

International Conference on Digital Solutions for Automotive Industry, Roadway Maintenance and Traffic Control (DS ART 2020)

IOP Conference Series: Materials Science and Engineering
Volume 1159

Moscow, Russia
14 - 16 December 2020

ISBN: 978-1-7138-4625-3
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

Preface	
Peer review declaration	
Improvement of the technology of cold reclamation of asphalt concrete in the asphalt plant and the possibility of its application in the republic of Iraq.....	1
<i>M M Al-Karaguli, A V Lupanov, V V Silkin, M M Haba</i>	
Study of material strength properties for horizontal road marking using innovation equipment	8
<i>V I Bochkarev, E V Zhustareva, S V Fedorov</i>	
Technology and principles of asphalt paving	15
<i>N M Andryukhov, S A Pavlov</i>	
The influence of the water flow on the stability of the coastal slope and adjacent transport constructions.....	20
<i>O Ya Maslikova, I I Gritsuk</i>	
Semi-Markov modeling for assessing reliability of road construction machines in the process of their operation.....	26
<i>V K Fyodorov</i>	
Hydraulic modeling of surface vortex funnels	32
<i>T V Artemyeva, A L Zuikov</i>	
Transformation of the Couette vortex along the length of the tubular structure.....	39
<i>E Yu Zhazha, A L Zuikov</i>	
Implementation of FPGA-based camera video adapter for vehicle identification tasks based on EUR 13 classification.....	44
<i>A V Ilyukhin, V S Seleznev, E O Antonova, M Y Abdulkhanova, E V Marsova</i>	
Economic efficiency of road surface construction using the cold technology of recycling the asphalt-concrete in Iraq and Russian Federation	50
<i>M M Al-Karaguli, A V Lupanov, V V Silkin, B G Zumbadze, S S Sarmad</i>	
Assessment of the possibility of local object to be flooded in megalopolis as a result of a hydraulic system breakage in the area of a transport tunnel.....	57
<i>T A Suetina, O N Chernykh, A V Burlachenko</i>	
A method for estimating the potential of the physiological and emotional characteristics of a driver in a changing traffic situation using the ADES information system.....	65
<i>AS Dotkulova</i>	
Development of a distributed mobile system «SiLOK» for the task of reconstructing a three-dimensional model of a roadbed rut	70
<i>M V Yashina, I A Kuteynikov, O S Lavrov</i>	
Positioning accuracy estimation for on-board data processing at the road surface defects monitoring.....	78
<i>M V Yashina, A G Tatashev, M Y Fomina</i>	
Hydraulics of the subcritical Ventury channels.....	85
<i>A L Zuikov</i>	

The additive manufacturing in road construction as factor of its sustainability in conditions of climate change and hydrological catastrophe	94
<i>T A Suetina, D D Koroteev, A I Koreneva, Jueru Huang</i>	
Decrease in ecological damage of water throughput tubular transitions on spawning	102
<i>T A Suetina, O N Chernykh, A V Burlachenko</i>	
On the use of asphalt concrete mixes (according to the PNST).....	110
<i>M E Telegina, G A Averchenko, I R Mukhar'yamov, Y E Vasiliev, E V Kotlyarskiy</i>	
The application of the fuzzy controller for tension system control of the scraper conveyor in the mines	119
<i>Le Dinh Hieu, I.O Temkin, Le Van Tung</i>	
Optimization of pedestrian traffic in residential areas of large cities	129
<i>T V Konovalova, S L Nadiryan, M P Mironova, A E Litvinov</i>	
Study of the ways to increase the urban street and road network capacity	135
<i>P I Pospelov, D S Martiakhin, T K Komarova, DM Nemchinov</i>	
Development of proposals for the development of the design algorithm of road pavements using geosynthetic materials	144
<i>A V Korochkin, V A Dumenko</i>	
Analysis of the properties of new forms of transitional sections of railway and highway curves	150
<i>G V Velichko, P I Pospelov</i>	
Road conditions and traffic speeds	159
<i>P A Lushnikov, N A Lushnikov, V A Kretov, A V Kostsov</i>	
Impact of traffic speed on the strength of highway pavements	165
<i>Andrey Korochkin</i>	
Decision support system for street-road network objects repair	172
<i>Yu E Vasiliev, M A Fineeva, A B Belyakov, S V Varshavsky, A A Caesar</i>	
Development of a database for information support of virtual digital analysis in design and testing of road infrastructure elements	185
<i>I V Demyanushko, L F Samigullin, N E Surkova</i>	
The deliberate results distortion problem in the road construction materials laboratory and its disposal	192
<i>Y E Vasiliev, U O Menkina, V I Kochnev, I Y Sarychev</i>	
Computing information and control complex for control of road construction machines	198
<i>O I Maksimychev, K N Mezentssev, A N Yakubovich, A V Libenko, V M Guryanov</i>	
Testing of cement-concrete road surfaces for wear resistance	209
<i>V V Ushakov, Yu E Vasiliev, S M Dmitriev, G G Dyakov, O Agaryshev</i>	
Numerical modeling of multilayer asphalt-concrete roads based on the finite element method	215
<i>I V Demyanushko, V M Stain, A V Stain</i>	
Development and scientific justification a set of the high-speed road construction machines with hardware-percent integration and intellectual interactions algorithm of various technical systems	227
<i>G V Kustarev, A V Ushkov</i>	

