



Balkan Tribological
Association



Society of Bulgarian
Tribologists



Technical University
Sofia

The Balkan Tribological Association
The Society of Bulgarian Tribologists
The Technical University of Sofia
The Faculty of Industrial Technology

ORGANIZE

11th International Conference on Tribology

BALKANTRIB'24

PROGRAM

26-28 September 2024, Technical University - Sofia, Bulgaria

ПРОГРАМА PROGRAM

**11th International Conference on Tribology
*BALKANTRIB'24***

26-28 September 2024

**Technical University of Sofia,
Bulgaria**

Contacts:

Tribology Center, Technical University - Sofia 1756

E-mail: kandevam@gmail.com & emiass@abv.bg

Prof. Dr. Mara Kandeva, Assoc. Prof. Dr. Emilia Assenova

BALKANTRIB'24

SPONSORED BY



Balkan Tribological Association



Society of Bulgarian Tribologists



Technical University of Sofia



Faculty of Industrial Technology at
TU



TTZH
Tribologie & Hochtechnologie
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IMFT
Institute of Metalcasting and Foundry
Technologies Jsc

11th International Conference on Tribology – BALKANTRIB '24

The Conference will be held in Sofia, Bulgaria, at the Technical University of Sofia, from 26 to 28 September 2024. The BALKANTRIB'24 conference is supported by the Balkan Tribological Association, the Society of Bulgarian Tribologists, the Technical University – Sofia, and the Faculty of Industrial Technologies at TU-Sofia. The BALKANTRIB Conference is organized every three years since 1993. In 1993 in Sofia, Bulgaria, the Society of Bulgarian Tribologists with President Prof. Nyagol Manolov, organized and established the First Balkan Conference on Tribology under the name BALKANTRIB'93, and a Balkan Tribological Association (BTA) with member-countries Bulgaria, Greece, Macedonia, Romania, Turkey and Yugoslavia. Ten previous conferences BALKANTRIB were held: in Bulgaria (1993 and 2008), Greece (1996 and 2011), Romania (1999 and 2014), Turkey (2002 and 2017) and Serbia (2005 and 2021). Now, for the third time, the BALKANTRIB conference will be hosted by Bulgaria. The 30th anniversary of the Balkan Tribological Association and the 50th anniversary of the Bulgarian Tribology will be celebrated during BALKANTRIB '24.

Venue:



Balkantrib'24 conference will be hosted at the Technical University of Sofia, **Block 8, Prof. Tsvetan Lazarov Hall** at National Center for Mechatronics and Clean Technologies, [Google Maps link](#)
Address of the University campus:
8, Kliment Ohridski Blvd, Sofia, Darvenitza,
Bulgaria

TOPICS:

Fundamentals of Friction and Wear
Nano- and Microtribology
Tribology in Manufacturing Processes
Tribology in Machine Elements
Tribology in Transportation Engineering
Lubrication, Lubricants, and Bearings
Lubricant Rheology and Chemistry
Green Tribology
Tribology in 3D Technologies
Tribological Properties of Solid Materials
Coating Tribology
Tribotesting and Tribosystem Monitoring
Surface Engineering
Biotribology
Geotribology
Design and Calculation of Tribosystems
Tribochemistry and Mechanochemistry
Interdisciplinary Aspects of Tribology

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Program BALKANTRIB'24

Wednesday, 25 September, 2024
16:00÷18:00 – Registration: in front of Tsvetan Lazarov Hall
Thursday, 26 September, 2024
8:00÷10:00 – Registration: in front of Tsvetan Lazarov Hall
<ul style="list-style-type: none">• 10:00÷10:45 – Opening Ceremony – Welcome Speeches:<ul style="list-style-type: none">▪ Prof. DSc Ivan Kralov – Rector of the Technical University Sofia▪ Prof. DSc Georgi Todorov – Dean of the Faculty of Industrial Technology▪ Prof. Dr. Aleksandar Vencl, President of the Balkan Tribological Association▪ Prof. Dr. Mara Kandeva, President of the Society of Bulgarian Tribologists & Chairman of the Conference BALKANTRIB'24

