Extrica Conferences

ISSN ONLINE 2538-8479 ISSN PRINT 2345-0533

December 2025 **VOLUME 60**

Mechanical Engineering

Multidisciplinary Engineering

Materials Science and Technology

Vibroengineering Procedia





Editor in Chief

Minvydas Ragulskis

Editorial Board

Kaunas University of Technology, (Lithuania)

minvydas.ragulskis@ktu.lt

Rafał Burdzik

Mahmoud Bayat The University of Texas at Arlington, (United States)

Silesian University of Technology, (Poland)

Jinde Cao Southeast University, (China) Maosen Cao Hohai University, (China) Sezgin Ersoy Marmara University, (Turkey) Chen Lu Beihang University, (China)

Nicola Nisticò Sapienza University of Rome, (Italy) Subhash Rakheja Concordia University, (Canada)

Vinayak Ranjan University of Pittsburgh at Bradford PA, (United States)

Miguel A. F. Sanjuan University Rey Juan Carlos, (Spain) University of Houston, (United States) Gangbing Song

Xiao-Jun Yang China University of Mining and Technology, (China) ranjan@rowan.edu rafal.burdzik@polsl.pl jdcao@seu.edu.cn cmszhy@hhu.edu.cn sersoy@marmara.edu.tr luchen@buaa.edu.cn nicola.nistico@uniroma1.it subhash.rakheja@concordia.ca vinayak.ranjan@bennett.edu.in

miguel.sanjuan@urjc.es

xjyang@cumt.edu.cn

gsong@uh.edu

VP Vibroengineering PROCEDIA

Vibroengineering PROCEDIA Volume 60 contains papers presented at the 74th International Conference on Vibroengineering in Tashkent, Uzbekistan, November 27-29, 2025. The main theme of the Conference is "Resource-Efficient Technologies in Transport".

Aims and Scope

Journal publishes original papers presenting the state of the art in vibroengineering of dynamical systems. The list of principal topics:

- Measurements in engineering
- Mathematical models in engineering
- Acoustics, noise control and engineering applications
- Mechanical vibrations and applications
- Fault diagnosis based on vibration signal analysis
- Vibration control, generation and harvesting
- Seismic engineering and applications
- · Modal analysis and applications
- Vibration in transportation engineering
- Flow induced structural vibrations
- Oscillations in biomedical engineering
- Chaos, non-linear dynamics and applications
- Oscillations in electrical engineering
- Fractional dynamics and applications
- System dynamics in manufacturing system modeling
- Dynamics of smart and functionally graded materials

All published papers are peer reviewed and crosschecked by plagiarism detection tools.

More information is available online https://www.extrica.com/journal/vp

Vibroengineering PROCEDIA is referred in:

Scopus: ELSEVIER Bibliographic Database.

EI Compendex: ELSEVIER Bibliographic Database.

EBSCO: Academic Search Complete;

Computers & Applied Sciences Complete; Central & Eastern European Academic Source;

Current Abstracts; TOC Premier.

Gale Cengage Learning:

Academic OneFile Custom Periodical;

Science in Context.

ResearchGate: https://www.researchgate.net

Scilit: https://www.scilit.net

Dimensions: https://www.dimensions.ai

Semantic Scholar: https://www.semanticscholar.org

Google Scholar: https://scholar.google.com

CORE: https://core.ac.uk

Ulrich's Periodicals Directory: https://ulrichsweb.serialssolutions.com

CNKI Scholar: http://eng.scholar.cnki.net

cnpLINKer (CNPIEC): http://cnplinker.cnpeak.com
WanFang Data: https://www.wanfangdata.com.cn

TDNet: https://www.tdnet.io

WorldCat Discovery Services: https://www.oclc.org/en/worldcat-discovery.html

Crossref: https://search.crossref.org

Content is archived in Martynas Mazvydas National Library of Lithuania

Internet: https://www.extrica.com E-mail: publish@extrica.com

Publisher: Extrica

74th International Conference on VIBROENGINEERING

November 27-29, 2025, in Tashkent, Uzbekistan

The main theme of the conference: Resource-Efficient Technologies in Transport

General Topics of the Conference:

- Mechanical vibrations and applications
- Fault diagnosis based on vibration signal analysis
- Seismic engineering and applications
- Vibrations in transport engineering
- Vibration control, generation and harvesting
- Acoustics, noise control and engineering applications
- Flow induced structural vibrations
- Modal analysis and applications
- System dynamics in manufacturing system modelling
- Materials and measurements in engineering
- Mathematical models in engineering
- Vibration Engineering
- Robotics and Mechatronics
- Vibration problems in smart Transportation Systems and Logistics
- Energy (topics related to vibroengineering)
- Artificial Intelligence and Machine Learning in vibroengineering
- Signal Processing and electronic circuits (topics related to vibroengineering)
- Electronics and power systems (topics related to vibroengineering)
- Data analysis and visualization (topics related to vibroengineering)

Chairs:

Odil Kalandarovich Abdurakhmanov Tashkent State Transport University

Scientific Organizing Committee Members

Ibrakhim Mirzaev	Tashkent State Transport University
Nodirjon Tursunov	Tashkent State Transport University
Salokhiddin Z. Yunusov	Tashkent State Transport University
Khurshidbek Nurmetov	Tashkent State Transport University
Nozima Khusnidinova	Tashkent State Transport University
Odiljan Turdiev	Tashkent State Transport University
Kamaljan Abbasovich Karimov	Tashkent State Transport University
Akmal Mukhitdinov	Tashkent State Transport University
Ruslan Khakimzyanov	Tashkent State Transport University
Samandar Komilov	Tashkent State Transport University
Abdurauf Safarov	Tashkent State Transport University
Bobomurod Rakhmonov	Tashkent State Transport University
Altinbek Lesov	Tashkent State Transport University
Fakhriddin Zokirov	Tashkent State Transport University
Ravshanjon Akhmatjanov	Tashkent State Transport University
Natalya Yaronova	Tashkent State Transport University

