

# Contents

2013  
5(40)  
october

**Bulletin  
of Civil  
Engineers**

Scientific-technical journal

*The Founder* — the Federal State Budgetary Educational Institution of Higher Vocational Education „Saint-Petersburg State University of Architecture and Civil Engineering” (SPSUACE)

**The Editor-in-Chief**

*Ye. I. Rybnov*, Dr. Sci. Ec., Professor, Honorary Worker of Higher School of the Russian Federation

**Assistants to the Editor-in-Chief**

*Yu. P. Panibratov*, Dr. Sci. Ec., Professor, Winner of the State Award of the Russian Federation and the Award of the Government of the Russian Federation, Honorary Worker of Sciences of the Russian Federation, Academician of RAACS

*Ye. B. Smirnov*, Dr. Sci. Ec., Professor, Honorary Worker of Higher School of the Russian Federation

*V. I. Morozov*, Dr. Sci. Tech., Professor, Winner of the Award of the Government of the Russian Federation (The Senior Editor)

**Editorial Board**

*M. I. Alekseev*, Dr. Sci. Tech., Professor, Winner of the Award of the Government of the Russian Federation, Honorary Worker of Sciences of the Russian Federation, Academician of RAACS

*A. N. Asaul*, Dr. Sci. Ec., Professor, Honorary Builder of the Russian Federation, Honorary Worker of Sciences of the Russian Federation

*M. D. Bal'makov*, Dr. Sci. Chem., Professor  
*G. I. Belyy*, Dr. Sci. Tech., Professor, Honorary Worker of Sciences of the Russian Federation

*B. G. Vager*, Dr. Sci. Phys.-Math., Professor, Honorary Worker of Higher School of the Russian Federation

*A. I. Vahmistrov*, Dr. Sci. Ec., Professor, Winner of the Award of the Government of the Russian Federation

*V. V. Verstov*, Dr. Sci. Tech., Professor, Honorable Builder of Russia

*A. A. Veselov*, Dr. Sci. Tech., Professor

*Ye. G. Guzhva*, Dr. Sci. Ec., Professor

*T. A. Datsuk*, Dr. Sci. Tech., Professor

*A. P. Dolgov*, Dr. Sci. Ec., Professor

*S. A. Evtukov*, Dr. Sci. Tech., Professor, Honorary Worker of Higher School

*G. V. Yesaulov*, Dr. Arch., Professor, Academician of RAACS

*Yu. V. Zaytsev*, Dr. Sci. Tech., Professor, Winner of the Award of the Government of the Russian Federation, Extraordinary and Plenipotentiary Ambassador

*S. P. Zavarikhin*, Dr. Arch., Professor, Honorary Architect of the Russian Federation

*F. V. Karmzinnov*, Dr. Sci. Tech., Professor, Winner of the Award of the Government of the Russian Federation

*N. I. Karpenko*, Dr. Sci. Tech., Professor, Winner of the Award of the Government of the Russian Federation, Honorary Worker of Sciences of the Russian Federation, Academician of RAACS

*B. N. Karpov*, Dr. Sci. Tech., Professor

*A. N. Kim*, Dr. Sci. Tech., Professor

*V. A. Koshcheev*, Dr. Sci. Ec., Professor

*L. M. Kolchedantsev*, Dr. Sci. Tech., Professor

*G. P. Komina*, Dr. Sci. Tech., Professor

## ARCHITECTURE, URBAN PLANNING, DESIGN

- A. S. Aroyan*. The city-planning advisability principle at designing covered urban spaces of middle-sized and big-sized cities (on the example of Poltava, Ukraine) ..... 5
- O. Yu. Belyavskaya*. Architecture of public buildings of Poltava of the 1950-s ..... 10
- E. G. Bobrova*. Reconstruction projects of residential districts of the Soviet period in the historic urban landscape ..... 16
- E. R. Voznyak*. The types and rules of designing balusters as an architectural form of historical buildings in Saint-Petersburg ..... 21
- S. G. Golovina, V. A. Murgul*. Solar energy systems in the architecture of historic cities ..... 26
- S. V. Krylova*. Typology of space-planning solutions and general characteristics of architecture of temples in St. Petersburg and the nearest vicinities in the XVIII century – the first half of the XIX century ..... 32
- E. P. Kuznetsova, L. V. Sosnovskikh*. Graffiti as a “make-up” for the facade ... 43
- A. F. Perova*. Current trends in the development of typology and the system of business tourism institutions (analysis of national and international experience) ..... 47
- I. N. Polovtsev*. University campus in Petrodvorets, the brainchild of the academician of Arts Igor Fomin ..... 52
- T. A. Fedorova*. Tourism organization in the Northern European countries ... 58
- G. V. Filatov*. Formation of an architectural and planning structure of inhabited bridges in the XX century ..... 63