Prospects for the use of composite and polymer materials in transport construction	233
<i>V S Nadezhdin, A S Gruzdev, O V Titov</i>	
Comparative evaluation of the performance of different asphalt concrete road pavements on reinforced concrete road structures.....	241
<i>N N Arous, M G Goryachev</i>	
Ready-mixed concrete recycling system	248
<i>O I Maksimychev, A V Ostroukh, N A Filippova, C B Pronin, A V Libenko</i>	
Railroad cement warehouse digital system.....	252
<i>Y E Vasiliev, A V Ostroukh, C B Pronin, I Y Sarychev, I.E. Kotlarsky</i>	
Capacity of merging areas of multi-lane roads with two-lane entrance ramps.....	261
<i>A V Kostsov, A M Tanatova</i>	
Mathematical model of an intelligent decision support system for road quality management	268
<i>E M Abbasov, N N Teodorovich, N P Sidorova, T S Abbasova</i>	
Application of digital technologies at road monitoring	274
<i>A A Fotiadi, E V Zhustareva, V I Bochkarev, S A Gnezdilova, E D Partsevsky</i>	
Methodology and examples for assessing the environmental performance of certain road traffic management measures.....	281
<i>S V Shelmakov, T U Grigoreva</i>	
Assessment of the road transport infrastructure facility functionality loss risk resulting from climate change.....	288
<i>A N Yakubovich, Y V Trofimenko, I A Yakubovich, E V Shashina</i>	
Distributed generation in small-scale power generation. Search for energy-efficient solutions by automation of complex power systems.....	295
<i>T V Golubchik, A S Kulikov, D Y Taratutin</i>	
Processing of expert information for anti-pollution systems research.....	303
<i>A M Reznik, A V Pogodin, N V Logacheva</i>	
The development of standards for road restraint systems.....	308
<i>I V Demiyanushko, B T Tavshavadze, I A Karpov, S S Petrosyan</i>	
Methodology and results of experimental studies of precision weighing systems of refueling complexes of upper stages and spacecraft of space rockets	316
<i>A N Sova, V M Shulga, O A Valyaev, S A Zolotoy, A A Loginov</i>	
Production of modifying additives for highways	324
<i>A D Kolosov, V V Kondrat'ev, R V Kononenko, E A Guseva</i>	
Nanostructures based on carbon and silicon dioxide to improve the properties of building and structural materials	330
<i>V V Kondrat'ev, M V Konstantinova, R V Kononenko, A D Kolosov</i>	
Technology for the production of modifying additives for concrete and asphalt concrete.....	335
<i>A S Sukhanov, A D Kolosov, V V Kondrat'ev, R V Kononenko</i>	
Development of an algorithm for the introduction of innovative technologies in the construction of roads	340
<i>I V Dudina, Y A Skorobogatova, O V Arkhipkin, A S Bovkun</i>	

