



BIOSPHERE COMPATIBILITY: HUMAN, REGION, TECHNOLOGIES

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Journal is included into the List of the Higher Examination Board of the Ministry of Education and Science of Russian Federation for the group of scientific specialties 05.23.00 – Building and architecture: 05.23.04, 05.23.08, 05.23.19, 05.23.21, 05.23.22

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Journal is registered in Russian federal service for monitoring communications, information technology and mass communications

The certificate of registration: **ИИ № 0С77-56639**

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G.S. ABDRAILOVA, N.P. UMNIAKOVA, B. KAKIMZHANOV

DIGITALIZATION OF ECONOMY AND DIGITAL ENVIRONMENT OF MODERN ARCHITECTURE

The article discusses the increasingly popular in the work concept of the digital economy and its influence on the development of architecture. Digital economics is the one where a kind of cyber-physical system acts as an industrial complex creating products and services that ensure the life and comfort of the population. Technological advancement makes it possible to carry out more and more not only commercial, but also other operations online (distance learning, medical consultations, online design etc.).

The authors of the article are trying to find answers to the questions: what is a digital economy, how does architecture integrate into a digital economy, what do architects need to study in order to be ready to work in a digital economy?

Computer programs are widely used not only in architectural design, but also in all related technical areas (calculation and design of buildings and structures, engineering systems etc.). Based on the analysis of the design practice, the authors of the article divide the use of digital technologies in architecture into two groups: software products as a design tool and digital technologies as elements of the structural, technical and functional characteristics of buildings and structures.

All elements of virtual design are embedded in modern systems, for example, BIM – building information modeling. The article considers how in the projects of modern buildings and complexes in the digital economy, the elements of innovative technologies are used, such as Smart House, Smart City. It is indisputable that modern architecture as a sphere of production of the human life environment is an integral part of the digital economy and is developing its own digital environment.

The main conclusion of the authors: in order to be ready for practical activities, students-architects need to realize that modern architecture will develop in line with the digital economy. Therefore, the future architect needs to master all the components of the digital environment of the architecture, both the digital design tools and the smart technology.

Keywords: digital technology, digital economy, virtual instrument, smart home, smart system, digital architecture.

M.Y. SHEVCHENKO

PRINCIPAL DESIGN TECHNIQUES OF RECONCILIATION OF ARCHITECTURE AND NATURE IN CHINESE GARDENS OF SUZHOU

Park and garden design of China initially had relatively few strict limitations and rules and there was a great deal of room for creativity. However study of gardens of Suzhou makes it possible to distinguish some basic compositional design features. Those features are: zoning of the park space; designing of routes for visitors; creation of contrast and background both in large landscape zones and in small-scale objects; "landscape borrowing"; use of depth and succession of landscape views. A major challenge for the architect is creation of complex, multi-layered space, where walking routes between the compositional dominants play a significant role. The use of these design features visually extends the garden space, gives the visitor choice between several routes and enriches content of the garden. Besides, several main design objects can be distinguished, such as: large and small water bodies; artificial mountains and stone groups; garden structures, including pavilions, terraces, towers and galleries; decorations and vegetation. Individual design objects and in particular the architectural structures allow us to elaborate the garden space in more detail. Chinese park is inconceivable without the synthesis between the nature and architecture. The acquisition of basic compositional design features allow us not only to better understand the organization of private gardens in China, but also to use them in own design practice.

Keywords: parks of Suzhou, China, park composition, park architecture.

E.V. KHOLODOVA

ARRANGEMENT WITH GARDENS AND PARKS IN COUNTRY HOMESTEADS OF KURSK CITY. PART II. COMPOSITION, STRUCTURE AND GARDENS AND PARKS ARRANGEMENT IN THE LARGE HOMESTEADS OF THE FIRST HALF OF XIX CENTURIES

The study is based on the identified archival and published sources, field research of the author, which enable to reconstruct a more reasonably shaped, the material structure is lost in the nobility and merchant estates in the area of origin of horticulture and the natural border of Russia. The basis of the study is the study of topography and physical and geographical types of terrain characteristic of the Kursk region.

The scientific novelty of the research is associated with the author's expeditions to identify signs of the existence of manor objects – landscapes and parks, full-scale survey of a number of preserved manor complexes, which did not attract the attention of researchers to a sufficient extent.. Of particular importance is the identification of archival and printed sources that allow more reasonably reconstruct the figurative and material structure of the lost elements of noble and merchant estates.

The contribution to modern knowledge is systematic information about different types of management, their impact on the spatial structure of the estate and its natural environment, as well as about the features of garden and Park techniques that existed in the studied period of the history of the Kursk region.

