

# Contents

## BUILDING AND ARCHITECTURE

### ARCHITECTURE, URBAN PLANNING, DESIGN

- L. P. Lavrov, N. S. Novokhodskaia.* Long yards, courts of honor, inner streets in St. Petersburg as a response to the request of «upper middle class» ..... 5

### BUILDING DESIGNS

- S. N. Krivoshapko.* Perspectives and advantages of tangential developable surfaces in modeling machine-building and building designs..... 20
- B. V. Labudin, V. I. Melekhov, A. S. Toropov, A. V. Karelskiy, E. V. Popov, A. V. Ruslanova, D. A. Stolypin.* Reduction coefficients of the cladding made of compressed bent ribbed panels with flexible connections ..... 31
- V. V. Pavlov.* Floor structure design of reconstructed buildings..... 38
- R. V. Sinitza, V. S. Osadchiy, L. S. Stolyarov, A. V. Chernetskiy.* Analysis of the existing methods for determining the parameters of wave damping with enclosure hydraulic structures of incomplete vertical profile ..... 43
- A. O. Khagai, N. M. Kirilin, E. O. Khagai.* Experimental study of strength properties of steel fiber reinforced concrete of higher classes ..... 56

### STRUCTURAL MECHANICS AND CALCULATION OF STRUCTURES

- L. M. Kagan-Rosenzweig.* The method for calculating the natural frequencies of elastic rods by application of direct integration of differential bending equation ..... 61

### GEOENGINEERING

- I. V. Noskov, A. V. Sviderskih.* Performance of cone-spiral screw piles in soil frost heaving conditions..... 67

### TECHNOLOGY AND ORGANIZATION OF CONSTRUCTION

- A. N. Biryukov, E. O. Dobryshkin.* Mathematical model of the title list of buildings and structures formation for total building renovation in conditions of limited investment ..... 76
- P. D. Kapyrin, N. S. Sevryugina.* Verification technique of resource saving and safety of high level responsibility objects..... 83
- A. A. Lapidus, Ya. V. Shesterikova.* Formation of potential of the complex quality index in construction ..... 90
- V. V. Sokolnikov.* Modeling of work organization based on the concept of physical construction stream..... 94
- S. A. Sychev, A. A. Koposov.* Technology of erecting prefabricated buildings and structures based on single-layer planar building system of high-speed installation ..... 100
- A. F. Yudina, S. A. Evtuykov, Yu. I. Tilinin.* Development of housing construction technologies in St. Petersburg..... 110

### BUILDING MATERIALS AND PRODUCTS

- V. A. Dorf, R. O. Krasnovskiy, P. S. Sulygova, D. E. Kapustin.* Experimental determination of the thermal and physical properties of steel fiber reinforced concrete ..... 120

### Scientific-technical peer reviewed journal

*The Founder* — the Federal State Budgetary Educational Institution of Higher 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 (SPSUACE)

### 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 (SPSUACE)

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

### Editorial council

*A. A. Akaev*, Dr., Prof., Foreign Member of the RAS (Lomonosov Moscow State University, Russia)

*L. Ungvari*, Dr. Sci., Professor, (Technical University of Applied Sciences Wildau, Germany)

*N. V. Kazhar*, Dr. Arch., Professor (Częstochowa University of Technology, Poland)

*G. Kipiani*, Dr. Sci. Tech., Professor (Georgian Technical University, Georgia)

*H. V. Tokmajyan*, Dr. Sci. Tech., Professor, Rector of SEUA (State Engineering University of Armenia)

*J. Eberhardsteyner*, Dr. Sci. Tech., Professor (Vienna University of Technology, Austria)

*S. N. Leonovich*, Dr. Sci. Tech., Professor (Belarusian National Technical University, Belarus)

*Y. Iwasaki*, Dr. Sci. Tech. (Geo-Research Institute, Japan)

*T. Tanaka*, Dr. Sci. Tech., Professor

(University of Tokyo, Japan)

*A. Zh. Zhusupbekov*, Dr. Sci. Tech., Professor

(L. N. Gumilyov Eurasian National University, Astana, Kazakhstan)

### Editorial Board

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

*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 (NIISF RAACS)

*L. S. Lyahovich*, Dr. Sci. Tech., Professor, Honorary Worker of Sciences of the Russian Federation, Academician of RAACS (TSUAB)

*V. Sargsyan*, Dr. Sci. Tech., Professor (National University of Architecture and Construction of Armenia)

*V. I. Travush*, Dr. Sci. Tech., Professor, Winner of the Award of the Government of the Russian Federation, Academician of RAACS (RAACS)

*V. S. Fedorov*, Dr. Sci. Tech., Professor, Academician of RAACS (MSURE)

*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 (IVGPU)

*E. M. Tchernyshov*, Dr. Sci. Tech., Professor, Honorary Worker of Sciences of the Russian Federation, Academician of RAACS (VSUACE)

