

Table of Contents

Preface

Chapter 1: Materials and Technologies of Environmental Engineering

Utilization of Spent Detergent Solutions of the Specialized Agricultural Machinery Repair Shop	
L. Chernyshova, S. Movchan, O. Dereza and V. Skyba	3
Innovative Technology for Clearing Detergent Solutions after Car Washing while Making Environmentally Friendly Managerial Decisions	
N. Bukatenko, M. Zinchenko and N. Iershova	10
Catalytic Activity of Fibrous Complexites	
N. Korovnikova, V. Oliinik and J. Svishheva	19
Adsorption Purification of Wastewater from Chrome Ions and Phosphate Ions with Bentonite	
M. Malovanyy, I. Bordun, H. Sakalova, A. Blazhko and N. Beznosiuk	27
Integrated Process of Ammonium Ion Adsorption by Natural Dispersed Sorbents	
M. Malovanyy, N. Chornomaz, I. Bordun, I. Tymchuk and J. Zaharko	33
Use of Natural Zeolite to Improve Quality and Environmental Safety of Natural Surface Waters and Waste Surface Waters	
V. Iurchenko and O. Melnikova	42
Studies of Adsorption Capacity of Montmorillonite-Enriched Clay from the Khmelnytskyi Region	
V. Kochubei, Y. Yaremchuk, M. Malovanyy, S. Yaholnyk and W. Lutek	49
Investigation of Clinoptilolite Ion Exchange Capacity Relative to Copper and Zinc Ions in Conditions of Ideal Intermixing Mode	
M. Malovanyy, Z. Odnorih, I. Tymchuk, Y. Dziurakh and W. Lutek	56
Experimental Investigations of Removal of Phosphorus Compounds from Wastewater under Biological Purification	
K. Tsytlshvili	64
Research of Modern Technologies of Wastewater Treatment of Food Products Combined with Ozonation and Hydrogen Peroxide	
K. Tsytlshvili, N. Rashkevich and D. Poltavska	73
Electrochemical Formation of Aluminum Coagulants for Dairy Wastewater Treatment	
Y. Makarov, V. Andronov and Y. Danchenko	83
Improving Occupational Safety and Health in the Processing of Metallurgical Waste and Features of their Microstructure Transformation	
B. Tsymbal, A. Petryshchev, L. Anrieieva and O. Sharovatova	91
Study of Short-Term Effects on the Soil of Disposable Protective Face Masks Used in the COVID-19 Pandemic	
N. Leonova, V. Loboichenko, M. Divizynyuk and R. Shevchenko	101
Drilling Waste Disposal Technology Using Soil Cement Screens	
O.V. Mykhailovska and M.L. Zotsenko	115

Chapter 2: Fire-Resistance, Fire-Retardant Materials and Technologies of Fire-Extinguishing

Improving the Quenching of the Undercarriage Space due to the Adhesive Properties of Gel-Forming Compositions	
K. Ostapov, Y. Senchykhin, S. Ragimov and I. Kirichenko	127
Improving the Fire-Retardant Properties of Cotton-Containing Textile Materials Through the Use of Organo-Inorganic SiO₂ Sols	
O. Skorodumova, O. Tarakhno and O. Chebotaryova	137
Methodology for Determining Parameters of Ozone-Safe Fire Extinguishing Substances	
K. Umerenkova, V. Borisenko and M. Goroneskul	143

Mathematical Modeling of the Protective Effect of Ethyl Silicate Gel Coating on Textile Materials under Conditions of Constant or Dynamic Thermal Exposure	
A. Sharshanov, O. Tarakhno, A.M. Babayev and O. Skorodumova	151
Theoretical Prerequisites for Creating a Fire-Extinguishing Solution Based on Water-Absorbing Polymer Ecoflocf-07 for Extinguishing Fires in Ecosystems	
A. Kodrik, O. Titenko, S. Zhartovskyi, A. Borisov and A. Shvydenko	161
Application of Intumescent Coating for Increasing Fire-Resistance Values of Cable Products	
R. Likhnyovskyi, A. Tsapko, V. Kovalenko and A. Onyshchuk	179
Application of Coating for Fire Protection of Textile Structures	
Y. Tsapko, O. Bondarenko, A. Tsapko and Y. Sarapin	189