Local Organizing Committee Members

Miraziz Mirkadirovich Talipov Said Sanatovich Shaumarov Tashkent State Transport University Tashkent State Transport University

VP Vibroengineering PROCEDIA

DECEMBER 2025. VOLUME 60, PAGES (1-853), ISSN PRINT 2345-0533, ISSN ONLINE 2538-8479

Contents

MECHANICAL VIBRATIONS AND APPLICATIONS

PLANAR DYNAMIC MODELING OF A ROTOR-BEARING-HOUSING SYSTEM WITH POLYURETHANE SUPPORT LAYER SHAKHNOZA MAKHMUDOVA, NODIRJON TURSUNOV, GULNAZA AVAZOVA	1
ANALYSIS AND SYNTHESIS OF A CAM-ACTUATED VARIABLE-LENGTH CRANK FOR FRAME SAW DRIVES WITH PERPENDICULAR SPRINGS VITALIY KORENDIY, VIACHESLAV PASIKA, VLADYSLAV KYRYCHUK, ROMAN KACHMAR, VOLODYMYR BOROVETS, VASYL BRYTKOVSKYI	8
VIBRATION MECHANICS OF A SEMI-CYLINDRICAL CUSHION WITH INERTIAL PROPERTIES REYHAN AKBARLI, PARVIZ GARAYEV, RUZIGUL SAYFUTDINOVA, KHADICHA UROLOVA	16
Investigation of body motion in the trough of a vibratory conveyor with asymmetric oscillations of walls Leonid Serilko, Oleg Lyashuk, Oleksandr Stadnyk, Dmytro Serilko, Dmytro Mironov, Serhiy Morozyuk	24
FAULT DIAGNOSIS BASED ON VIBRATION SIGNAL ANALYSIS	
SPATIAL WAVEFIELD ANALYSIS FOR DELAMINATION IMAGING IN COMPOSITE CURVED PANELS JING WANG, WEN XIAO, ZIXI LI, GANGGANG SHA	32
INSPECTION OF HELICOPTER BLADES IN FIELD APPLYING VIBRATION DIAGNOSTIC TECHNIQUES ALEKSEY MIRONOV, PAVEL DORONKIN, ALEKSEJS SAFONOVS	38

VIBRATION CONTROL, GENERATION AND HARVESTING

RANDOM PARAMETRIC NONLINEAR VIBRATIONS OF A DISCRETE MECHANICAL SYSTEM PROTECTED FROM VIBRATION	44
OLIMJON DUSMATOV, MURADJON KHODJABEKOV, BAKHTIYOR ASHUROV	
EXPANSION JOINTS AND THE INTERFACE ZONE OF ROAD PAVEMENT ON BRIDGES AND OVERPASSES IVAN BONDAR, SEIDULLA ABDULLAYEV, GABIT BAKYT, GALYMZHAN ASHIRBAYEV, LAILA SAGATOVA, DIAS SEIDEMETOV, YERBOL DUISEMBIN	54
SEISMIC ENGINEERING AND APPLICATIONS	
STRESS ANALYSIS AND SEISMIC PERFORMANCE TESTING OF SURROUNDING ROCK IN COAL MINE ROADWAY CHENGFENG WANG, XUZHOU YANG, GUORONG FU	61
EFFECT OF VIBRATION ON THE CALCULATED RESISTANCE OF SANDY SOILS ABDUBAKI KAYUMOV, AKHROR KHISOMIDDINOV, OLMOS ZAFAROV, ISLOM RUZIYEV, KHUSNIDDIN ERGASHEV	68
LIQUEFACTION ANALYSIS OF A TRANSMISSION TOWER SITE DURING THE 2023 MS6.2 JISHISHAN EARTHQUAKE YIMING XIE, YINFENG DONG, YILIN WANG, YIPING WANG, FUCHAO CAO, SIYU LI, ZHENGLUN CHENG	75
FIELD EVALUATION OF THE GEOTECHNICAL BEHAVIOR OF LIME-GROUND CUSHIONS IN THE REPUBLIC OF TAJIKISTAN Ne'matjon Mukhammadiyev, Zardakov Sherafkan, Khasanov Nurali	82
ASSESSMENT OF DAMAGE TO RESIDENTIAL BUILDINGS IN A SCENARIO-BASED STRONG EARTHQUAKE IN THE FERGANA VALLEY REGION VAKHITKHAN ISMAILOV, SHAROFIDDIN YODGOROV, BEKZOD AKTAMOV, SHUKHRAT AVAZOV, ASADBEK AZAMJONOV, DOSTON JUMAEV	91
OBTAINING SHEAR WAVE INPUT FOR 1D SITE RESPONSE ANALYSIS: A FREQUENCY ADJUSTMENT METHOD BASED ON STRONG MOTION RECORDS – PART I: FORMULATION AND THEORETICAL VALIDATION YIPING WANG, YINFENG DONG, YILIN WANG, YIMING XIE, FUCHAO CAO	97
OBTAINING SHEAR WAVE INPUT FOR 1D SITE RESPONSE ANALYSIS: A FREQUENCY ADJUSTMENT METHOD BASED ON STRONG MOTION RECORDS – PART II: APPLICATION TO SITES AND THE 2011 TOHOKU EARTHQUAKE YIPING WANG, YINFENG DONG, YIMING XIE, FUCHAO CAO, YILIN WANG	104
MODAL ANALYSIS AND APPLICATIONS	
ANALYSIS OF MODAL AND VIBRATION RESPONSE CHARACTERISTICS OF HIGH-PRESSURE STORAGE TANKS XUZHOU YANG, GUORONG FU, CHENGFENG WANG	111
STUDY ON MODAL CHARACTERISTICS OF THE MAIN SHAFT SYSTEM OF THE BOOSTER PUMP IN THE FIRE STATION GUORONG FU, CHENGFENG WANG, XUZHOU YANG	118

