

International Scientific-Technical Conference on Innovative Engineering Technologies, Equipment and Materials 2016 (ISTC-IETEM 2016)

IOP Conference Series: Materials Science and Engineering
Volume 240

Kazan, Russia
7 – 9 December 2016

ISBN: 978-1-5108-4892-4
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.

Copyright© (2016) by the Institute of Physics
All rights reserved. The material featured in this book is subject to
IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2017)

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

Volume 240

International Scientific-technical Conference on Innovative Engineering Technologies, Equipment and Materials 2016 (ISTC-IETEM-2016)

**7–9 December 2016, Kazan, Russian Federation
(previous edition: [ISTC-IETEM-2015](#))**

**Accepted papers received: 11 September 2017
Published online: 28 September 2017**

Preface

011001

OPEN ACCESS

[International Scientific-technical Conference on Innovative Engineering Technologies, Equipment and Materials 2016 \(ISTC-IETEM-2016\)](#)

011002

OPEN ACCESS

[Peer review statement](#)

Papers

012001

OPEN ACCESS

[Scientific bases and principles of obtaining carbon-metallic material by catalytic pyrolysis of ethanol](#)

G M Akhmadiev.....1

012002

OPEN ACCESS

[Management of processes of electrochemical dimensional processing](#)

I D Akhmetov, A R Zakirova and Z B Sadykov.....4

012003

OPEN ACCESS

[New electrode-tool for the combined kerf of electrically conductive materials](#)

I D Akhmetov, A R Zakirova, Z B Sadykov and I I Khafizov.....7

012004

OPEN ACCESS

[Development of the technology of manufacturing a ceramic tip of a resectoscope](#)

I D Akhmetov, R N Kashapov and L N Kashapov.....10

012005

OPEN ACCESS

[Development and investigation of the stressed-deformed state of the demountable foundation for support](#)

L S Sabitov, N F Kashapov, I R Gilmanshin, Yu M Strelkov and D M Khusainov.....14

012006

OPEN ACCESS

[Optimal design of a combustion chamber of gas turbine engine by a Combustion chamber 1D-2D computer program](#)

Y B Aleksandrov and B G Mingazov.....22

012007

OPEN ACCESS

[Key concepts for production of high-quality parts](#)

V I Astashchenko, N N Zapadnova, G F Mukhametzianova and A N Shafigullina.....29

012008

OPEN ACCESS

[Management in the system of waste utilization of production and consumption](#)

U I Azimov, I R Gilmanshin, D R Krainova and I A Galeev.....32

012009

OPEN ACCESS

[Modeling of technological processes of heat supply, as a tool for assessing the state of objects of the property fund and engineering networks of enterprises](#)

U I Azimov and I R Gilmanshin.....35

012010

OPEN ACCESS

[Adaptive system of supplying lubricant to the internal combustion engine](#)

E P Barylnikova, A T Kulakov and O A Kulakov.....39

012011

OPEN ACCESS

[Mathematical modeling of the crystallization process to obtain a fine fraction aluminates](#)

D A Bashmakov, D I Israphilov and A D Samigullin.....43

012012

OPEN ACCESS

[Study of sound-absorbing properties of glass-fiber reinforced materials used in engineering](#)

V E Egorova, R R Habibova and L N Shafigullin.....47

012013

OPEN ACCESS

[Mathematical modeling of capillary flow of viscous fluid](#)

V L Fedyaev, E R Galimov and F M Il'yasova.....50

012014

OPEN ACCESS

[Formation of polymeric powder coatings](#)

V L Fedyaev, E R Galimov, N Ya Galimova, I R Gimranov and M M Marat.....54

012015

OPEN ACCESS

[Study of the combined laser-plasma effect on metals](#)

AT Gabdrakhmanov, AT Galiakbarov and I H Israphilov.....60

012016

OPEN ACCESS

[A shader for simultaneous ambient occlusion and edge detection for reverse engineering](#)

