# **Hydraulics 2018**

IOP Conference Series: Materials Science and Engineering Volume 492

Moscow, Russia 27 November 2018

ISBN: 978-1-5108-8332-1

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/.

Printed by Curran Associates, Inc. (2019)

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

Phone: 845-758-0400 Fax: 845-758-2633

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

## **Table of contents**

### **Volume 492**

**Hydraulics** 

27 November 2018, Moscow, Russian Federation

Accepted papers received: 28 January 2019

Published online: 13 March 2019

**Preface** 

**Hydraulics** 

Peer review statement

### **Papers**

An ejector for mixing a reagent with discharge water

B Ksenofontov, Ya Vasilieva and S Kaptinova....1

On the issue of starting-up overheating of electric motors of centrifugal pumps

A Protopopov and D Bondareva.....7

Development of methods for high-speed centrifugal pump analysis

A Protopopov and V Vigovskij.....14

Numerical investigation of two-phase media separation in the hydrodynamic filter

V Devisilov and E Sharai.....18

The application of dynamic risk analysis methods for safety improvement on highways located near or on the territory of hydraulic engineering dams

A Rozhok and V Tatarinov.....27

V Tatarinov and A Kirsanov.....33

Study of the influence of the design parameters of the wet end of the gear pump on the force factors, acting in the gear pump with external gearing, using the software package MATLAB 2018a

A Sinitsyna, B Borisov and O Gavryushina....38

Application of the method of random additions for the simulation of radioactive contamination

E Moiseeva, V Tatarinov and A Dutov.....45

<u>Jordan</u> — Gauss successive elimination method in solution of pneumohydraulic <u>floatation water purification problems</u>

B Ksenofontov, K Titov and A Firsova.....52

Methods and principles of forecasting risks of accidents on hazardous hydrotechnical objects

R Taranov and T Lebskaia.....60

Wet part hybrid optimization method of hermetic pump

P Chaburko and Z Kossova.....70

The development of the theory of calculation of the hydrodynamic coupling

V Lomakin, V Cheremushkin and A Petrov.....80

Investigation of the influence of centrifugal pump wet part geometry on hemolysis index

A Gouskov, V Lomakin, E Banin, M Kuleshova and P Chaburko....89

Independent component analysis of hydrodynamic bubbles' properties
S Gavrilev, O Ivanova and T Decaen101
The method of constructing the cavitation characteristics of a screw centrifugal pump using the methods of hydrodynamic modeling
N Egorkina and A Petrov106
Methodology of dynamic pumps testing on high-viscosity liquids
K Dobrokhodov and A Petrov113
Enhancement of monitoring systems for the transport of dangerous goods by road
V Tatarinov and A Kirsanov121
Simulation of hydrological regimes of a river with a specified roughness coefficient
O Ivanova, Zh Makhambetova and M Ivanov126
Estimation of the environmental damage of floods in Russia at the end of the 20th century
O Ivanova, M Ivanov and R Revetria134
Waste water depuration of the manufacture of mirrored surfaces for energy saving
A Kozodaev, Yu Korpusova and A Shulzhenko143
Research of reagent-free waste water treatment methods of the chrome plating line for mineralizing the rod of hydraulic cylinders
A Kozodaev, A Andrushko and A Firsova148

Improving of operating efficiency of fire brigades during the suppression of peat fires by introducing a unit for bioactivating drinking water into a water supply concept (an example of Tver region)

Yu Bogdanova, A Rozhok and V Tatarinov.....155

Regulation of bubbles ascending speed o in water

B Ksenofontov, M Ivanov, S Chauhan and I Schaikhiev.....160

Analysis of hydraulic modes of operation of the divergent plates block of the flotation-sedimentation tank

B Ksenofontov, E Senik and M Ivanov.....167

Hydrodynamic filters in hydraulic fluid cleaning system of hydraulic drive

V Devisilov and E Sharai.....172

The effect of design parameters of the closed type regenerative pump the energy characteristics

N Isaev.....178

Determination of parameters of the water-air mixture generated by an ejection aeration system with a dispersing agent

E Antonova.....188

Ring-shaped fluorescence of mineral oil on the front edge of the choke coil

V Pilgunov and K Efremova.....195

Study of the dynamics of an electro-hydraulic servo drive physical model on FESTO learning system

D Kulakov and B Kulakov.....205

Analysis of hydrodynamic properties of a gas phase in water by hydroacoustic method
S Gavrilev and M Ivanov216
Modification of polymeric membranes with unipolar corona discharge to intensify the separation of oil-in-water emulsions
I Shaikhiev, V Dryahlov, M Galikhanov, S Sverguzova and M Ivanov221
Obtaining of dependence of sustained angular rotor speed of centrifugal pump with hydrostatic bearings
S Korsakova and A Protopopov226
Multistage model of flotation process for water purification
B Ksenofontov231
Compromise Resource-Efficiency Curve for a Centrifugal Pump
A Protopopov and C Jakovich238
Obtaining the head characteristic of a Low Flow Centrifugal Pump by numerical methods
A Shablovskiy and E Kutovoy244
Test bench flow straightener design investigation and optimization with computational fluid dynamics methods
A Petrov, N Isaev and M Kuleshova248
Numerical prediction of the gas content effect on the cavitation characteristics of the pump using the simplified Rayleigh-Plesset equation

V Lomakin and O Bibik.....258

Simulation of non-stationary loads on the rotor of a pumping unit with an assembly pipeline

T Valiev and A Petrov.....266

Development and research of hydraulic disk pump

V Cheremushkin and V Lomakin....274

Optimal design of inlet device of multistage centrifugal pump

A Petrov, A Lysenko, T Valievand and N Isaev.....281

Electrical submersible centrifugal pump units of the new generation for the operation of marginal and inactive wells with a high content of free gas and mechanical impurities

A Trulev, V Verbitsky, S Timushev and P Chaburko.....287

Mathematical modeling of the mechanisms of volumetric hydraulic machines

S Semenov and D Kulakov.....295