

International Scientific Conference Energy Efficiency in Transport (EET 2020)

IOP Conference Series: Materials Science and Engineering
Volume 1021

**Kharkiv, Ukraine
18 – 20 November 2020**

ISBN: 978-1-7138-4551-5
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	
The composite functional statistical criterion for evaluating the effectiveness of the automatic control process and system	1
<i>A I Akimov, J A Akimova, V V Panchenko, M M Odiehov</i>	
Determination of parameters for automatic decompression of heat and power facility cylinders	7
<i>O O Anatskyi, D O Aulin, S V Bobrytskyi, Y V Zhovtyi, P V Chernenko</i>	
Comparative analysis of the reliability of electric locomotives based on semi-Markov models of restorable systems.....	13
<i>O A Dyshin, K Sh Pashayeva, C G Aslanov</i>	
Determination of the regularities of the covered wagon supporting structure dynamic loading when conducting fire from it in the horizontal plane	20
<i>O Fomin, A Lovska, J Gerlici, Yu Fomina, D Fedosov-Nikonov, P Prokopenko</i>	
Determination of residual resource of flat wagons load-bearing structures with a 25-year service life.....	29
<i>O Fomin, G Vatulia, M Horbunov, A Lovska, V. Pištěk, P. Kučera</i>	
Improvement of the grain cargo handling technology on the basis of resource-saving.....	38
<i>Anton Kovalov, Svitlana Prodashchuk, Anna Kravets, Dmytro Mkrtchian, Mikola Prodashchuk</i>	
Main criteria of complex evaluation of subway train power facility technological productive potential	46
<i>I I Kulbovskyi, O V Aharkov, V S Kharuta, M M Halushko</i>	
Prospects of introducing alternative sources of energy on Ukrainian railways	52
<i>V V Panchenko, A S Masliy, R O Kharin</i>	
Development of a methodology for determining an energy efficient technology for the freight transportation on a singletrack railway line.....	62
<i>A. Prokhorchenko, O. Malakhova, D. Gurin, G. Sikonenko, G. Prokhorchenko</i>	
Investigation of the Influence of Dynamic Loads of Industrial Equipment on the Occurrence of Prolonged Yielding of their Foundation Soils	72
<i>V A Aleksandrovych, O V Havryliuk</i>	
Determination of rational locomotive operating modes and resource costs based on information from global positioning systems	81
<i>Mykola Barybin, Anatoliy Falendysh, Victoria Hatchenko, Olha Kletska, Elena Kiritseva</i>	
Calculation residual strength of reinforced concrete beams with damages, which occurred during loading	89
<i>Yaroslav Blikharskyy, Rostyslav Vashkevych, Nadiia Kopika, Taras Bobalo, Zinoviy Blikharskyy</i>	
Scientific approach to fire resistance calculation of reinforced concrete beams and columns	97
<i>S L Fomin, Y V Bondarenko, S V Butenko, S M Koliesnikov</i>	

Improvement of the method of probability evaluation of the failure-free operation of reinforced concrete beams strengthened under load	104
<i>R Ye Khmil, R Yu Tytarenko, Ya Z Blikharskyy, P I Vegera</i>	
Environmental assessment of small scale solar thermal electricity generation	111
<i>Paul Koltun, Vasyl Klymenko, Valentyn Soldatenko, Serhii Kononchuk, Ruslan Teliuta</i>	
Physicochemical studies of the structure of energy-saving compositions based on slags	119
<i>Tetyana Kostyuk, Varvara Vinnichenko, rii Plugin, Olga Borziak, Artem Iefimenko</i>	
Strengthening of the reinforced concrete tank of anaerobic purification plants with the manufacture of biogas, damaged as a result of design and construction errors.....	125
<i>A Kramarchuk, B Ilnytskyy, D Hladyshev, O Lytvyniak</i>	
A study of bearing capacity of reinforced masonry beams with GFRP reinforcement	135
<i>Andrii Kramarchuk, Borys Ilnytskyy, Taras Bobalo, Oksana Lytvyniak</i>	
Methodical approach in determining the reliability and efficiency of urban cargo transportation taking into account the congestion of street networks	144
<i>O Kutya, A Kravcov, T Gorodetska, O Voytov</i>	
Reconstruction of Shallow Foundations Using Peracetic Silicate Solutions.....	153
<i>H M Levenko, V A Aleksandrovych</i>	
Resource-saving steel hopper for loading of railway cars	159
<i>Anton Makhinko, Nataliia Makhinko</i>	
Management of the technical condition of hydraulic structures	166
<i>B I Makovetsky, P M Sankov, R B Papirnyk, N O Tkach, I V Trifonov</i>	
Determining the Dependence of Fire Parameters in a Cable Tunnel on its Characteristics	174
<i>Oleksandr Nuianzin, Stanislav Sidnei, Petro Zayika, Svitlana Fedchenko, Bogdan Alimov</i>	
Research of Integrity of Fire Insulation Cladding with Mineral Wool of Steel Beam under Fire Impact.....	180
<i>Serhii Pozdieiev, Oleksandr Nuianzin, Olena Borsuk, Inna Nedilko</i>	
Research of Disclosure of Relief Venting Structures with Polycarbonate Fencing in Conditions of Explosion.....	186
<i>Serhii Pozdieiev, Vadym Nizhnyk, Yury Pidhoretskiy, Andriy Shvydenko</i>	
General model and the mechanics of concrete elements and structures deformation.....	192
<i>V M Romashko</i>	
Systems and subsystems of track, control and management of high-speed railway.....	200
<i>A A Shevchenko, O O Matviienko, V A Lyuty, V G Manuylenko, N A Murygina</i>	
Theoretical basis of bearing capacity calculation of the statically indeterminate reinforced concrete beams and its experimental research	210
<i>A A Shkurupiy, P B Mytrofanov, Yu O Davydenko, A G Horb</i>	
Features of assessing the evenness of road surfaces using laser road scanners	219
<i>R V Smolianiu, N V Smolianiu, I V Kiashko</i>	
Reinforcement of a deformed structure on the pile foundation	225
<i>Yu L Vynnykov, M O Kharchenko, S M Manzhali</i>	