R R Gaisin, K V Sharifullina and R N Kashapov.....64

012017

OPEN ACCESS

[Formation of scattering indicatrix of retroreflective coatings with microspheres](#)

E R Galimov, Yu A Pryakhin, E E Tukbaev, N Ya Galimova and L R Fazlyev.....71

012018

OPEN ACCESS

[Mathematic simulation of high-efficiency process of grain cleaning](#)

Y V Galyautdinova, I A Gaisin, A D Samigullin, A R Samigullina and R R Galyautdinov.....75

012019

OPEN ACCESS

[Development of expert systems for modeling of technological process of pressure casting on the basis of artificial intelligence](#)

K N Gavarieva, L A Simonova, D L Pankratov and R V Gavariev.....80

012020

OPEN ACCESS

[Investigation of reliability indicators of information analysis systems based on Markov's absorbing chain model](#)

I R Gilmanshin and A P Kirpichnikov.....85

012021

OPEN ACCESS

[Instrumental research method of qualitative composition of landfill gas in the surface layer of landfills](#)

I R Gilmanshin, N F Kashapov, S I Gilmanshina and A I Galeeva.....89

012022

OPEN ACCESS

[Competence formation of engineering directions students in the field of energy saving as a way to create new generation technologies](#)

I R Gilmanshin and S I Gilmanshina.....93

012023

OPEN ACCESS

[Teaching of students technology early professional orientation of schoolchildren](#)

S I Gilmanshina, R N Sagitova, I R Gilmanshin and A R Kamaleeva.....97

012024

OPEN ACCESS

[Training of chemistry teachers for sustainable development](#)

S I Gilmanshina, R N Sagitova, G F Melnikov and R R Fedotova.....100

012025

OPEN ACCESS

[Thermal and hydraulic efficiency of the corridor tube bundle in conditions of pulsating flow of fluid](#)

V K Ilyin, L S Sabitov, A I Haibullina and A R Hayrullin.....103

012026

OPEN ACCESS

[Factors influencing on the thermal flow with the cross-section of the corridor tube bundle in low-frequency non-symmetric pulsations](#)

V K Ilyin, L S Sabitov, A I Haibullina and A R Hayrullin.....111

012027

OPEN ACCESS

[External heat transfer in corridor and staggered tube bundles of different configuration under the application of low-frequency pulsations](#)

V K Ilyin, L S Sabitov, A I Haibullina and A R Hayrullin.....121

012028

OPEN ACCESS

[Research processing of tool steels surface in low pressure glow discharge](#)

D I Israphilov.....131

012029

OPEN ACCESS

[Ion source surface processing based on glow discharge in supersonic cross gas flow control](#)

D I Israphilov.....135

012030

OPEN ACCESS

[Application of reverse engineering in the medical industry.](#)

A A Kaleev, L N Kashapov, N F Kashapov and R N Kashapov.....138

012031

OPEN ACCESS

[Simulation of parameters of the vapor-liquid compression cooling system of power machines](#)

D L Karelin.....142

012032

OPEN ACCESS

[Energy-saving technologies of cultivation of sugar sorghum](#)

N F Kashapov, M M Nafikov, I R Gilmanshin, M Kh Gazetdinov, M M Nafikova and A R Nigmatzyanov.....146

012033

OPEN ACCESS

[Comparative evaluation of different machines for seedbed for sorghum](#)

N F Kashapov, M M Nafikov, M Kh Gazetdinov, M M Nafikova and A R Nigmatzyanov.....151

012034

OPEN ACCESS

[Obtaining alternative fuel from sweet sorghum in the conditions of the Republic of Tatarstan](#)

N F Kashapov, M M Nafikov, I R Gilmanshin and A R Nigmatzyanov.....156

012035

OPEN ACCESS

[Automated system of sheet-metal forming preproduction engineering control](#)