*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

*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

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

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

B. N. Karpov, Dr. Sci. Tech., Professor  
 L. N. Kondrat'eva, Dr. Sci. Tech., Professor  
 L. P. Lavrov, Dr. Arch., Professor, Honorary Architect of the Russian Federation, Correspondent Member 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. Sementsov, Dr. Arch., Professor  
 V. D. Kharlab, Dr. Sci. Tech., Professor  
 V. M. Ulyasheva, Dr. Sci. Tech., Professor  
 V. M. Petrov, Dr. Sci. Tech., Professor (SPSUACE)  
 S. A. Evtyukov, Dr. Sci. Tech., Professor, Honorary Worker of Higher School of the Russian Federation  
 P. A. Kravchenko, Dr. Sci. Tech., Professor, Honorary Worker of the Higher School of the Russian Federation  
 V. N. Dobromirov, Dr. Sci. Tech., Professor  
 Yu. G. Kotikov, Dr. Sci. Tech., Professor  
 A. V. Bondarenko, Dr. Sci. Tech., Professor  
 A. A. Kapustin, Dr. Sci. Tech., Professor  
 B. D. Efremov, Dr. Sci. Tech., Professor  
 R. N. Safiullin, Dr. Sci. Tech., Associate Professor (SPSUACE)  
 V. S. Lukinskiy, Dr. Sci. Tech., Professor (HSE in St. Petersburg)  
 V. N. Lozhkin, Dr. Sci. Tech., Professor, Honorary Worker of Sciences of the Russian Federation (Saint-Petersburg University of State Fire Service of EMERCOM of Russia)  
 A. N. Asaul, Dr. Sci. Ec., Professor, Honorary Builder of the Russian Federation, Honorary Worker of Sciences of the Russian Federation  
 I. V. Drozdova, Dr. Sci. Ec., Professor  
 G. A. Tokunova, Dr. Sci. Ec., Professor  
 A. A. Petrov, Dr. Sci. Ec., Professor  
 N. G. Pletneva, Dr. Sci. Ec., Professor  
 A. P. Dolgov, Dr. Sci. Ec., Professor  
 A. I. Solodkiy, Dr. Sci. Ec., Professor  
 V. V. Asaul, Dr. Sci. Ec., Professor  
 E. G. Guzhva, Dr. Sci. Ec., Professor (SPSUACE)  
 G. F. Shcherbina, Dr. Sci. Ec., Associate Professor  
 CEO (AO SSMO "LenSpetsSMU")  
 L. M. Kaplan, Dr. Sci. Ec., Professor  
 (St. Petersburg Union of Construction Companies)  
 R. A. Faltinskiy, Dr. Sci. Ec., Professor,  
 Adviser to CEO (OJSC Gazprompromgaz)  
 The address of the Founder and the Editorial Office:  
 2<sup>nd</sup> Krasnoarmeyskaya St. 4, 190005, St. Petersburg, Russia  
 Ph./ Fax: (812) 575-09-17  
 E-mail: [vestnikspb@mail.ru](mailto:vestnikspb@mail.ru)  
 The contents and abstracts of articles are presented on the site: <http://vestnik.spbgasu.ru>  
 The journal is registered by the Federal Service for Supervision of Communications, Information Technology and Mass Media (Roskomnadzor). The registration certificate of the mass media organization is ПИ № ФС77-69753, of 05.05.2017.  
 The journal is included by the Higher Attestation Commission (HAC) of the Russian Federation into the List of leading reviewed scientific journals and editions in which the major scientific results of theses on competition for the academic degree of the Doctor of Science are to be published.  
 In case of reprinting, the link to the "Vestnik grazhdanskikh inzhenerov - Bulletin of Civil Engineers" is obligatory.  
 On the cover one can see the monument to Nicholas I, the Emperor, in honour of whom the Institute of Civil Engineers (nowadays SPSUACE) was named on December 17, 1892.

M. S. Zakurazhnov, O. V. Artamonova, M. A. Shvedova, Yu. V. Makushina. Mechanochemical activation of the complex additive based on microsilica for modifying the cement stone structure..... 125

## ENERGY SAVING AND ENERGY EFFICIENCY

G. A. Ryabev. Determination of the actual coefficient of brickwork thermal conductivity of pre-revolutionary buildings..... 132

## TRANSPORT

I. S. Brylev, I. V. Vorozheikin. Development of recommendations for creating a modern fare payment system in the city public passenger transport in St. Petersburg ..... 138

V. A. Demin. The concept of the analytic model of management in the transport and logistics system as a subsystem of intelligent transport system ..... 146

S. S. Evtukov, E. V. Golov. Selection of coefficients at determining the cost of kinetic energy cost on the vehicle deformation..... 152

D. Yu. Kobzov, V. L. Lapshin, S. V. Repin, V. G. Gubanov, D. Lkhanag. Stability of hydraulic cylinders of transport and technological machines..... 158

Ju. G. Kotikov. Traction-speed properties of the quantomobile ..... 168

E. V. Kurakina, D. A. Lutov, U. N. Meike. Assessment of the road maintenance and risk factors of automobile roads ..... 177

A. I. Petrov, S. A. Evtyukov. A new anti-entropic conception of forming the road traffic safety provision systems..... 184

I. O. Chernyaev, I. S. Graevskiy, I. I. Vorontsov. Using the modern methods of information analysis for solving the problems of technical operation of vehicles ..... 194

A. A. Shimanova. Methods of ensuring the complex technical system health at the stages of the life cycle ..... 200

## ECONOMICS

A. P. Agranov. Estimation of financial sustainability using GAP-analysis of cash flows..... 204

E. G. Guzhva, O. P. Brisker, A. M. Chibinev, V. V. Kutsevskiy. Institutional agreements as basic coordination mechanisms in the Russian economy ..... 210

S. B. Sborshchikov, N. V. Lazareva, E. E. Bakhus, A. L. Demin, A. Y. Zinoviev. On the issue of modernizing the quality assurance systems at construction of nuclear power facilities..... 219

## CHRONICLE

Press-release from the conference..... 226  
 A new textbook has been published ..... 227

Abstracts ..... 228

Submitting materials requirements ..... 241

Subscription rules ..... 242