Chapter 3: Materials and Technologies

Additional Strengthening of “Screper” Jewelry Tool Using Friction	
O. Volkov, Z. Kraevska, A. Vasilchenko and T. Hannichenko	199
Investigation of the Regularities of the Influence of Technological Factors and External Conditions on the Temperature and Content of Condensed Products Oxide-Containing Mixtures	
I. Kyrychenko, O. Diadiushenko, O. Kyrychenko and O. Dibrova	206
Oscillation and Stepwise of Hydrocarbon Melting Temperatures as a Marker of their Cluster Structure	
D. Tregubov, O. Tarakhno, V. Deineka and F. Trehubova	215
Influence of Nature of Pigments and Dyes on Coloring Properties of Polymeric Superconcentrates	
O. Blyznyuk, A. Vasilchenko, O. Danilin and E. Darmofal	222
Durability of Acrylic Products during Heat Aging	
A. Kondratiev, V. Kochanov, T. Yuresko, A. Tsaritsynskyi and T. Nabokina	236
Investigation of Hybrid Modification of Eco-Friendly Polymers by Humic Substances	
V. Lebedev, D. Miroshnichenko, D. Bilets and V. Mysiak	245
Compliance of Fasteners in Metal-Composite Joints	
O. Dveirin, A. Tsaritsynskyi, T. Nabokina and A. Kondratiev	253

Chapter 4: Electrochemical Processes

Electrochemical Processing of Tungsten-Cobalt Pseudoalloys, Receiving Tungsten Powder for Modification of Aramid Tissue	
G. Tulskiy, L. Lyashok, V. Gomofov, A. Vasilchenko and L. Skatkov	267
Multistage Corrosion of Fuel Element Materials in Nuclear Reactors	
Y. Hapon, M. Kustov, M. Chyrkina and O. Romanova	277
Cluster Structure Control of Coatings by Electrochemical Coprecipitation of Metals to Obtain Target Technological Properties	
Y. Hapon, D. Tregubov, E. Slepuzhnikov and V. Lypovyi	284

Chapter 5: Computational Materials Science

Investigation of the Main Stages in Modeling Spherical Particles of Inhomogeneous Materials	
V. Pasternak, L. Samchuk, A. Ruban, O. Chernenko and N. Morkovska	293
Software Modeling Environment for Solving Problems of Structurally Inhomogeneous Materials	
V. Pasternak, A. Ruban, M. Surianinov, Y. Otrosh and A. Romin	301
Improving the Mechanical Properties of Liquid Hydrocarbon Storage Tank Materials	
O. Sierikova, V. Koloskov, K. Degtyarev and O. Strelnikova	309
Prediction of the Structural Properties of Powder Materials by 3D Modeling Methods	
A. Ruban, V. Pasternak and N. Huliieva	316

Modeling of Gas Sorption Process by Dispersed Liquid Flow M. Kustov, A. Melnichenko, O. Basmanov and O. Tarasenko	324
---	-----

Chapter 6: Materials in Construction

Influence of Temperature and Humidity of the Environment where the Concrete Hardening Takes over on the Efficiency of Surface Microdosis Application A. Shyshkina and A. Shyshkin	335
Specific Aspects of the Study of the Surface Properties of Plywood Y. Tsapko, O. Horbachova, S. Mazurchuk and O.P. Bondarenko	341
Design and Research of Bituminous Compositions Modified by Rubber Brittle Waste A. Cherkashina, I. Lavrova, V. Lebedev and T. Tykhomyrova	349

Chapter 7: Fire-Resistance and Fault Tolerance of Building Materials and Structures

Experimental Investigations of the Thermal Decomposition of Wood at the Time of the Fire in the Premises of Domestic Buildings D. Dubinin, A. Lisniak, Y. Krivoruchko and A. Pobidash	357
Fire Protection of Steel with Thermal Insulation Granular Plate Material on Geocement-Based T. Kurska, O. Khodakovskyy, A. Kovalchuk and S.G. Guzii	365
Results of Experimental Investigations of Reinforced Concrete Wall Elements According to the Standard Temperature Mode of Fire A. Perehin, O. Nuianzin, A. Borysova and V. Nuianzin	372
The Improvement of the Method to Determine the Temperature in Steel Reinforced Concrete Slabs in Assessment of their Fire Resistance V. Nekora, S. Sidnei, T. Shnal and O. Nekora	382
Research of Fire Resistance of Fire Protected Reinforced Concrete Structures A. Kovalov, Y. Otrosh, V. Poklonskyi, O. Semkiv and M. Tomenko	390
Issues of Resistance to Progressive Failure of Load-Bearing Systems in Lira-Sapr Software M. Barabash	399

Chapter 8: Information Systems for Identification of Emergency Situations

Application of UAV Video Communication Systems During Investigation of Emergency Situations I. Maladyka, S. Stas, P. Mykhailo and O. Dzhulay	411
Remote Visual Information System for Identification of Dangerous Substances Using Unmanned Aircrafts A. Bychenko, M. Udovenko, V. Nuianzin and A. Berezovskyi	424

Chapter 9: Research and Design in Mechanical Engineering

Current Trends in the Development of Automation Systems in Mechanical Engineering A. Ruban, V. Pasternak, L. Samchuk, A. Hubanova and O. Suprun	435
Technological Process of Manufacturing a Gear Wheel Using the Abaqus Software Product Method A. Ruban, V. Pasternak, A. Zhyhlo and V. Konoval	443