L R Kashapova and D L Pankratov.....160

012036

OPEN ACCESS

[Mesh three-dimensional arm orthosis with built-in ultrasound physiotherapy system](#)

R M Kashapova, R N Kashapov and R S Kashapova.....164

012037

OPEN ACCESS

[Ways of decrease in the material consumption in case of their separation by the combined methods](#)

I I Khafizov.....170

012038

OPEN ACCESS

[IT-strategy and major aspects of quality management on the market of goods and services](#)

I I Khafizov and A N Galimov.....173

012039

OPEN ACCESS

[Product quality as the main factor of increase of competitiveness \(on the example of JSC "Kazan helicopter plant"\)](#)

I I Khafizov and I G Nurullin.....176

012040

OPEN ACCESS

[Estimation of parameters of charge carriers in dielectric materials by CELIV method](#)

I I Khafizov, T N Saveleva and V S Lyubtsov.....181

012041

OPEN ACCESS

[Plasma spray coating with ferromagnetic powder by thermo-electric plasma equipment](#)

A A Khafizov, R I Valiev and Yu I Shakirov.....184

012042

OPEN ACCESS

[Practical-oriented teaching of gifted youth in the field of natural sciences](#)

F D Khalikova and S I Gilmanshina.....188

012043

OPEN ACCESS

[Engineering Background: Modern Formats and Challenges of Conceptual Engineering](#)

A F Khamidullina, M A Kuzmina, E M Khusnutdinova and I A Konakhina.....192

012044

OPEN ACCESS

[Mathematical modeling of a running cycle of the diesel engine with the additive of water at the intake](#)

V B Khlyupi.....195

012045

OPEN ACCESS

[Modeling of forming technological errors in processing by gear shaping machine](#)

R M Khusainov and R R Khaziev.....198

012046

OPEN ACCESS

[Comparative Analysis of Thermohydraulic Performance of Enhanced Viscous Oil and Oil Product Heaters](#)

E M Khusnutdinova, I A Konakhina and A F Khamidullina.....202

012047

OPEN ACCESS

[Investigations of Nanocrystalline Alloy Electrospark Coating Made of Nanocrystalline Alloy Based on 5БДСР Ferrum](#)

A V Kolomeichenko, I S Kuznetsov, A Yu Izmaylov, R Yu Solovyev and S N Sharifullin.....205

012048

OPEN ACCESS

[Technical and Economic Analysis of Injecting Enhancers into High-Paraffin Oil Heaters](#)

I A Konakhina, G R Khamidullina and E M Khusnutdinova.....211

012049

OPEN ACCESS

[Aerosol fluxing in electro arc metallization](#)

V N Logachev, A V Kolomeichenko, Yu A Kuznetsov, R Yu Solovev, V I Denisov and S N Sharifullin.....214

012050

OPEN ACCESS

[Multicultural University Education and Museum Pedagogy](#)

G F Melnikova and S I Gilmanshina.....221

012051

OPEN ACCESS

[Different load types modeling using MatLab](#)

I S Metelev, D V Dvorkin and R G Isakov.....224

012052

OPEN ACCESS

[Rise in accuracy of gas stream spectral analysis in mechanical engineering technology](#)

G F Mukhametzyanova, F G Karikh and I R Mukhametzyanov.....232

012053

OPEN ACCESS

[Process research into metallic pipe wear of hot chamber die casting machines and methods of increasing wear resistance](#)

G F Mukhametzyanova, MS Kolesnikov, I R Mukhametzyanov and V I Astatshenko.....236

012054

OPEN ACCESS

[Simulation of parameters of hydraulic drive with volumetric type controller](#)

V L Mulyukin, A V Boldyrev, D L Karelin and A M Belousov.....240

012055

OPEN ACCESS

[Improving upset forging tube billet technology to avoid the clamp defect on semi-axle housing forging](#)