VIBRATION IN TRANSPORTATION ENGINEERING

EXPERIMENTAL RESULTS OF REDUCING HARMFUL VIBRODYNAMIC EFFECTS CAUSED BY THE INTERACTION BETWEEN ROLLING STOCK AND TRACK THROUGH THE USE OF ELASTIC UNDER-SLEEPER PADS IN THE RAIL JOINT ZONE ABDUHAMIT ABDUJABAROV, MASHKHURBEK MEKHMONOV, MAQSUDJON KHAMIDOV, SHERZOD TADJIBAEV, SAULET SHAYAKHMETOV	125
REINFORCEMENT OF THE EMBANKMENT WITH REINFORCED CONCRETE PILES IN THE TRANSITION ZONE FROM THE RAILWAY EMBANKMENT TO THE BRIDGE ABDUKHAMIT ABDUJABAROV, MASHKHURBEK MEKHMONOV, MAQSUDJON KHAMIDOV, MAVJUDA MIRKHANOVA, AUYEZMURAT YEMBERGENOV	133
IMPROVING THE CONDITIONS FOR SECURING INTERMODAL UNITS AGAINST TRANSVERSE VIBRATIONS AND LONGITUDINAL DISPLACEMENTS ALONG THE ROUTE SHUKHRAT SAIDIVALIYEV, DIYOR BOBOEV, ADYLKHAN KIBISHOV	142
DYNAMIC CALCULATION OF A MODERNIZED DESIGN OF A MOTOR CARRIAGE SUBWAY CAR WITH JUSTIFICATION OF THE STRENGTH PARAMETERS GALINA KHROMOVA, BAKHODIR MIRSALIXOV, ALIYA ZABIYEVA	149
EXPERIMENTAL METHOD FOR DETERMINING THE VIBRODYNAMIC STATE OF EMBANKMENTS ON HIGH-SPEED RAILWAYS MASHKHURBEK MEKHMONOV, ROVSHANBEK ISANOV, SAULET SHAYAKHMETOV	157
CHARACTERIZATION AND ASSESSMENT OF ROLLING STOCK STRUCTURAL DURABILITY UNDER ELEVATED OPERATING TEMPERATURES NURIDDIN ZAYNIDDINOV, GRIGORY VOLOKHOV, SHERZAMIN ABDURASULOV	165
IMPROVEMENT OF THE SYSTEM FOR REPORTING THE STATE OF THE ELECTRIFIED RAILWAY CONTACT LINE SULTON AMIROV, SAYFIDDIN NORJIGITOV, ISLOM KARIMOV, IRODA ABDUAZIMOVA	172
STRESS-STRAIN STATE OF RAILWAY FASTENING ELEMENTS UNDER HIGH-SPEED TRAIN MOVEMENT SAULET SHAYAKHMETOV, KUVANDIK LESOV, BALNUR YERZHAN, FENG HUAIPING, MUKHAMEDALI KENJALIYEV	180
EXPERIMENTAL AND FINITE ELEMENT ANALYSIS OF THE STRUCTURAL DURABILITY OF SPECIAL SELF-PROPELLED ROLLING STOCK FRAMES IZZATILLO RAXMIDDINOV, SHERZOD FAYZIBAEV, YUSUFOV ABDULAZIZ, YOU TAIWEN, KHUSAN KOSIMOV, NUSRATILLO ABDULLAYEV	186
MODERN STRENGTHENING TECHNIQUES FOR ENHANCING THE LOAD-CARRYING CAPACITY OF IN-SERVICE ROAD BRIDGES IN UZBEKISTAN ULUGBEK KHAMDAMOV, ABDURAKHMAN ISHANKHODJAEV	193
FLOW INDUCED STRUCTURAL VIBRATIONS	
Analysis of the influence of vibration phenomena in pump systems on electrical energy consumption and operational efficiency Xumoyun Xaydarov, Oybek Ishnazarov, Jasurbek Nizamov	200