## BUILDING DESIGNS

- V. I. Morozov, A. V. Glukhova*. The calculation model of heavy ferrocement at operation before cracking starts to form ..... 69
- D. A. Piunov, V. A. Bystrov*. Improving the technology of strengthening adhesive joints of bridge spans ..... 76
- V. B. Filatov*. Perfecting of code design procedure for punching of reinforced concrete flat plates ..... 80

## STRUCTURAL MECHANICS AND CALCULATION OF STRUCTURES

- V. N. Elistratov*. Calculation of compressed ferroconcrete elements taking into account the creep of concrete ..... 85
- V. G. Temnov*. Graphical-analytical methods for the calculation and optimization of lattice structures for strength and rigidity in the CAD environment ..... 91

## GEOENGINEERING

- A. A. Volkov, D. Yu. Chunyaev*. Zoning of the surrounding buildings on the degree of exposure to excess and emergency deformations ..... 96
- A. I. Mamontov, N. Ya. Tsimbelman, T. I. Chernova*. Numerical modeling of soil shear test ..... 101
- O. P. Minaev*. Selecting the method and key parameters of vibro-dynamic deep compaction of sand soil bases ..... 108
- O. I. Rubtsov, D. A. Kassin, M. V. Sryvkova, S. I. Mironov*. A comparative evaluation of the geo-radar sub-surface sounding and the tacheometric survey of the surface of the foundation plates used for the determination of possible soil fall-through places ..... 116

## TECHOSPHERIC SAFETY

- I. I. Pereslavytseva, S. A. Yaremenko*. Experimental research of time needed for evacuation of people by staircases of buildings and structures ..... 122

## TECHNOLOGY AND ORGANIZATION OF CONSTRUCTION

- V. N. Romanovskiy*. To the issue of concrete coupling in the joint connecting the industrial equipment and the basement ..... 127
- N. I. Fomin*. Research of construction technology of prefabricated and monolithic walls in permanent reinforced concrete form ..... 131

## BUILDING MATERIALS AND PRODUCTS

- T. P. Belogurova, O. N. Krashenninikov, A. V. Sergeeva*. Effective heavy weight concretes with an admixture of ash waste produced as a result of coal-water slurry fuel combustion ..... 137

L. N. Kondrat'eva, Dr. Sci. Tech., Professor  
P. A. Kravchenko, Dr. Sci. Tech., Professor,  
Honorary Worker of the Higher School  
of the Russian Federation  
Yu. I. Kurbatov, Dr. Arch., Professor, Honorary  
Architect of the Russian Federation,  
Correspondent Member of RAACS  
L. P. Lavrov, Dr. Arch., Professor,  
Honorary Architect of the Russian Federation,  
Correspondent Member of RAACS  
N. N. Lapshev, Dr. Sci. Tech., Professor, Honorary  
Worker of Sciences of the Russian Federation  
S. N. Leonovich, Dr. Sci. Tech., Professor  
L. L. S. Lyahovich, Dr. Sci. Tech., Professor,  
Honorary Worker of Sciences of the Russian  
Federation, Academician of RAACS  
R. A. Mangushev, Dr. Sci. Tech., Professor, Honorary  
Worker of the Higher School of the Russian  
Federation, Correspondent Member of RAACS  
A. M. Maslennikov, Dr. Sci. Tech., Professor,  
Honorary Worker of Sciences of the Russian  
Federation  
S. N. Nikiforov, Dr. Sci. Tech., Professor  
Yu. V. Puharenko, Dr. Sci. Tech., Professor, Winner  
of the Award of the Government of the Russian  
Federation, Correspondent Member of RAACS  
S. V. Repin, Dr. Sci. Tech., Professor  
S. V. Sementsov, Dr. Arch., Professor  
V. I. Travush, Dr. Sci. Tech., Professor, Winner  
of the Award of the Government of the Russian  
Federation, Academician of RAACS  
V. S. Fedorov, Dr. Sci. Tech., Professor,  
Academician of RAACS  
S. V. Fedosov, Dr. Sci. Tech., Professor, Winner  
of the Award of the Government of the Russian  
Federation, Honorary Worker of Sciences  
of the Russian Federation, Academician of RAACS  
V. D. Kharlab, Dr. Sci. Tech., Professor  
A. G. Chernykh, Dr. Sci. Tech., Professor  
E. M. Tchernyshov, Dr. Sci. Tech., Professor,  
Honorary Worker of Sciences of the Russian  
Federation, Academician of RAACS  
V. M. Shelkovich, Dr. Sci. Phys.-Math., Professor  
Editor T. V. Ananchenko, T. I. Bogdanova  
Translator T. V. Lappo  
Proof-reader M. P. Popova  
Computer imposition V. I. Zholobov  
The address of the Founder and the Editorial Office:  
2nd Krasnoarmeiskaia St. 4  
190005, St.-Petersburg, Russia  
Ph./ Fax: (812) 575-16-74, (812) 316-53-11  
E-mail: vestnikspb@mail.ru,  
morozov@spbgasu.ru  
The contents and abstracts of articles are presented  
on the site: <http://www.spbgasu.ru>  
The journal is registered by Federal Agency of Supervision  
of Legislation Observance in the sphere of mass  
communications and protection of cultural heritage  
of the Russian Federation.  
The certificate on registration of mass media  
ПИ № ФС77-18997 is dated 29.11.2004. The Journal  
is included by the HAK of the Russian Federation  
into the List of leading reviewed scientific magazines  
and editions in which the basic scientific results  
of dissertations on competition of scientific degree  
of Doctor of Sciences are to be published  
Requirements on representation of materials are presented  
at the end of journal. Manuscripts not corresponding  
to subject range of the journal and not meeting  
the specified requirements are not accepted; articles  
rejected by the editor are *not returned* to the author  
Authors of the published works receive one copy  
of journal at the personal reference in editorial office  
In case of reprints the reference to the „Bulletin of Civil  
Engineers” is obligatory  
On the cover one can see the monument to the Emperor  
Nicholas I whose name was appropriated to the Institute  
of Civil Engineers (nowadays SPSUACE)  
on December, 17th, 1892