D L Pankratov, R S Nizamov and I Z Kharisov.....243

012056

OPEN ACCESS

[Alternative evaluation of innovations' effectiveness in mechanical engineering](#)

A S Puryaev.....247

012057

OPEN ACCESS

[Fuel system for diesel engine with multi-stage heated](#)

Yu N Ryzhov, Yu A Kuznetsov, A V Kolomeichenko, I S Kuznetsov, R Yu Solovyev and S N Sharifullin.....252

012058

OPEN ACCESS

[Increase of reliability of contact networks of electric transport, due to increase of strength of the joint unit of pipes of different diameters](#)

L S Sabitov, N F Kashapov, I R Gilmanshin, I Z Gatiyatov and I L Kuznetsov.....257

012059

OPEN ACCESS

[Method of the steel aluminum wires protection of air transmission lines from fast vibration damage at the output from the support clamp](#)

L S Sabitov, N F Kashapov, Yu M Strelkov and I L Kuznetsov.....262

012060

OPEN ACCESS

[Algorithm of calculation of energy consumption on the basis of differential model of the production task performed on machines with computer numeric control \(CNC\)](#)

D T Safarov, A G Kondrashov, G F Glinina and L R Safarova.....267

012061

OPEN ACCESS

[System Analysis and Decision-Making During Synthesis of High-Performance Hybrid Boilers](#)

T R Safin, I A Konakhina and G R Khamidullina.....272

012062

OPEN ACCESS

[Production of thermally conductive carbon foams and their application in automobile transport](#)

V M Samoylov, E A Danilov, E R Galimov, V L Fedyaev, N Ya Galimova and M A Orlov.....275

012063

OPEN ACCESS

[Investigation of physical-mechanical and performance properties of glass fiber reinforced polyurethane materials used in the machine building industry](#)

L N Shafigullin, V I Astashchenko, N V Romanova, A R Ibragimov, G R Shafigullina and A N Shafigullina.....279

012064

OPEN ACCESS

[Ensuring uniformity of metals and alloys structure by multiple extrusion](#)

V G Shibakov, D L Pankratov, A P Andreev and R F Utyaganov.....282

012065

OPEN ACCESS

[Algorithms of walking and stability for an anthropomorphic robot](#)

R T Sirazetdinov, V M Devaev, D V Nikitina, A Y Fadeev and A R Kamalov.....286

012066

OPEN ACCESS

[Noise mapping inside a car](#)

V A Strekalov and R R Shaimuhametov.....292

012067

OPEN ACCESS

[Designing physically realizable state observer for estimating the kinematic parameters of the road train](#)

V G Volkov and D N Demyanov.....294

012068

OPEN ACCESS

[Application of reverse engineering in the production of individual dental abutments.](#)

A V Yunusov, R N Kashapov, L N Kashapov and E O Statsenko.....298

012069

OPEN ACCESS

[The simulation method of chemical composition of vermicular graphite iron on the basis of genetic algorithm](#)

L R Yusupov, K V Klochkova and L A Simonova.....303

012070

OPEN ACCESS

[Automated road marking recognition system](#)

R R Ziyatdinov, R R Shigabiev and D N Talipov.....308

012071

OPEN ACCESS

[Analysis and development of methods for obtaining metallic powders for selective laser melting](#)

R N Kashapov, L N Kashapov and N F Kashapov.....311

012072

OPEN ACCESS

[Method of control position of laser focus during surfacing teeth of cutters](#)

V V Zvezdin, R M Hisamutdinov, R R Rakhimov, I H Israfilov and R F Akhtiamov.....316

012073

OPEN ACCESS

[Management of laser welding based on analysis informative signals](#)

V V Zvezdin, R R Rakhimov, Ruz R Saubanov, I H Israfilov and R F Akhtiamov.....320

012074

OPEN ACCESS

[Formation of cracks in the selective laser melting of objects from powdered stainless steel 17-4 PH](#)

R N Kashapov, L N Kashapov and N F Kashapov.....324