Research of the behavioral of the wooden beams with fire protection lining under fire loading	234
<i>M I Zmaha, S V Pozdieiev, Y V Zmaha, O V Nekora, S O Sidnei</i>	
Application of energy efficient materials in reconstruction of buildings and structures of transport infrastructure	240
<i>S Zolotov, O Pustovoitova, P Firsov, Y Orel, M Rezunenko</i>	
The use of incineration waste to improve the properties of the bases	247
<i>M L Zotsenko, O V Mykhailovska, I I Lartseva, V V Klymenko</i>	
Carbon fiber plastics for vehicles manufactured by resource-saving formation technology	253
<i>P Bilym, A Rogozin, P Firsov, S Zolotov</i>	
Justification of reference table data of dependence of wind effect on critical surface density heat flux for corrugated cardboard	260
<i>A Borysova, V Nizhnyk, Ya Ballo, O Kyrychenko</i>	
Prediction of the life time of cylindrical tribosystems of a vehicle	266
<i>A Dykha, J Padgurskas, O Babak</i>	
Influence of the flow area of distribution systems on changing the operating parameters of planetary hydraulic motors	273
<i>S Kiurchev, P Luzan, A Zasiadko, H Radionov, N Boltianska</i>	
Conceptual Resource-Saving Design of Real-Time Socio-Technical Systems	282
<i>Anatolii Kosolapov, Pavlo Ivin</i>	
Study on the prospects for the use of lubricants produced by Fuchs Lubritech GmbH on the Ukrainian railways in “wheel of rolling stock-rail” tribocoupling	288
<i>Andrii Kravets, Vitaliy Vlasovets, rii Yevtushenko, Yevgen Romanovych, Anna Kravets</i>	
Simulation of the oil film thickness on a friction surface in the presence of fullerene compositions in the lubricant.....	298
<i>A Kravtcov, Y Gradiskiy, B Tsymbal, K Borak</i>	
Use of modern logistics technologies in terms of saving resources	304
<i>D V Lomotko, H O Prymachenko, O V Kovalova, O V Shkurenko, Y I Hryhorova</i>	
Features of determining engagement line of traction gears with different degrees of wear of gear teeth	314
<i>V I Moroz, V I Hromov, O V Bratchenko, O A Logvinenko</i>	
Ways to increase the traction efficiency of modular draft device.....	321
<i>V Nadykto, V Kyurchev, A Chaplinskyi, A Ayubov</i>	
Principles of Energy-effective Land Use in Automobile Transport in Ukraine	330
<i>I O Novakowska, P F Zholkevskyi, M P Stetsiuk, N F Ishchenko</i>	
Kinematics of motion of rotors of an orbital hydraulic machine.....	336
<i>A Panchenko, A Voloshina, P Luzan, I Panchenko, S Volkov</i>	
Estimation of the State of Engine of Mobile Machines in the Conditions of Operation on Basis of Onboard Diagnostics	345
<i>S V Panchenko, M P Remarchuk, O V Kebko, Ya. V Chmuzh, A O Zadorozhnyi</i>	
Justification of the parameters of the life-test bench for railway wheelsets	351
<i>S V Raksha, P G Anofriev, O S Kuropiatnyk</i>	

Method for determining non-uniform loading of gondola cars with bulk cargo	358
<i>Yevhenii Romanovych, rii Kravets, Georgii Afanasov, Yevhenii Povorozhenko, Olga Afanasova</i>	
Mathematical modeling of dynamic loads on the ground robotic complex of special purpose.....	368
<i>V B. Strutinsky, A. M. Gurzhii, O. Y. Yurchyshyn</i>	
Determination of the influence of soil irregularities on dynamic processes in caterpillar engines of a terrestrial robotic complex.....	375
<i>S V Strutynskyi, R V Semenchuk</i>	
Simulation modeling of the automobile braking system performance	384
<i>G Viselga, E B Ugnenko, E N Uzhviieva, O N Tymchenko, N I Sorochuk</i>	
Simulation of change in rheological properties of structure of combined materials in tribosystem.....	390
<i>A Voitov, K Fenenko, O Fenenko</i>	
Fractals Theory Application for Evaluation of Influence of Non Metallic inclusions on Mechanical Properties of S355J2 Steel.....	398
<i>V M Volchuk, O V Uzlov, O V Puchikov, S V Ivantsov</i>	
Experimental studies of a throughput of the distribution systems of planetary hydraulic motors	404
<i>A Voloshina, A Panchenko, O Titova, V Pashchenko, A Zasiadko</i>	
Influence of Temperature and Concentration of Additives on the Lubricity of Track Machine Oils.....	413
<i>S Voronin, V Stefanov, D Onopreichuk, O Ovchynnikov, O Pashchenko</i>	
Correlation of rheological parameters with the flow of non-Newtonian fluids	420
<i>A A Zadorozhnyi, M P Remarkuk, A P Kovrevski, Y V Chovnyuk, S A Buhaievskyi</i>	

Author Index