## SANITARY ENGINEERING AND ECOLOGY

- D. A. Bocharnikov. Estimation of residential buildings' environmental safety taking into account energy saving aspects .....144  
A. V. Ivanova. Distinctive features of operation activity of autonomous gas boilers in conditions of low outdoor air temperature ..... 147  
V. M. Ulyasheva, I. D. Kibort. The graphical-analytical method application for selecting optimum work regime of the air heat pump....150  
S. V. Fedosov, V. A. Maslennikov, Yu. P. Osadchiy, A. V. Markelov. Increasing the concentration of components of industrial discharges by ultrafiltration .....154  
**AUTOMOBILE TRANSPORT, TRANSPORTTECHNOLOGICAL CONSTRUCTION AND COMPLEXES**  
S. S. Evtyukov, V. N. Dobromirov. Russian experience in improving methods of determining the speed of vehicles at traffic accidents' expertise.....160  
E. V. Kurakina, S. A. Evtyukov. Investigation of the influence of coupling characteristics of roads on road safety.....166  
P. A. Lavrent'ev. Forecasting motor-road asphalt abrasion .....173  
A. V. Lipenkov. About the influence of the location of passenger bus stop pavilion on acceptance rate of city transport stops .....177  
T. A. Menukhova. «The calculated cycle time» as a universal time interval for calculating technical and operational indicators of automobiles in long-distance and international carriage .....184  
S. V. Repin, S. A. Sizikov, A. P. Skripilov. Theoretical and experimental study of the vibratory impact screen equipment for fractionating sand .....188

## ECONOMICS AND MANAGEMENT

- A. K. Alamshoev. Normative-legal and organizational-technological factors of forming tariffs in the water-supply and sanitation sector in the Republic of Tajikistan .....194  
A. S. Butorina. Problems of developing the market of automobile cargo transportation .....199  
O. T. Vasil'eva. Housing sector of the Russian Federation as an object of research: concept and key aspects.....203  
A. M. Golovan', F. K. Klashanov, S. N. Petrova. To the theoretical basics of building up models of construction management.....208  
Kh. M. Gumba, M. Yu. Mishlanova. Prospects for the development of the vector SWOT-model as applied to the problems of economics and management in construction .....213  
T. A. Datsuk, E. B. Smirnov, I. K. Pinkevich. Methodology of Integrated Assessment of Designed Residential Buildings' Ecological Safety.....219  
S. N. Demidov. Substantiation of multilevel system of factors for forecasting housing construction dynamics.....227  
S. A. Ershova, V. V. Vinogradova. Methodology of the analysis of the megalopolis housing stock .....235  
T. N. Orlovskaya, E. A. Petrova. The concept and essence of the project cost management at the complex development .....243  
N. V. Osipova. Choosing a model of strategic management of investments in social infrastructure of the megalopolis.....250  
E. D. Trushkovskaya, Kh. A. Magamadov. Formation of the conditions for integrated development projects implementation .....257  
V. A. Fedorov. The role of public relations in the solution of transport problems of the megalopolis on the example of Saint-Petersburg.....261  
Yu. A. Shamara. Investigation of reproduction features of the enterprise's fixed assets .....271

## PHYSICS, NATURAL SCIENCES AND INFORMATICS

- A. M. Demin. Mathematical modeling of heat treatment of raw briquet in the course of foam glass production.....280  
M. G. Lapina. The impact of assumption of data distribution type on the effectiveness of the unconstrained demand recovery.....288  
**Abstracts** ..... 295  
**Submitting materials requirements**..... 312  
**Subscription rules** ..... 313