SESSION PRESENTATIONS

Thursday, 26 September, 2024, Tsvetan Lazarov Hall	
Plenary session 10:45÷12:15	Plenary session <i>Chair: Mara Kandeva, Emilia Assenova</i>
10:45÷11:15	Chronicle: 30 years of the Balkan Tribological Association and 50 years of Bulgarian Tribology, Emilia Assenova, Bulgaria
11:15÷11:45	Macro-, micro- and nanoscale characterisation of nanocomposites reinforced with AL2O3 nanoparticles and CNTS Aleksandar Vencl, Serbia
11:45÷12:15	Contact behavior and properties influencing formation of the real contact area Mitjan Kalin, Slovenia
12:15÷13:15	Coffee break and Lunch break
Thursday, 26 September, 2024, Afternoon, Tsvetan Lazarov Hall	
Session 1	<i>Chair: Aleksandar Vencl, Razvan Ripeanu</i>
13:15÷13:30	Surface engineering of a thin walled coil of the steel boiler: surface strain and stress under internal pressure, Kemal Yildizli, Fatih Aslan, Mehmet Baki Karamış, Turkey

13:30÷14:00 Plenary Paper	Tribological performance of graphene oxide (go) coating on diesel engine cylinder liner by successive ionic layer adsorption and reaction (SILAR) method E. Hakan KALELİ, Halit ÇAVUŞOĞLU , Veli UYSAL, Turkey
14:00÷14:15	Energy relation between seismic and petrologo-mineralogical processes at friction in the earth's crust Emilia Assenova, Evgenia Kozhoukharova, Bulgaria
14:15÷14:30	Friction induced seismic waves in geotribological systems of the earth's crust Evgenia Kozhoukharova, Bulgaria
14:30÷14:45	Investigation of the lubricating conditions in the sliding friction pair with applied electric voltage Raimondas Kreivaitis, Albinas Andriušis, Audrius Žunda, Lithuania
14:45÷15:00	Application of tribological design on the example of concrete steel moulds Gordana Globočki-Lakić, Branislav Sredanović, Dražen Dragić, Aleksandar Vencl, BIH (Republika Srpska), Serbia
15:00÷15:15	The tribological and rheological properties of vegetable lubricating grease modified with graphene oxide Rafal Kozdrach, Poland
15:15÷15:30	Research on factors which affect corrosion wear of mixing crude oil pipes Razvan George Ripeanu, Romania
15:30÷15:45	Modelling the erosion wear of materials specific to progressive cavity pumps and piston pumps used in petroleum industry Aristia-Ioana Popovici, Mohamed Iyad Al Naboulsi, Ammar Mulla, Niculae Napoleon Antonescu, Romania
15:45÷16:00 Coffee break	
Session 2	Chair: Razvan Ripeanu, Aleksandar Vencl
16:00÷16:15	Tribological and structural behaviour of a tilting pad bearing with a textured and non-textured surface, Bendaoud Nadia, Mehala Kadda, Bendaoud Mohamed Habib, Algeria
16:15÷16:30	Delamination of photovoltaic panels by high-frequency dielectric heating using intermolecular friction, V. Kamburov, D. Arnaudov, A. Nikolov, R. Dimitrova, M. Zagorski, K. Dimitrov, Bulgaria
16:30÷16:45	Antifrictional effect of laser surface texturing on titanium alloy in the biological environment Tadas Matijošius, Aušra Selskienė, Pavels Onufrijevs, Juozas Padgurskas, Lithuania, Latvia
16:45÷17:00	A comparative study on the tribological properties and wear behavior of fused filament fabricated PLA and PLA-CF Emmanouil L. Papazoglou, Panagiotis Karmiris-Obratanski, Nikolaos A. Fountas, Angelos P. Markopoulos, Nikolaos M. Vaxevanidis, Greece, Poland
17:00÷17:15	An updated bibliometric analysis of the scientific literature on thermal spray coatings from Southeastern Europe Emmanouil L. Papazoglou, Nikolaos M. Vaxevanidis et al, Greece

