Table of Contents

Preface

Chapter 1: Flowing Parts Hydromechanics, New Designs, Energy and Resource Saving of Pumps and Compressors

| Study of Flow Pattern in Components of Intermediate Stage Vanes Diffuser of Centrifugal | |
|---|-----|
| Pump S. Lugova, P. Olshtynskyi, I. Tverdokhleb and A. Davidenko | 3 |
| Determination of Static and Dynamic Component of Axial Force in Double Suction | |
| Centrifugal Pump S. Lugova, H. Matvieieva, A. Rudenko and I. Tverdokhleb | 13 |
| Modeling of Centrifugal Pumps Operating Modes V.S. Boiko, M.I. Sotnyk, S.O. Khovanskyy and L.V. Gapich | 21 |
| Investigation of Energy Losses in the Flow Section of the Small-Sized Axial-Flow Pump A. Gusak, O. Matvienko and V. Nenja | 29 |
| Interaction between Impeller and Axial Diffuser of Mixed Flow Pump M. Varchola and P. Hlbočan | 35 |
| Numerical Approach for Simulation of Fluid Flow in Torque Flow Pumps I. Krishtop, V. German, A. Gusak, S. Lugova and A. Kochevsky | 43 |
| The Application of CFD Methods to Analyse the Flow Structures in the Radial Labyrinth Pump | |
| P. Szulc | 52 |
| Jet Thermal Compression of the Ammonia-Water Mixture for Heat Pumps and Refrigerating Systems V. Arsenyev, V.M. Kozin, I. Merzliakov and M. Protsenko | 61 |
| Jet-Reactive Turbine: Experimental Researches and Calculations by Means of Softwares S. Vanyeyev and V. Getalo | 66 |
| Cavitation its Use and Mathematical Modelling J. Jablonská and M. Kozubková | 72 |
| Methods Development for Determining the Aerodynamic Characteristics of Vertical Exist | |
| of Wind Turbine V. Lupoviy and A. Papchenko | 79 |
| Evaluation of Oil Viscosity Influence on Hydraulic Shock in Long Pipe A. Bureček, L. Hružík and M. Vašina | 85 |
| Existing Perspectives of Rotodynamic Pumps Rotation Speed Increase A. Gulyi and A. Kobyzska | 91 |
| Mining Submersible Pump - Design, Characteristics and Protections A. Korczak, G. Peczkis, T. Synowiec and I. Altyntsev | 99 |
| Investigation of Liquid-Steam Stream Compressor M.G. Prokopov, D.A. Levchenko and A.E. Artyukhov | 109 |
| Modeling and Design of Inertial – Filtering Gas Separators-Condensers for Compressor | |
| Units of Oil and Gas Industry V.I. Sklabinskyi, A.A. Liaposhchenko, O.V. Nastenko and M.M. Al Rammahi | 117 |
| Development of Mathematical Model of Working Process of Multi-Functional Heat- | |
| Generating Aggregate-Hydromill A. Papchenko, S. Kovalyov, M. Ovcharenko and O. Barykin | 124 |
| Selection of Pumping Equipment for Oil Pipeline Transport I. Tverdokhleb, A. Biryukov and G. Vizenkov | 130 |
| Creating a Standard Size Range as One of the Factors Reducing Production Time of Modern Pumping Equipment | 127 |
| I. Tverdokhleb, A. Semenov, A. Ivanyushin, O. Niemtsev and A. Rudenko Replaceable Hydraulic Parts in Spiral Volute Pumps | 137 |
| A. Ivanyushin, A. Rudenko and I. Tverdokhleb | 143 |