Mixture substantiation of the powder composition for bearing units seats restoring of rolling bearings	345
<i>Yu E Lyakhov, V A Zorin</i>	
The concept of functioning of the on-board quality control system for anti-icing pavement treatment.....	350
<i>K P Mandrovskiy, Y S Sadovnikova</i>	
Changing the spatial structure of the rocker arm of the tipping mechanism in a garbage truck.....	356
<i>N M Andryukhov, S A Pavlov, K D Mikhailov</i>	
Assessment of the deformation and strength properties of parts manufactured using additive technologies, depending on the connection method and operating conditions	362
<i>I S Nefelov, N I Baurova</i>	
Investigation of the mechanical properties of polymer composite materials with various types of hybrid matrices in the extreme conditions of the Arctic.....	368
<i>E A Kosenko, N I Baurova, V A Zorin</i>	
Formation of minimum social standards in the field of public transport services for the provinces of Syria	376
<i>D M Othman, A I Roshchin</i>	
Engine performance, emissions characteristics of the compression ignition engine using HHO gas (Brown's gas)	381
<i>Nguyen Thin Quynh, Andrey Y. Dunin, Le Hoai Duc, Mikhail G. Shatrov</i>	
Simulation of the force factors causing engine idling to vibrate	389
<i>P V Safronov, I V Alekseev</i>	
Dynamic tests in real vehicle conditions	395
<i>Anton V Aleksandrov, Ivan A Dolgov, Timofey V Morozkin, Alan K Tsoriev, Dmitriy S. Konyushkov</i>	
Factors affecting the formation of the established deceleration of two-wheeled vehicles.....	405
<i>I S Brylev, S A Evtyukov, M M Blinder, T Y Cherepnina, V R Rogov</i>	
Computer materials science of electrical construction composite materials with specified properties	412
<i>A V Ilyukhin, I I Zaripova, M Y Abdulkhanova, E V Marsova</i>	
Assessment of the ecological and social potential of the organization of ecological zones to ensure sustainable transport development of territories.....	419
<i>V V Donchenko, S V Shelmakov, M I Sharov, A V Lobikov, V S Chizhova</i>	
Energy efficiency of autonomous vehicles on hilly roads	427
<i>S Shadrin</i>	
Main trends in digital transformation of passenger automobile transport	435
<i>N O Bludyan</i>	
Modern methods of the digital virtual analysis for design and tests of road vehicle restraint systems	444
<i>I Demijanushko</i>	
Navigation system with STV driver assistance function	457
<i>V V Gaevskiy, S Ghith</i>	

Modeling of diesel structure-borne noise in an unsteady operating mode	465
<i>M G Shatrov, A L Yakovenko, I V Alekseev, S N Bogdanov, A O Glazkov</i>	
Development of the integrated IKTS-MADI complex for design and research of common rail fuel systems of diesel engines with electronic control.....	471
<i>A U Dunin, M G Shatrov, L N Golubkov, P V Dushkin, A L Yakovenko</i>	
Reduction and equalization of thermal loading of contact pairs of the friction unit.....	481
<i>P A Polyakov, A E Litvinov, E A Polyakova, E S Fedotov, A A Golikov, A E Zadayanchuk</i>	
Evaluation of SVM modulation methods for indirect two-level three-phase frequency converter and direct frequency converter.....	487
<i>Le Van Tung, Ngo Van An, Le Dinh Hieu, Thanh Pham Long</i>	
Kinematic and power characteristics of the elastic wheel while rolling with camber and convergence.....	497
<i>T A Balabina, M Yu Karelina, A N Mamaev</i>	
Wheel rolling on deformable ground with slippage	504
<i>T A Balabina, M Yu Karelina, A N Mamaev</i>	
The results of the analysis of the current state of the creation and operation of refuelling complexes of wheeled vehicles specially the big carrying capacity, taking into account their environmental, fire and explosion	513
<i>A N Sova, A N Abramov, K R Korobeynikova, Y L Krasnobaev, Y V Trofimenko</i>	
A method for assessing the cross-country capability of a particularly heavy-duty vehicle with all-wheel control based on the compliance of the support surface during curved movement.....	518
<i>G S Mazlumyan, R V Yushchuk, I O Sudarikov, T V Sevastyanova, A N Sova</i>	
Modeling quality criteria for restoring parts of cars, vehicles and road-building machines.....	527
<i>M Yu Karelina, A I Belyaev, A V Terentev, T Yu Cherepnina</i>	
Tensor analysis of uncertainty in freight transport ULS-systems.....	532
<i>P F Yurchik, O I Maksimych, V B Golubkova, A V Volosova</i>	
Study of changes in the side clearance between vehicles and cable barriers installed along the highway centre	540
<i>A V Kostsov, N A Lushnikov, A A Zuikov</i>	
Electrolytic alloying of iron-chromium during deposition of coatings from a sulfate-chloride electrolyte.....	545
<i>A F Sinelnikov, E V Bomeshko, N I Korneychuk, A S Ianuta</i>	
Increasing the level of automation of dispatch control when regulating at the end stops of public transport routes	553
<i>P O Voronov, A A Kudryavtsev, N A Filippova</i>	
Synthesis of oil-soluble corrosion inhibitors from raw materials of plant origin	561
<i>S M Gaidar, M Yu Karelina, Hoang Duc Quang, A A Akulov</i>	
Environmental safety diagnosis and maintenance specific of heavy vehicles and buses engines functioning with compressed natural gas	565
<i>A P Boldin, Yu V Panov, A A Solntsev, P V Aksenov</i>	
The concept of structural steels surface hardening for tribo-joint elements	575
<i>O V Chudina, Yu M Luzhnov</i>	

