International Conference on Civil, Architectural and Environmental Sciences and Technologies (CAEST 2019)

IOP Conference Series: Materials Science and Engineering Volume 775

Samara, Russia 19 November 2019

Part 1 of 2

ISBN: 978-1-7138-4712-0

ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 3.0 International Licence. Licence details: http://creativecommons.org/licenses/by/3.0/.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact the Institute of Physics at the address below.

Institute of Physics Dirac House, Temple Back Bristol BS1 6BE UK

Phone: 44 1 17 929 7481 Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400

Fax: 845-758-2633

Email: curran@proceedings.com Web: www.proceedings.com

TABLE OF CONTENTS

PART 1

D		
Peer	review	statement

Assessment of technical condition of gearbox-motor-wheels and tires according to heating wear criterion when transporting building materials	1
E K Abdulaev, P N Makharatkin, A I Kuzhelev, N N Grudinin	
Utopia or reality: architectural and urban typologies in the future of cities	ε
Urban information spaces as the basis of the system "Smart City"	13
Structure of urban bioecoagrocentres in context of universal design principles	19
Application of metareconstruction method as a means of marking traces of lost historical buildings T G Artemyeva, E M Balzannikova	25
Toward the construction of a comfort model for urban environment	31
'Smart city' system as an asset of cultural landscapes development	36
Smart space solutions of pedestrian ways in public transport transit hubs	41
"Mobility game": interactive technology for urban planning education	48
Model of urban identity of a Russian city through the example of Samara	55
Urban environment digitalization and its characteristic features within the framework of the project "Smart City" (through the example of Samara)	70
Perspective directions of the use of smart technologies for the modern urban environment development	74
E I Dmitrieva	
Contemporary urban environment: the image of the history and the history of the image	81
Formation of innovative public spaces in railway areas	91

Samara historical urban nucleus
Contemporary architecture of the Baltic capitals: the global in the identical, the identical in the global
global
Multihub – point of increase in Samara agglomeration- conurbation spatial development
Issue of annular space filling requirement in engineering networks renovation justification
Social practice of urban environment quality assessment
VA Ivashova, G V Tokareva, E G Agalarova, Yu B Nadtochiy, I V Yushchenko Shopping streets as an instrument of architectural and design formation of consumer and investment attractiveness of functional-planning structure of city
investment attractiveness of functional-planning structure of city
A V Krasheninnikov, A D Anisimovets "Smart environment": problems of social identity
E G Krivykh Smart city concept as an element in the formation of the economic policy in the South Ural cities
Features of underground space formation at the base of high-rise buildings
Historical environment experience as a megapolis regeneration strategy
Use of concrete mats to protect slopes of water bodies in urban areas
Development of personnel as a factor in increasing production efficiency in construction
Global development trends in organization of tourist and recreational areas
Method of reconstruction of Samara yard in educational designing
Criteria of comfort of housing in cities of future
Masterplan as a strategy of spatial city development based on the model of conflict-free reconstruction

Perspective directions of development of waste processing enterprises in Khabarovsk	214
Urban morphotypes and functional diversity of city environment	220
Ecological and economic efficiency of the life cycle of railway territorial-industrial complexes	237
Cultural and historical potential of the urban environment (regional aspect)	242
Architecture of residential wooden houses in the cities of Samara province in the second half of the XIX - Early XX centuries	247
Media technologies in shaping urban identity	253
The Samarsky yard: context	257
City branding. Features of urban image design	262
Concept of a system for monitoring the dynamics of transport infrastructure development in a megalopolis	268
Main directions of sustainable development of transport systems of major cities and agglomerations A V Zhogoleva, K I Vinogradov	273
Regulatory and methodological innovations in the formation of construction costs in regard to oversees facilities with Russian funding	280
New types of urban formations modeling in the framework of educational design	288
Influence of human lifestyle on creating typological structure of residential urban environment	295
Calculation algorithm of the building of CLT for the Russian Federation	300
Use of underground space in creating a comfortable environment of a modern city	308
Multifunctional urban environment and building typologies. Mix of functions at the ensemble and object level in Russia - challenges and limitations	313
Adaptive reuse of parking in the cities of the future	318
Establishing relevant regulatory framework for construction cost calculation in BIM-systems	323