Key words: *Kursk region (province), landscape, topography, estates, nature, gardens, parks, ponds, rivers, planning.*

I.Y. GLINYANOVA, V.N. AZAROV, V.T. FOMICHEV

PHYTOMONITORING AS A METOD OF THE ASSESSMENT OF ATMOSPHERIC AIR POLLUTION BY URBAN ENVIRONMENT BY FINE DUST

*Fine dust: (PM_{2.5}, PM₁₀) is a priority pollutant that contributes to the development of numerous diseases in urban areas. The purpose of this scientific work is to study the dispersed composition of dust particles on the leaves of apricot trees (*Prúnus armeniaca*) in the residential zone of Volgograd. The novelty of the work lies in the study of the dispersed composition of dust particles on the leaves of apricot trees (*Prúnus armeniaca*) in the residential zone in the city of Volgograd near the construction industry enterprise, mechanical engineering, leather production and railway transport line in comparison with the conditionally clean (control) zone of the SNT "Orocenets" (Sovetsky District, Volgograd) from the standpoint of random functions expressed by integral distribution curves of the mass of particles over their equivalent diameters. As a result of the research, the dispersed composition of dust on the leaves of apricot trees (*Prúnus armeniaca*) in the residential area of Volgograd was revealed. Fine particles were found: PM_{2.5}, PM₁₀ in each of the studied points, which by their values, both in their number and mass fraction, significantly exceed the data on fine dust in a conditionally clean area (control) in the SNT "Oroshanets" (Sovetsky district Volgograd), which creates certain environmental risks for local residents. The dispersed analysis of particles from the standpoint of random functions in the future will allow with a sufficiently high degree of accuracy to predict the dust content of urban atmospheric air in the range of monthly and / or seasonal average values compared to the traditional measurement of fine dust concentration in atmospheric air of the urban environment as the maximum single or daily average. At the same time, further studies of dust on the leaves of plants in an urban environment, namely, the study of the density of its sedimentation, will also reveal a group of urban plants that are best suited to retain PM_{2.5} and PM₁₀ on leaf plates in this region, which can significantly increase the quality of the atmospheric air of the urban environment and be of a recommendatory nature for the state-owned landscaping services of the city of Volgograd when improving the green areas of a megacity.*

Keywords: *fine dust, PM_{2.5}; PM₁₀, residential area, dispersion, leaves of apricot trees, apricot ordinary (*Prúnus armeniaca*), environmental risk, dust particles, environmental situation, urban environment, fitomonitoring.*

A.G. KOLESNIKOV, A.A. BELKIN

USE OF THE PROCESSED GALVANIC SLIMES AS ONE OF THE RECYCLING OF TECHNOLOGIES

The analysis of a situation in the sphere of galvanic production recycling is presented in work. Galvanic production is one of the most dangerous sources of environmental pollution. Mainly superficial and underground sources are soiled. It occurs because of the large volume of the sewage containing harmful impurity of heavy metals, inorganic acids and alkalis, surfactants and other highly toxic connections and solid waste is formed. Especially because a reagent way of the sewage containing heavy metals in a slightly soluble form.

Assessment of harm of chemical components of galvanic slimes is presented. The possibility of slimes processing by hardening in concrete mix as a part of paving slabs is considered. The paving slabs with use of slimes as the painting pigment is offered.

The order of carrying out tests for definition of galvanic slimes safety using for production of construction materials (paving slabs) is given. Influence of slimes introduction on mechanical properties of products is shown.

The dependence of products color on amount by the entered galvanic slime and possibility of color schemes correction are shown.

Key words: recycling, galvanic slime, paving slabs, painting pigment.

T.S. BASHEVAYA

ASSESSMENT OF ENVIRONMENTAL SAFETY AT THE ADDRESS WITH WASTE OF CONSTRUCTION AND DISMANTLING OF BUILDINGS

In the article the estimation of ecological safety of schemes of handling was executed building wastes that are used presently. A comparative analysis is conducted with the perspective methods of handling wastes (recycling, incineration). Basic indicators are set for the estimation of ecological safety of construction. The quantitative values of environmental indicators for each of the ways of waste management have been determined. Results show that in terms of the Global Warming Potential, the most environmentally friendly treatment was recycling, followed by incineration and lastly landfilling.

Key words: construction and demolition waste, environmental safety, waste landfilling, recycling, waste incineration.

U. YU. PAVLOVA, V. F. ASMININ

DESIGN OF PASSENGER SHELTER CONSTRUCTIONS WITH NOISE-PROTECTIVE FUNCTION OF URBAN ENVIRONMENT

Negative influence for agglomeration ecological safety are modern growth of the cities, increase in population density, intensification of automobile transportations. The urban environment everything more becomes subject to the acoustic pollution of road traffic. Negative influence of this type of pollution on a human body is conventional and is shown in the big range of influences. For example the Concept of complication offered by A. Chic, which reflects subjective psychological feelings from the acoustic pollution of road traffic in the city and beyond its.

The existing methods of fight against auto transportation noise is ineffectively or sometimes unacceptably in the developed living area. The most acoustic pollution sites in urban environment are the locations of public transport stop points. Recommendations for design of PSC taking into account their shielding effect for the purpose of decrease acoustic pollution are developed.