Software package for evaluation of efficiency of motor vehicle fleet operation	583
<i>P I Smirnov, B S Subbotin, D A Ptitsyn, A O Volkov</i>	
Establishing the requirements for the minimum values of stopping sight distance on the road surface from the condition of vehicle braking safely	589
<i>Yu V Kuznetsov, Ola Ismail Ghassan</i>	
Problems of introducing capacitive fuel level sensors on city buses	595
<i>V A Maksimov, N V Pozhivilov, A E Andrianov</i>	
Methodology of assessing the regulated crossing throughput with a dedicated lane for ground public transport based on a probabilistic model	603
<i>P I Pospelov, Le Duc Long, A G Tatashev, M V Yashina</i>	
Theoretical aspects of assessing the residual engine oil resource	610
<i>A V Laushkin, A A Khaziev</i>	
Methods of electrochemical research of corrosion resistance of metal treated with corrosion inhibitors, created on the basis of plant-based raw materials	615
<i>M Y Karelina, O N Didmanidze</i>	
Analysis of hydrogen use as an energy carrier in transport	621
<i>A V Keller, K E Karpukhin, A F Kolbasov, V N Kozlov</i>	
Russian national non-commercial vehicle safety rating system RuNCAP	628
<i>A M Ivanov, S R Kristalniy, N V Popov</i>	
Modeling of systems for restoration of parts of cars, other vehicles and road construction machines	633
<i>Yu M Karelina, A I Belyaev, A V Terentev, V R Rogov</i>	
Crushing and screening digital system	639
<i>A V Ostroukh, N G Kufitnova, C B Pronin, Y E Vasiliev, K.A. Barinov</i>	
Protection of steel constructions against wear and corrosion in difficult climatic conditions by new techniques of zinc metallization	645
<i>L G Petrova, P E Demin, A S Sergeeva, G Y Timofeeva</i>	
Application of digital modeling to determine design criteria for mobile frontal barriers	653
<i>P S Mikheev, I A Karpov</i>	
Analysis and mathematical modeling of cable barrier mechanics during car impact	661
<i>I V Demiyanyushko, I A Karpov</i>	
The development of a dependent mathematical model of dielectric properties of an engine oil to the concentration of soot formation	668
<i>A A Khaziev, N N Sugatov, A V Laushkin</i>	
Justification of efficiency of route fuel consumption norms for trucks operated in tropical conditions	676
<i>A N Rementsov, V A Egorov, Fan An Vu</i>	
Comparative characteristics of wear resistance of electroplated copper coating and composite electrolytic coating obtained with use of lead bronze electroerosive materials	684
<i>E V Ageev, A N Novikov, M Yu Karelina</i>	

A comprehensive mathematical model and the methodology for assessing technical excellence road trains with active links and all-wheel control	689
<i>A N Sova, S A Eruslankin, O A Valyaev, I M Makeev, I O Sudarikov</i>	
Statistical means of the assessment of the passive safety of road vehicles.....	698
<i>E Y Balaev, T V Konovalova, A E Litvinov, M P Mironova, I S Senin</i>	
The impact of lean tools on the growth of overall equipment efficiency (OEE) in vehicle manufacturing.....	704
<i>V S Shmatkov, A V Shmatkova</i>	

Author Index