cultures.

Key words: pipe drain, fissure drain, filter material, two-tier drainage, upper layer of ground water, excessively moist soils.

Construction and Architecture

DEFINITION OF MAXIMUM LOAD ON CIRCULAR AND RING PLATES

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Are studied both circular and circular, as well as having the initial curvature plates with plastic bending deformations accordingly of Mises plasticity conditions. The presented plate with a thickness of 2*h*, load $P = P(r)$. In this paper are calculated values of the ultimate load for various cases of plate supporting. In order to simplify the nonlinear differential equation is also applied Treska-Saint-Venant plasticity condition, accordingly of that the ellipse is substituted by interim of circumscribed and inscribed hexagons ($\sigma_s^{'} \approx 1{,}08\sigma_s$).

Key words: plate, ultimate load, plasticity, boundary conditions, stress, deformation.

Environmental protection

EVALUATION ECOLOGICAL CONDITION OF THE RIVER DURUJI

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The Duruji River considered as one of the most debris flow dangerous river of Georgia, which no one create danger for town Kvareli. For Kvareli danger is debris flow formed in river basin, that difficult is inert mass which is accumulated in the river bed. In article is considered modern condition of river Duruji basin and is provided recommendation about river bed cleaning necessity.

Water management

THE ASSET MANAGEMENT PROBLEMS IN WATER SUPPLY AND WATER DISCHARGE SECTORS

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For the reforms of water economic sectorit is necessary to have a more precise idea about the system, particularly to master the information expresses physically and in values. For this reason it is necessary to implement the system asset inventory, reassessment, relevant registry creation and its management.

In the stage of development the system assets total registration, inventory and reassessment is of great significance in water economic sector. The above mentioned is important for the more integral presentation of the organization activities current picture as well as to cover the tax (amortization allotments) and financial problems (involvement of necessary investments):

In the organizations of water economy system there are currently accounted more than 189.0 billion AMD of fixed assets.

In the article there are presented complications related to asset management and the settlement of certain actions in water economy area.

Key words: water supply, water discharge, sector, water economy, property, asset, management.

Environmental protection

FURFURAL ADSORPTION FROM WATER SOLUTIONS BY ACTIVATED CARBON PREPARATION

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The emission of organic compounds into the environment must be controlled, because many organic chemicals are toxic, carcinogenic. One of the best way for water treatment is adsorption process using.

In this paper is presented the preparation adsorbents as activated carbon (AC) from agricultural wastes. It has proposed the ways for AC preparing from fruits / apricot, peach / seeds and date pits. This is the possibilities for reused of agricultural wastes also.

The yield of AC is defined as ratio of final weight of the obtained AC after washing and drying to the

weight of dried dates stones initially used. It has been established, that the AC receives from agricultural by-products with a good yield in the absence of the any inorganic components with high yield. It has been measured the prepared ACs adsorption properties and surface areas.

Key words: organic compounds, adsorption, furfural, agricultural wastes, activated carbon.

Environmental protection

THE USE OF VOLCANIC BUILDING MATERIALS FOR WASTE WATER TREATMENT

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The results of research are submitted in the field of oil product treatment containing water solutions by the volcanic building materials as Armenian natural zeolites and tuff. It has established that such materials are convenient for applying at waste water treatment from ammonia and organic impurities.

It has been established that the proposal method can be applied to the river water treatment processes by using domestic natural sorbents. It has been shown the advantages of natural zeolite-tufa and popular Armenian building stone as tuff in comparison with other sorbents, such as technological stability, low cost, availability and filtering properties. The application of the Armenian volcanic material in the mentioned processes has been scientifically approved according to the comprehensive evaluation of its mechanical, physical, physical-chemical and technological properties.

Key words: volcanic building materials, waste water treatment, organic pollutants, sorption, sorbent, zeolite and tuff.

Water management

DIMENSIONING OF ROOF DRAINAGE SYSTEMS IN THE CONTEXT OF RAINFALL WATER RUNOFF MANAGEMENT

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The article analyzed the design guidelines drainage of rain roofs of buildings, recommended for different systems. There was a wide divergence of recommendations given by different manufacturers systems. They referred it to the guidance relating to the determination of the maximum rainfall, taking into account the characteristics of the rainy region's in Poland and the probability of occurrence of such rain. In the paper the conclusive rainfall for the region have been recommended. The importance of the correct determination of rainfall drainage system sizing and proper management of storm water runoff from urbanized areas.

Key words: rainfall water, roof drainage, drainage system, water management.

Construction and architecture

WATER CONSUMPTION ON THE BACKGROUND OF THERMAL MODERNIZATION

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The thermal protection of buildings and rationalization of water consumption are directly related with energy savings but also with other aspects. The article presents the real results of the thermal modernization activity based on the monitoring of their effects in fourth educational buildings. The analysis includes water, electricity and energy consumption of these buildings. It was found that after thermal modernization the reduction of the consumption of water, electricity and gas has been noticed. The significant decrease in rates of consumption of media attributed to one student, the learner in a year, in the analyzed schools has been registered.

Key words: thermal modernization, water consumption, electrical power consumption, gas consumption, utility costs.

Economics of Melioration and Water Economy

SOME ISSUES OF MANAGEMENT OF FINANCIAL RESOURCES DIRECTED TO THE CONSTRUCTION OF NEW AND REHABILITATION OF EXISTING WATER STORAGE BASINS

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For water supply problem of Georgia reclamation objects one possible way is regulation of water resources of Eastern region of country by new water reservoirs building and existing rehabilitation. As a result of this works will be avoided water shortage for irrigation soils and suitable planned reduction of agricultural harvest.

In this regard definition interest is money recourses management, which toward this field, among them taking into accounts risks factors in planning their return interest. In the article is proposed methodic for evolution of investment projects, which use give possibility reliably assessment of water reservoirs building (rehabilitation) effectively, will define of water management building priorities, will be receive planned profit and suitable timely return of money resources invested by potential investors.

Key words: water management, economy, money resources management, taking into account risks.

Environmental protection

ISSUES OF ENVIRONMENTAL PROTECTION AND ECOLOGY IN CONDITIONS IN THE PRESENT STAGE OF DEVELOPMENT

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The article discusses a number of issues relating to the protection of the environment and ecological balance in the present stage of development of society and production.

Key words: environment, production, industry, fuel and energy resources, technology, pollution.