Specific features of diaphragm wall construction	330
Pocket house and supra-spatial cities	346
Principles of forming a polycentric system in a metropolis based on the reorganization of historical industrial areas (a case study of the Vyborgskaya Side in Saint Petersburg)	351
Dot sub-downtown – a new pattern in urban areas of future	358
Spatial organization of modern university campuses environment	368
Architectural and typological priorities creating comfortable urban environment in future cities O G Iconopisceva, G A Proskurin	376
Multifunctional urban exoskeleton in the context of eco-architecture	383
Garden space. Morphotypes of private gardens of Jiangnan region	388
Directions of transformation and development of border towns of the Leningrad region in modern conditions (through the examples of Ivangorod and Svetogorsk)	394
Current educational facilities. Experience in energy-efficient design and modernization of German schools as an analogue for Russia	403
Typology of depressive communal areas in a Russian town	410
Cities of the future: a building typology with optimal daylighting	415
Basics of architectural typology of modern fitness centers	420
Indoor temperature monitoring for cultural heritage	427
Modern practices of urban regulation of spatial development of south-east Bashkortostan	433
Economic feasibility for the cost of land use provided for construction: a case study of the Stavropolsky municipal district of Samara region	441
Preservation of the heritage of historical environment through the example of the Vvedensky Cathedral of Orenburg	447

Wooden houses of Penza Town of the 19th - early 20th centuries and the problem of heritage preservation	450
preservation E G Lapshina, D V Eshchin	432
Use of augmented reality information and communication technologies in urban historical environment	457
S G Malysheva	
Practical restoration-related experience with creation of basement level and underground parking into and near architectural monuments in down-town of Saint-Petersburg	462
Architecture of Cossack fortresses in the Middle Volga in the 18th century	477
Historical city center in the XX - XXI centuries: back to pedestrian	486
PART 2	
Estates of the highest nobility of the St. Petersburg province as a special spatial structure of the	401
historical St. Petersburg agglomeration	491
Current state of Gagarin Park: its problems and the ways to improve the comfort of recreational environment	501
A V Shabanova, O G Orlov, V I Karpova	
Thermal insulation in pavement as a means of preserving or restoration the historical vertical layout of city streets	506
A M Simanovskii	
Optimization of air flows in Orthodox church by numerical simulation	513
Space structure features of the Garden of Cultivation in the context of traditional private gardens of Suzhou	519
D S Tceluiko	
Peculiarities of shaping of architectural moulds and profiles in St. Petersburg architecture of the XVIII century	524
E R Vozniak	
Theory and practice of heritage renovation of landscape and recreational spaces in the city of Voronezh. Renovation project for the Park named after A. Durov	531
Polychromy of objective-spatial heritage of the 19th century Voronezh as the basis for conceptual ideas of modern city coloristic	542
A E Yenin, A S Guriev, S N Guriev	
Architectural and urban planning features of the restoration of T S Khilinsky's diocesan buildings lost in the 1930s	548

improvement (Russian experience)
Investigation of the biologically-resistant organic pollution destruction process in wastewater by ozone
S Alekseev
Wastewater from the regeneration of cation-exchange filters for water treatment
Trivalent chromium wastewater treatment
Study of efficiency of mechanical and contact flocculation tanks
Areas of sustainable development in island districts of Saint Petersburg
Computer simulation study of the vacuum effect during sewage pipelines annular space backfill in trenchless renovation
Control and management scheme of air flows in inner space of steel silo during grain storage
Ionic composition of drinking water and its influence on the value of its zeta potential (ZP)
Modern technologies of architectural and urban planning modeling in design and training
Method for predicting trihalomethanes content in drinking water (by the example of surface type water intake)
Activity of fly ash as an indicator of their modifying ability
Rainfall parameters for the design of surface water treatment facilities
Wastewater cleanup method reducing corrosion impact on pipelines and equipment of oil stabilization production
Evaluation results of the wastewater treatment system of small settlements in Syria
Surface wastewater purification from emulsified and dissolved organic pollutants with the city of Samara as an example
Electronic classifier of natural water treatment technologies