ANALYSIS OF VIBRATION CHARACTERISTICS OF AUTOMOBILE AIR CONDITIONING PIPING SYSTEM BASED ON CFD LIXIAN WANG, HONGQIANG SU, XIAOHUA LOU, SEN ZHANG	208
ANALYSIS ON THE INFLUENCE OF BLADE PITCH ANGLE ON DYNAMIC CHARACTERISTICS OF THE ROTOR SYSTEM QIANG GUO, XIAO XU DING, ZHAO KAI WANG, SHUANG LI, FEI WANG	215
WIND STABILITY ANALYSIS OF THE ROTATING GIRDER SEGMENT DURING CONSTRUCTION OF A RIGID-FRAME BRIDGE DING XU, SHU PU, JIUQUN MAO	223
DYNAMICS AND OSCILLATIONS IN ELECTRICAL AND ELECTRONICS ENGINEERING	
Influence of powertrain topology (FWD vs RWD) on regenerative braking capabilities in electric vehicles Asanov Seyran, Umerov Fikret, Inoyatkhodjaev Jamshid, Bekmurodov Nodirbek, Kodirov Bobiromon	229
MAGNETOELASTIC OSCILLATION OF CURRENT-CARRYING PLATES IN AN ALTERNATING MAGNETIC FIELD RAVSHAN INDIAMINOV, ADILJON DJURAEV, SULTON KHAKBERDIYEV, SHUKHRAT NEMATOV, MUHAMMAD INDIAMINOV	237
ACHIEVING EFFICIENCY BY ENSURING VIBRATION-FREE OPERATION OF A SOLAR-POWERED ASYNCHRONOUS MOTOR AZAMOV SAIDIKROM, BOIHANOV ZAILOBIDDIN, MUSTAFOQULOV ALMARDON	244
SCIENTIFIC AND PRACTICAL SUBSTANTIATION OF TRANSIENT PROCESSES IN ASYNCHRONOUS ELECTRIC MOTORS OF MAINLINE ELECTRIC LOCOMOTIVES OTABEK ERGASHEV, OBIDJON KASIMOV	252
ANALYSIS OF A 10 KW MINI PUMPED HYDRO STORAGE PLANT WITH SOLAR INTEGRATION IN UZBEKISTAN ALMARDON MUSTAFOQULOV, MAKHMUDOV FARHOD, SAIDIKROM AZAMOV, EGAMBERGANOV DILMUROD, YULDASHEVA GULORA	260
MATERIALS AND MEASUREMENTS IN ENGINEERING	
ROAD ZONING IN THE FERGANA VALLEY BASED ON THE LEVEL OF TRAFFIC SAFETY ASLIDIN UROKOV, DILMUROD TASHEV, SHERALI TOJIBOEV, ZAFAR UTASHOV	268
APPLICATION OF LASER SCANNING FOR AUTOMATED EFFICIENCY ASSESSMENT OF SOLAR PANELS: A CASE STUDY IN UZBEKISTAN SHAKHZOD TAKHIROV, SULTAN KUDRATOV, AKBAR NORMO'MINOV, ZHAMSHID TAKHIROV	276
EXPERIENCE WITH THE VIBRATION MONITORING METHOD FOR DRIVING PILES IN AN EXISTING FOUNDATION ASKAR ZHUSSUPBEKOV, ABDULAZIZ GULAMOV, ADIL ZHAKULIN, GULSHAT TLEULENOVA, DIYAR MUKHANOV, OLEG MINAEV	284
ANALYSIS OF THE STRUCTURAL PERFORMANCE OF REINFORCED CONCRETE UNDER FIRE LOADING DILSHOD IMAMALIEV, AMIRKHAN SAZAIROV, REYHAN AKBARLI	291

EVALUATION AND MODELING OF AIRBORNE DUST POLLUTION IN THE KAMCHIK RAILWAY TUNNEL DURING TRAIN MOVEMENTS SHAVKAT KH. ABDAZIMOV, SHERZOD R. ABDUVAKHITOV, SHAKHBOZ R. ABDUVAKHITOV	298
DESIGN AND DEVELOPMENT OF AN INNOVATIVE LABORATORY SETUP FOR THE RESTORATION OF DYNAMIC ACTIVITY IN SPENT ZEOLITES MAKHAMAT-IBRAHIM MAKHAMAJANOV, ZEBO ALIMOVA, DMITRIY AYRAPETOV, AKHROROVA ALPHIA	305
STUDY OF A TWO-STAGE WOOD CHIP HYDROLYSIS PROCESS AND THE KINETICS OF MONOSACCHARIDE FORMATION ELMUROD EGAMBERDIEV, SAMANDAR S. SODIQJONOV, VAYS N. JURAEV, SEVARA J. KHOLIKOVA, OYBEK Y. ARIPDJANOV, NODIRA I. SHARIPOVA	311
THE IMPORTANCE OF USING GEOSYNTHETIC MATERIALS IN ENSURING ANTI-EROSION STABILITY OF RAILWAY EMBANKMENTS KUVANDIK LESOV, AKMAL URALOV, MUKHAMEDALI KENJALIYEV, ULUGBEK ERGASHEV, FENG HUAIPING	318
VIBRATION-RESISTANT MIXED BINDERS USING MAN-MADE BURNT ROCKS FOR TRANSPORT INFRASTRUCTURE TAALAIBEK T. BOLOTOV, AKYMBEK A. ABDYKALYKOV, ALAYBEK B. KURBANBAEV, ISLAN K. OMURBEKOV, RASHIDBEK HUDAYKULOV, BARNO SALIMOVA, DILSHOD ARALOV	325
FATIGUE PERFORMANCE ANALYSIS AND REINFORCEMENT MEASURES FOR FOUNDATION CONNECTION COMPONENTS OF WIND TURBINE TOWERS YIMING XIE, YINFENG DONG, YIPING WANG, YILIN WANG, FEIPENG LIU, HONGXING LI	332
IMPROVING THE TECHNICAL AND ECONOMIC PERFORMANCE OF DIESEL ENGINES FOR SHUNTING LOCOMOTIVES BAHODIR KULMANOV, VLADIMIR GRACHEV, OTABEK ERGASHEV, SHOHIJAKHON KUDRATOV	339
STRUCTURAL AND FUNCTIONAL PROPERTIES OF ZR-NB-O COATINGS DEPOSITED BY PVD FOR VIBRATION-RESISTANT TRANSPORT APPLICATIONS K. K. KADIRBEKOVA, M. M. ABDULLAEV, MAKHBUBA ZIYAEVA	345
TECHNOLOGY OF SURFACE HARDENING OF TEETH OF EXCAVATOR BUCKETS BY COMPOSITE CARBURIZING METHOD MUZAFFAR UBAYDULLAEV, ELENA RUKLINSKAYA, UMIDBEK KOSIMOV, UTKIR KHALIKULOV	353
ENHANCING THE STRENGTH OF STEEL GRADE 45 GUIDE RAILS FOR BALL ROLLING USING THE CHEMICAL-THERMAL CARBONITRIDING METHOD MUZAFFAR UBAYDULLAEV, ELENA RUKLINSKAYA, UMIDBEK KOSIMOV, UTKIR KHALIKULOV	359
STUDY ON THE INTERACTION STATE BETWEEN POLYMER MODIFIERS AND ASPHALT BASED ON PRECISE GRINDING PAN YIXIN	364
CREATION OF A WEAR-RESISTANT BIMETALLIC COATING FOR THE TRACK TREADMILL OF A CRAWLER NURKHON BEKMURZAEV, KHURSHIDBEK NURMETOV, SHAVKAT ALIMUKHAMEDOV	370