Possibilities of the developed computer program for design of PSC with noise-protective characteristics concerning object of a noise-protective are reflected in this work. The problem of optimization of PSC technical parameters for the purpose of increase of level of security of an urban environment from the acoustic pollution of road traffic is solved. Nomograms for determination of optimum height of PSC with installation on them additional screens are developed.

Keywords: *environmental safety, road traffic, acoustic pollution, urban environment, shielding effect, stop points of public transport, passenger shelter constructions (PSC), object of a noise-protective.*

K.G. PUGIN

USING THE METHODOLOGY OF "GREEN" CONSTRUCTION FOR RATING EVALUATION OF ROADS

The use of new technologies and raw materials, including man-made materials, in the production of construction and road materials increases the risks of forming a negative technogenic load on environmental objects when used in road construction. This is of particular relevance due to the fact that the road network has a long extension in the settlements and as a result has a negative impact on the person. A new methodology for "green" construction, which is currently being effectively used in a number of developed European countries, can give a comprehensive assessment of the emergence of risks. On the basis of analytical and laboratory studies it is shown that the methodology of "green" construction used for the evaluation of residential and industrial buildings can not be applied to the evaluation of road construction objects. When assessing the building materials used in road construction, the change in their physicochemical condition during long-term operation in the elements of road structures is not taken into account. It is shown that the emission of environmentally hazardous chemical compounds that make up construction materials increases with the cyclicity of the pH of the medium of their placement, the discontinuity of the surface. It was proposed to include such provisions as "protection from the aquatic environment", "stable pH values of the external environment" for the formation of a rating system for assessing the "green" construction of motor roads in order to ensure environmental safety.

Keywords: *green building, road construction, industrial waste, environmental protection, rating evaluation.*

N.V. BAKAEVA, L.V. CHAYKOVSKAYA, A. A. KORMINA

THE URBAN PLANNING AS A COMPLEX ACTIVITY ORIENTED AT THE FOUNDATION OF SOCIALLY ORIENTED CITY ENVIRONMENT

Social characteristics of the life quality at the urban area and their relationship with the demographical situation and depopulation factors of the population of present-day Russia are considered in the article. Besides the demographical factor, the ecological component of most cities and locations predetermines at the stable march of the society and provides the security of the urban population vital activity. A new model of socially - oriented urban area is offered. The model is a biosphere compatible conception of the city-building, which was developed by Russian Academy of Architecture and construction sciences. The realization of the social oriented urban area consists in the close - knit execution of some principles, which are directed to the provision of harmonious balance between people and environment. According this position the formation of social -oriented urban area has a connection with the necessity of the rethinking the traditional representation and guidelines and the formation of people's world outlook in the context of common humanitarian sciences, which were made by the human at the stage of development. At the practice the creation of the social - oriented urban area should be started with the changing of the system of the city control. The system of the city control is the practice of the urban planning within city - planning complex, which is the uniting part of people's vital activities. In this way there is no alternative of the transition to the symbiont type of relationship between the homuncle and natural environment - the urban planning systems and their natural environment. Such situation can be shown within the difficult and complex problem of the safety with the aim of the social - oriented urban area.

Keywords: human environment, safety, comfort, principles of symbiosis of the biosphere and the city, human potential, urban management, socially-oriented urban environment.

D. N. VLASOV, V.V. RASOV

THE QUALITY OF PASSENGER SERVICES IN INTERMODAL HUBS

One of the most important questions about public transport services development is the attractiveness of public transport for population. Transport transit hubs are the key elements in a transport system structure of a city, providing the interaction of all modes of transport and the urban environment. Every transport transit hub provides the interaction of different in nature, direction, goals and objectives of the movement passenger flows. Comfort, safety and easy movement of passengers are formed by a layout of the communication elements of a hub. The main part of the territory of the Russian Federation is located in the Northern climatic zone, which makes closed and protected communication elements the most convenient and attractive for passengers. The article deals with the rational use of travolators as a communication elements in transport hubs. There is the result of analysis of the existing simulation models of pedestrian traffic. According to the set of properties, the model of attracting forces was determined as the basis for the formation of the computational model. The calculations carried out on the theoretical model that was developed during the project experiment. The experiment consisted in observations of the main characteristics of the flow of passengers in the Moscow metro in the morning "peak" hours. The experiment was conducted using a video surveillance system of the Moscow metro. Good convergence of theoretical calculations with practical observations was obtained. In the future, it is plan to create the matrix planning solutions communications elements with all types of accommodation moving walkways. The calculations allowed determining the main characteristics of passenger traffic in which it is advisable to use travolators, as well as directions for further research on this topic.

Keywords: sustainable urban development, mobility, transport hub, communication elements, intermodal transportation, travolator, passenger comfort.