| Influence of Operation Mode on Efficiency and Life Cycle Cost of Double Suction Pump I. Tverdokhleb, A. Kostyuk and S. Sokolov | 147 |
|---|-----|
| The Design Features of BB4 and BB5 API 610 Pumps for Water Injection Systems D. Viter, Y. Mikhaylov, O. Rodenko, I. Tverdokhleb, A. Obozniy and A. Biryukov | 151 |
| Monitoring of Pumping Unit Operation in Indicators of Energy Efficiency of its Work M.I. Sotnyk, S. Sapozhnikov and K. Prykhodko | 158 |
| Chapter 2: Bearings and Seals | |
| Axial Flow Seal/Bearing Efficient Pressure Formulation for a Reynolds Equation Solution P. Allaire, V. Yurko, J.M. Cao and T. Dimond | 169 |
| A Review on Active Bearings and Perspectives of Using Them in Rotating Machinery D. Shutin, L. Savin and A. Babin | 181 |
| Reliability Improvement of Rotor Supports by Combining Rolling-Element Bearings and Fluid-Film Bearings | 100 |
| R. Polyakov, L. Savin and D. Shutin Effect of Lubrication of Fluid Friction Bearings with Media of Complex Rheology | 188 |
| L. Savin, A. Kornaev and E. Kornaeva Solutions for Increasing the Bearing Capacity of Thrust Bearings | 199 |
| V. Martsynkovskyy and V. Yurko Studying the Interaction of Liquid and Solid in the Flow of Liquid in Annulus by CFD | 208 |
| Analysis M. Kozdera, M. Bojko, S. Drábková and M. Kozubková | 220 |
| Simulation of the Working Fluid Stream in the Pumps and Turbines Flow Path Seals A. Ivanov and A. Moskvichev | 228 |
| Flow Simulation in a Labyrinth Seal G.A. Bondarenko, V.N. Baga and I.A. Bashlak | 234 |
| Analysis of a Nonlinear Elastic Force in a Relatively Long Annular Seal and its Impact on the Dynamics of the Rotor A. Beda and V. Simonowsky | 240 |
| Static and Dynamic Analysis of the Closing Rotor Balancing Device of the Multistage Centrifugal Pump I. Pavlenko | 248 |
| The Lubrication Regimes of Mechanical Face Seals N. Brunetière | 255 |
| The Calculation of Static Characteristics of Impulse Gas Seal V. Martsynkovskyy, C. Kundera and A. Khalizeva | 267 |
| Proposal to Improve the Design of the Impulse Face Seal C. Kundera and V. Martsynkovskyy | 277 |
| Sealing of Pipelines Flange Connections in Conditions of Fasteners Tightening Torque Reducing | |
| O. Bondarenko and A. Dziuba Indirect Method of Leakage Flow Rate Measurement in Compressed Air Pipelines | 283 |
| R. Dindorf and P. Wos | 288 |
| Oil Lip Seal and Shaft as a Specific Friction Couple M. Gawlinski and G. Romanik | 294 |
| Laser Texturing of Sliding Surfaces of Bearings and Pump Seals B. Antoszewski and V. Tarelnyk | 301 |
| Chapter 3: Strength, Mechanical Vibrations and Reliability, Materials and Technology | |
| Computer Design of Compressor Impellers of Increased Fatigue Strength G. Lvov, V. Levashov and O. Kostromitskaya | 311 |
| Elastic Bellows Prepared by Selective Laser Sintering C. Kundera and T. Kozior | 318 |

| Thermal Stress State of Impeller Seal Made from Composite Material S.M. Vereshchaka and A.V. Deineka | 326 |
|--|-----|
| Assessment of the Mechanical Properties of a Diesel Engine Injector A. Bakowski, J. Jaroszewicz and L. Radziszewski | 334 |
| Analysis of the Radial-Axial Oscillations of the Rotor of a High-Speed Pump V. Martsynkovskyy, O. Zhulov and C. Kundera | 341 |
| Determination of Reliability of Rotor-Annular Seals System by Theory of Runs of Random Functions | |
| Y. Tarasevich and A. Savchenko | 350 |
| Influence of Changing the End Floating Seal Dynamic Characteristics on the Centrifugal Compressor Vibration State V. Yurko and V. Martsynkovskyy | 356 |
| Dynamics of the Interaction between Human Circulatory System and Centrifugal Pump as a Left Ventricle Assist Device I. Altyntsev and A. Korczak | 365 |
| Damping of Self-Excited Pressure Pulsations in Petrodiesel Pipeline D. Himr and V. Haban | 375 |
| Considerations Regarding the Pumps Vibration Monitoring Using Proactive and Predictive Maintenance Programs | |
| A.F. Oprea, N. Popa and C. Onescu | 383 |
| New Method of Friction Assemblies Reliability and Endurance Improvement V. Tarelnyk, V. Martsynkovskyy and A. Dziuba | 388 |
| Upgrading of Pump and Compressor Rotor Shafts Using Combined Technology of Electroerosive Alloying | |
| V. Tarelnyk and V. Martsynkovskyy | 397 |