IMPROVING THE MECHANICAL PROPERTIES OF TRANSPORT VEHICLES BY ADDING SECONDARY WASTE TO BUTADIENE-NITRILE RUBBER OF VIBRATION DAMPING ELEMENTS	378
DILNOZA NIGMATOVA, AXMADJAN IBADULLAYEV, SHERALI MAMAYEV, MUXAMMAD-AYUBXON IKROMOV, QUVONDIQ POLVANOV	
IMPROVING THE QUALITY OF CAST BLANKS BY APPLYING FORCE TO THE SOLIDIFYING METAL	385
N. S. Uzdieva, E. M. Bakhteev, K. L. Vakhidova, Sh A. Nazarov	
REDUCING TOXIC EMISSIONS AND VIBRATION LEVELS FROM AUTOMOBILE ENGINES BY USING GASOLINE WITH OXYGEN-CONTAINING ADDITIVES BAXTIYOR BAZAROV, ABUTOLIB SOBIRJONOV, SHUXRAT ALIMOV, AKMAL AZIMOV, ABDIRASHIDOV ASLIDIN	393
URBAN TERRAIN MORPHOMETRY FOR TRANSPORT PLANNING: A GIS-BASED ANALYSIS OF TASHKENT USING OPEN DEMS JAMSHID SODIKOV, KUVONCHBEK MUSULMANOV, DILSHODBEK ADIZOV, DINH VAN HIEP, FAZILAT SAYDAMETOVA	400
LOAD-BEARING CAPACITY OF LARGE-SIZED PILES IN SOILS IN UZBEKISTAN KHASANOV ASKAR, BAKHODIR KURBANOV	408
DEVELOPMENT OF A TECHNOLOGY FOR PRODUCING CAST IRON IN AN INDUCTION CRUCIBLE FURNACE, MODIFICATION IN A LADLE AND CASTING IN A SYSTEM OF CASTING MOLDS UCHKUN RAKHIMOV, NODIRJON TURSUNOV, TALGAT URAZBAYEV, ERKIN BAKHTEEV, ISMOIL OMONOV	416
COMPOSITE THERMOPLASTIC MATERIALS FOR FILAMENT PRODUCTION IN 3D PRINTING TECHNOLOGY ALEXANDER ANTONOV, KHURSHIDBEK NURMETOV, ALIMJON RISKULOV, TALGAT URAZBAEV, VASILY STRUK, DENIS NAKHVAT	424
VIBRATION DAMPING AND INTERFACIAL ADHESION BEHAVIOR OF STEEL-UHMWPE COMPOSITE STRUCTURES AKBARJON BAYMIRZAEV, NODIRBEK MADAMINOV, DURDONA VOHIDOVA	431
THE PROPERTIES OF SELF-COMPACTING FINE-GRAINED CONCRETE MIXTURES FOR ENERGY-EFFICIENT VIBRATION-FREE CONSTRUCTION TECHNOLOGIES ANVAR ADILKHODZHAEV, BAKHRIDDIN KHASANOV, ILKHOM KADYROV, MIRZOKHID RADJABOV, ISOMIDDIN UMAROV, DILBAR TOSHEVA	436
INDUCTIVE TRANSDUCERS FOR MEASURING VIBRATIONS S. F. AMIROV, A. KH SULLIEV, A. A. SHOIMKULOV, ELNUR ABDULLAEV	444
New composition of film-forming materials for maintaining freshly laid cement-concrete road pavements Tursoat Jumayevich Amirov, Matchon Bekjonovich Tukhtayev, Elyor Sotimovich Sottiqulov	450
COMPOSITE MATERIALS BASED ON POLYOLEFINS MODIFIED WITH CARBON-CONTAINING COMPONENTS ALEXANDER ANTONOV, KHURSHIDBEK NURMETOV, ALIMJON RISKULOV, VASILY STRUK, WAN XUEMIN	458