Transformation and sustainable development of sanitary engineering systems in the cities of the future	652
Kinetic and static parameters of a new sorbent based on clays and ways of its determination	661
Problems of defining sanitary protection zones for existing water supply and water disposal enterprises	668
A K Strelkov, P A Gorshkalev, M D Chernosvitov	
The impact of the factors of oil-containing wastewater formation of Bezenchuk oil extraction plant	673
Using pipes from various materials for sewage network: theoretical analysis	678
Development of high-efficiency equipment for wastewater treatment from difficult-to-oxidize organic compounds and suspended solids	683
Development of measures to reduce water consumption for own needs of waterworks	688
Issues of municipal wastes utilization in urban territories	693
Discriminative model of pipeline accidents detection in water supply and distribution systems	697
Innovative methods of wastewater treatment	704
Study of melt amount influence on the expansion degree of expanded clay gravel	709
Social and technological aspects of building materials production in the concept of a smart city	714
Features of the preparation of calcium-containing raw materials in the production of ceramic bricks	720
Applied temperature analysis for designing technology of composite materials: parameter determination of aluminium alloys rolling	727
Effect of concreting defects on the uptime of reinforced concrete during the construction of new Arctic settlements by the criterion of exposure to air carbon dioxide	734
Improvement of technological processes of production and application of liquid phosphate binders	740
Bond strength between concrete layers of three-layer concrete structures	746

Methods for estimating ice adhesion to surface	752
Analysis of possibility of using indicator method to study functional groups of surface of new components of building materials	757
Research of possibility of producing ceramic paving stones by vibrocompression with the purpose of using them in the improvement of urban areas	761
Heat engineering problems of phosphogypsum utilization during its processing into construction gypsum	767
Experimental investigation of reinforced concrete beams using post- tension	772
Method for determining surface destruction area of concrete elements	778
Use of materials with shape memory effect to improve the performance properties of parts of drill string	782
Optimization of structural solutions building envelopes of industrial buildings operated in variable thermal conditions	788
Improvement of production technology of asphalt concrete with the use of polymer waste	794
Theory of polystructural properties of silica-lime construction materials	799
Modeling the influence of variable temperature fields on the stressed state of offshore facilities	805
Mechanochemical activation of natural and technogenic raw materials in the production of high strength plaster	812
Basis of use of dispersed carbon-containing modifiers for production of construction materials with given properties	820
Optimization of fractional composition of Volga River sand for improvement of characteristics of mortars and concrete	828
Ensuring chemical resistance of pile foundations when they are installed in permanently and seasonally frozen soils with aggressive environments	833
Structural mechanics and theory of structural analysis	838

How to assess the reliability of performing the comfort function by a residential building	842
Modeling of stress-strain state of external reinforcement of single-span reinforced concrete beams S I Merkulov, S M Esipov	847
Solution of equation of extreme streamline with free flowing of a torrential stream behind rectangular pipe	854
Typical defects and damage to the industrial buildings' facades	861
Numerical study of stress-strain state of reinforced concrete slab in punching zone	866
Unsteady thermoelasticity problem for rigidly fixed round plate	870
Optimal size of an axisymmetric perfectly flexible membrane with a rigid centre loaded with a concentrated static force	878
Investigation of nodal coupling of reinforced concrete column and floor in buildings with monolithic assembly framework by ANSYS	884
Aerodynamic and thermal interference between two building models	889
Analysis of the factors influencing prolongation of inter-repair terms of capital repairs of the apartment house	898
Use of two-parameter distributions for a joint assessment of the residual resource of building structures and engineering systems of buildings and structures	903
Features of preliminary stresses in wooden constructions	911
Value of additional vertical deformations of foundations depending on injection grouting conditions	917
Geodesy and modern technologies	925
Study of non-formwork hollow-core slabs with support zone restraint in brick walls	930
Discrete-analytical nonlinear analysis with improved computation accuracy for steel frame lateral response evaluation	944
Analytic method of structural analysis of modular buildings	950

Welded joints of offshore fixed platforms for the extraction of oil, gas and other minerals on shelf	956
Stress condition of the elements of support blocks of fixed offshore platforms and resource evaluation of them	964
Study of deformations of building structures thin-walled elements by the method of moire strips	674
Overall stability of steel web-tapered frame members	980

Author Index