EVALUATING THE EFFECTIVENESS OF THE NICOFLOK POLYMER-MINERAL ADDITIVE IN SOIL REINFORCEMENT IBRAGIM SADIKOV, RAKHIMJON SOATALIYEV, SANJAR OTAKHONOV, ABDURASUL SHARIPOV	466
ENVIRONMENTAL PROTECTION OF RAILWAY WASTEWATER USING NATURAL DIATOMITE SORBENTS: DEVELOPMENT AND VALIDATION OF A THREE-LAYER FILTRATION STRIP MIRAZIZ TALIPOV, OLEG ILYASOV, OLGA KOVALEVA, BAKHRIDDIN BEGMATOV, ZHYRGAL ISMAILOVA	473
EXPERIMENTAL STUDY ON PERFORMANCE DETERIORATION OF INTERNALLY CURED PAVEMENT CONCRETE UNDER SULFATE-WET-DRY EROSION CYCLES HAONAN QUAN, XIAO QIN, HAOLIN ZHANG, XIANGYU XIN, YIRAN XU	479
IMPROVED EVALUATION OF MEASUREMENT UNCERTAINTY AND TRACEABILITY IN VIBROMETER CALIBRATION SYSTEMS BAKHROM KHAMDAMOV, AZIZBEK SATVOLDIYEV, KHAYRULLO VASIEV	486
TENSILE STRENGTH OF CONCRETE REINFORCED WITH COMBINED STEEL AND BASALT FIBERS AKHMEDOV AKMALJON, BAKHTIYOR MAKSUD UGLI, ABDURASUL MARTAZAEV, RAVSHANBEK MAVLONOV, ODILJON FOZILOV	493
RESEARCH ON STRENGTH TESTING TECHNOLOGY FOR AIRCRAFT CARGO HOLD RESTRAINT NETS MA LINA, LI LEI	500
EFFECT OF THERMALLY ACTIVATED SPARINGLY SOLUBLE ADDITIVES ON RHEOLOGICAL AND STRENGTH PROPERTIES OF CEMENTS FOR VIBRATION-RESISTANT TRANSPORT STRUCTURES NARGIZA LUTFULLAEVA, KAMOLA MUKHITDINOVA, JALOLIDDIN BAKHTIYOROV, BEKMURODJON RAKHIMJONOV, SHAKHIDA SHAMURATOVA, YELENA KODIROVA	507
TECHNICAL AND ECOLOGICAL EVALUATION OF A DIATOMITE-BASED FILTER STRIP FOR CLEANING POLLUTED RUNOFF FROM A RAILWAY EMBANKMENT OLEG ILYASOV, MIRAZIZ TALIPOV, ISLOM KHURRAMOV, MUKADDAS TIRKASHEVA	515
ENGINEERING PROTECTION OF THE SUBGRADE FROM SAND DRIFTS USING GEOMATERIALS, AS EXEMPLIFIED BY THE BUKHARA-MISKIN RAILWAY LINE KUVANDIK LESOV, BAKHYTZHAN SARSENBAYEV, MUKHAMEDALI KENJALIYEV, NODIR BEGMATOV, AKMAL URALOV	522
SELF-COMPACTING CONCRETE BASED ON RECYCLED CRUSHED STONE AND ORGANIC-MINERAL ADDITIVE GUVALOV ABBAS, AGHAZADA MAHIRA, AKHRAROV ABRORBEK, XOSHIMOV IFTIXORJON	527
HIGH-PRESSURE HIGH-TEMPERATURE SYNTHESIS OF WC-CO COMPOSITES: OVERCOMING THE HARDNESS-TOUGHNESS TRADE-OFF THROUGH THERMOBARIC PROCESSING ZIYODA MUKHAMEDOVA, SHERZOD FAYZIBAYEV, OLEG IGNATENKO, RUSTAM KUCHKARBAYEV	533
STATIC PUSH OUT TEST OF RECTANGULAR STEEL TUBE CONCRETE COMPONENTS YIPING WANG, YINFENG DONG, FEIPENG LIU, HONGXING LI	542

IMPACT OF BASALT FIBER ON MECHANICAL PROPERTIES AND DURABILITY OF SHOTCRETE	549
Guoxue Zhu, Zhonghua Yang, Dengzhou Li, Hanghang Wang, Lizhi Hu	
TECHNOLOGY FOR PRODUCING MODIFIED POLYMER SULFUR BITUMEN AND ITS PROPERTIES	556
ALISHER MAMATMUMINOV, SADIKOV IBRAGIM, IFTIXOR XOSHIMOV	
ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF HYBRID STEEL-FRP REINFORCED CONCRETE BEAMS RAVSHANBEK MAVLONOV, KAMOLIDDIN MUMINOV, SOHIBA NUMANOVA,	563
ABDURASUL MARTAZAEV, ODILJON FOZILOV, AKHMEDOV AKMALJON	
THE EFFECT OF THE QUANTITY AND LENGTH OF FIBERS ON THE MECHANICAL PROPERTIES OF FIBER-REINFORCED CONCRETE BASED ON POLYPROPYLENE FIBERS ASALXON JURAEVA, ABDURASUL MARTAZAEV, SOBIRJON RAZZAKOV, AKHMEDOV AKMALJON	571
EXPERIMENTAL EVALUATION OF RESIDUAL DEFLECTION AND STRUCTURAL STIFFNESS OF THE UZTE16M LOCOMOTIVE FRAME UNDER STATIC LOADING CONDITIONS	579
ABDULAZIZ YUSUFOV, KHUSAN KOSIMOV, SHOHIJAKHON KUDRATOV	
MATHEMATICAL MODELS IN ENGINEERING	
CHALLENGES TO PROPERLY ACCOUNTING FOR CYCLIC RESPONSE IN TRANSVERSELY ISOTROPIC ELASTIC SOIL IDEALIZATIONS VICTOR N. KALIAKIN, SAID SHAUMAROV, DAULET KHADIM	586
Influence of microvibrations on the quality of remote sensing data Z. Z. Shamsiev, L. F. Sulyukova, R. Z. Shamsiev	596
NUMERICAL SIMULATION OF SURROUNDING ROCK DAMAGE INDUCED BY DIFFERENT EXPLOSIVE CASINGS IN SLOTTED CHARGE BLASTING YANXIN YANG, WANHAO YU, SHALU HUANG, SHANQUAN FAN	604
STRESS-STRAIN STATE OF A WELDED HIGH-STRENGTH STEEL PIPELINE IN THE PRESENCE OF SURFACE DEFECTS ANDRII DZIUBYK, ANDRIY DZHUS, LIUDMYLA DZIUBYK, YAROSLAV KAPUSHCHAK, YURII POROKHOVSKYI, VITALIY KORENDIY	615
	(2)
MODELING AND PREDICTING THE THERMAL STATE OF A TRANSFORMER THROUGH AN ADAPTIVE INTELLIGENT APPROACH MUKHAMMADYUSUF MUKHAMMADJONOV, YUSUPOV DILMUROD, ODILJON KUTBIDINOV, KHAMDAMOV SAIDMURODJON, ANVAR NORBOEV, OTABEK BABAEV, NILUFAR KHALILOVA, ABDURAXIM KHABIBULLAYEV	626
MAGNETIC FIELD INDICATORS OF TRACTION ELECTRIC MACHINES OF ROLLING STOCK IN THE RAILWAY SYSTEM OF UZBEKISTAN SARDOR NURIDDINOV, KHUSNIDDIN YULDOSHOV, SHUHRAT RAYKHONOV, UMID BAYNAZOV, ABDURAKHMON SOTIBOLDIEV, IBROHIM JABBOROV	634
EVOLUTIONARY HYBRID SEARCH FOR OPTIMIZATION IN TRANSPORT LOGISTICS INFORMATION SYSTEMS LARISA SULYUKOVA, ZARRINA AXMEDJANOVA	641

THE TECHNOLOGY OF NON-STOP PASSAGE OF HIGH-SPEED PASSENGER AND FREIGHT TRAINS ON DOUBLE-TRACK SECTIONS AND ITS IMPACT ON OPERATIONAL PERFORMANCE	650
RAMAZON S. BOZOROV, ADYLKHAN T. KIBISHOV	
NUMERICAL SIMULATION OF A GAS-FLOTATION OIL—WATER HYDROCYCLONE SEPARATOR	657
HAONAN CUI, YONGDONG HUANG, ZHAOQI YAO, WEIGUO YAN, XIAOJUN ZHOU	
RESEARCH OF THE STRESS-STRAIN STATE AND DURABILITY OF FREIGHT WAGON TROLLEY SPRINGS BY THE METHOD OF FINITE ELEMENT MODELING IN ANSYS SALOKHIDDIN ABSATTAROV, SALOKHIDDIN YUNUSOV, NODIRJON TURSUNOV	664
Numerical simulation of the spatial distribution of temperature fields in spring elements of freight wagons of railway transport Salokhiddin Absattarov, Nodirjon Tursunov, Bakhteev Erkin, Kholida Khojakhmedova	670
HIGH-SPEED ROLLER/RAIL DYNAMICS AND THERMODYNAMICS CONSIDERING SURFACE ROUGHNESS AND REVOLUTION JIAN XU, ZHEN YANG, XUEFANG CHANG, QIANG LI	676
Numerical modeling of reinforced concrete structures made of lightweight concrete using ANSYS Odiljon Fozilov, Abdurasul Martazaev, Sobirjon Razzakov, Ravshanbek Mavlonov, Bakhtiyor Maksud ugli	683
OPTIMIZATION-BASED METHOD FOR EFFECTIVE ORGANIZATION OF LOCAL WAGON-FLOWS SHERZOD JUMAYEV, SHOKHRUKH KAMALETDINOV, ALEKSANDR SVETASHEV, NARGIZA SVETASHEVA, SUNNAT KOSIMOV	690
STRENGTH ANALYSIS OF THE CENTRAL SUPPORT STRUCTURE OF THE PE2M(U) INDUSTRIAL TRACTION UNIT USING FINITE ELEMENT METHOD SHERZAMIN ABDURASULOV, SAFAROV UTKIR, JULENEV NIKOLAY, OLEG ABLYALIMOV, TAIWEN YOU	697
APPLICATION OF PREDICTIVE MAINTENANCE MODELS FOR AIRCRAFT ENGINE RELIABILITY AND SAFETY ENHANCEMENT: A CASE OF CIVIL AVIATION IN UZBEKISTAN UMAROV FARHOD UMIROVICH	704
DEVELOPMENT OF AN INTEGRATED MODEL FOR POPULATION TRANSPORT SERVICE OPTIMIZATION MARINA KILOCHITSKAYA, ALEXANDER EROFEEV, NODIRJON TURSUNOV	711
INFLUENCE OF OBSTACLE STIFFNESS ON THE IMPACT DYNAMICS OF A PARTIALLY FLUID-FILLED SPHERICAL SHELL ISRAIL KARIMOV, IBRAKHIM MIRZAEV	718
AN OPTIMIZED LAGRANGIAN APPROACH TO REACTIVE POWER COMPENSATION IN NONLINEAR TRACTION POWER-SUPPLY SYSTEMS MIRJALIL YAKUBOV, MIRAZIZ TALIPOV, USMON NURULLAEV	724
EVALUATION OF MEAN STRESS UNDER LOAD CYCLE OF PE2M(U) INDUSTRIAL TRACTION UNIT MOTORIZED DUMPCAR UNDERFRAME USING FINITE ELEMENT METHOD	731
SHERZAMIN ABDURASULOV, NURIDDIN ZAYNIDDINOV, ABDULAZIZ YUSUFOV, SHUKHRAT JAMILOV KHUSAN KOSIMOV TAIWEN YOU	

ENHANCING THE CARRYING CAPACITY OF COMPLEX MOUNTAIN RAILWAY SECTIONS THROUGH THE OPTIMIZATION OF TRAIN MASS STANDARDS UTKIR KHUSENOV, MA'SUD MASHARIPOV, RAMAZON BOZOROV, DAVLATJON UMIRZAKOV	738
NONLINEAR MODELS OF VISCOELASTIC PLATES AND SHELLS RAVSHAN INDIAMINOV, AKRAM NARKULOV, SULTON KHAKBERDIYEV, RUSLAN BUTAYEV, SOBIR KHOLJIGITOV, SHUKHRAT NEMATOV	748
Investigation of transient processes in auxiliary asynchronous electric motors of locomotives using differential equations Obidjon Kasimov, Otabek Ergashev	758
DIGITAL SOLUTIONS FOR THE TRANSITION TO A SUSTAINABLE PUBLIC TRANSPORT SYSTEM IN TASHKENT SHAKHBOZ R. ABDUVAKHITOV	766
KINEMATIC SYNTHESIS OF A CAM-FOLLOWER MECHANISM OF A NOVEL INTERNAL COMBUSTION ENGINE VIKTOR TOKAI, ARTEMII BURKOT, VITALIY KORENDIY, VIACHESLAV PASIKA, ANDRII KYCHMA	772
ASSESSMENT OF THE INFLUENCE OF EXTERNAL DYNAMIC FACTORS ON FORCE LOADING OF ANCHOR BANDAGE OF TRACTION ELECTRIC MOTORS OLEG ABLYALIMOV, NIKOLAY JULENEV, MOHAMAD ZIAD SAGHIR	781
THEORETICAL ASSESSMENT OF THE MECHANICAL PROPERTIES OF FIBER CONCRETE USING THE DISPERSION ANALYSIS METHOD ABDURASUL MARTAZAEV, SOBIRJON RAZZAKOV, RAVSHANBEK MAVLONOV, ODILJON FOZILOV, BAKHTIYOR MAKSUD UGLI	788
MODELING OF THE TRANSPORTATION PROCESS ON THE KOKAND-ANDIJAN SECTION OF THE KOKAND REGIONAL RAILWAY TRACK JUNCTION OF THE UZBEK RAILWAY OLEG ABLYALIMOV, ALTYNBEK LESOV, MOHAMAD ZIAD SAGHIR	795
GRAPHICAL ANALYTICAL MODELING OF THE KINEMATIC SCHEME OF A ROCK-PISTON PUMP	803
BAKHTIYAR ALIMOV, RAKHMAT SINDAROV	
SYSTEM DYNAMICS IN MANUFACTURING SYSTEM MODELING	
DESIGN OF A MULTIFUNCTIONAL UAV BASED ON COMPOSITE MATERIALS: INTEGRATION OF VACUUM INFUSION, CFD ANALYSIS, AND INTELLIGENT ENERGY MANAGEMENT	810
TAKHIROV JONIBEK, KHUSNUTDINOVA KHAMIDA, ABDUJABAROV NURIDDIN INNOVATIVE DESIGN OF A GEAR BELT TRANSMISSION FOR TECHNOLOGICAL	818
MACHINES SHAKHNOZA MAKHMUDOVA, SALOKHIDDIN YUNUSOV, KENJAYEV SIROJIDDIN, TURAKULOV MURAT	010
AN ANALYSIS OF THE ULTRASONIC TECHNOLOGY TO STITCH MATERIALS, AND CONCEPTUALIZATION AND REALIZATION OF A NEW SEWING MACHINE NASIBA PALVANNAZIROVA, PETR BUTOVSKIY, M. M. ALLAMOV, OTABEK XUDOYNAZAROV	825

CONTENTS

DIE CASTING MOLD DESIGN OF CH367B1 ALUMINUM ALLOY THROTTLE VALVE BODY MINGHUI WANG, CHUN CAO, WANYAO CHEN, XIAOXIAO GUO, YING WANG, YINGHAN CAO	832
Influence of angular speed of tedder on kinematic parameters of linter machine drive S. Z. Yunusov, D. A. Kasimova	839
TOWARDS THE EFFICIENCY RESEARCH OF THE WORKING PROCESS OF LOCOMOTIVES DIESEL UNDER OPERATING CONDITIONS OLEG ABLYALIMOV, DOSTONBEK KHAMIDOV	845
ERRATUM: VIBRODIAGNOSTICS AND DYNAMIC OPERATION OF REINFORCED	853

SHORT DESCRIPTION ABOUT THIS CATEGORY

Vibroengineering is an abbreviation of two words: vibration and engineering. Vibration phenomena play an important role in a wide range of mechanical, structural, electromechanical systems. Vibration engineering covers such topics as mechanical vibrations and applications, fault diagnosis based on vibration signal analysis, seismic engineering, acoustics and noise control, energy harvesting and vibration generation.

Every consecutive Volume of Vibroengineering Procedia is dedicated to a separate conference in the series of International Conferences on Vibroengineering.