	17:15÷17:30 Coffee break
17:30÷18:45 Tsvetan Lazarov Hall	Balkan Tribological Association Board Meeting
19:30÷22:30	CONFERENCE DINNER – Restaurant Magiko <u>https://g.co/kgs/Ui8N84D</u>

13:45÷17:00
Poster Session

THURSDAY, 26 SEPTEMBER, 2024, AFTERNOON,
POSTER SESSION, LABORATORY COMPLEX AT NATIONAL CENTER FOR
MECHATRONICS AND CLEAN TECHNOLOGIES

Balkantrib'24: List of Posters

- P1 Structure and mechanical properties of protective titanium-based coatings,**
Petya Tabakova, Anna Petrova, Korneli Grigorov, Lilyana Kolaklieva, Tetiana Cholakova, Stefan Kolchev, Christo Bahchedjiev, Ekaterina Zlatareva, Roumen Kakanakova, Bulgaria.....
- P2 Anomalous diffusion phenomenon in surface layers of metals under the complex effect of electric discharges and accelerated chemical-thermal heating in electrolyte**
V. Mihailov, S. Iwashcu, A. Ianachevici, D. Croitoru, E. Ovchinnikov, J. Padgurskas, Moldova, Belarus, Lithuania
- P3 Geometrical and physico-mechanical parameters of refractory graphite coatings, used in foundry sand mould and cores**
Gergana Buchkova, Krum Petrov, Michail Zagroski, Anton Mihailov, Rangel Rangelov, Mara Kandeva, Bulgaria.....
- P4 Erosion resistance of refractory coatings for foundry sand moulds**
Gergana Buchkova, Michail Zagroski, Mara Kandeva, Rangel Rangelov, Anton Mihailov, Krum Petrov, Bulgaria.....
- P5 Influence of geometrical and mechanical properties of refractory coatings to the quality of cast iron castings**
Gergana Buchkova, Rangel Rangelov, Mara Kandeva, Krum Petrov, Anton Mihailov, Bulgaria...
- P6 Static friction in tribosystems composed of aluminium-silicon alloys**
M. Kandeva, B. Dochev, M. Zagorski, D. Dimova, P. Kasabov, V. Tsonev, Bulgaria...
- P7 Investigation of the influence of the structure on the roughness class, microhardness, macrohardness and wear resistance of aluminium-silicon alloys**
M. Kandeva, B. Dochev, M. Zagorski, D. Dimova, P. Kasabov, V. Tsonev, Bulgaria...
- P8 Effect of aging on the mechanical properties of polymer test specimens**
K. Nikolov, V. Tsonev, Y. Marcheva, Bulgaria.....
- P9 Machine for accelerated aging using UV radiation and periodic immersion in water**
K. Nikolov, N. Kuzmanov, V. Tsonev, K. Penkov, Bulgaria.....
- P10 Wear of tribosystems with lubricant containing nanodiamonds additives**
Mara Kandeva, Georgi Todorov, Mihail Zagorski, Yavor Sofronov, Konstantin Kamberov, Anna Dimitrova, Bulgaria
- P11 Friction in rolling bearings with lubricants containing nanodiamond additives**
Mara Kandeva, Georgi Todorov, Yavor Sofronov, Konstantin Kamberov, Mihail Zagorski
- P12 Determination of grinding parameters by DEM simulation for different ball mill equipment**
Miglena Paneva, Nikolai Stoimenov, Peter Panev, Aleksandar Vukov, Bulgaria
- P13 Surface characteristics and properties of titanium alloys electrospark modified with TiCN-based composite electrodes**
Todor Penyashki, Georgi Kostadinov, Zhecho Kalitchin, Mara Kandeva, Bulgaria
- P14 The effect of texturing of Mo coatings on the tribological properties of lubricated friction pairs**
Juozas Padgurskas, Mindaugas Rukanskis, Raimundas Rukuiža, Valentin Mihailov, Todor Penyashki, Lithuania, Moldova, Bulgaria

Friday, 27 September, 2024, Morning, Tsvetan Lazarov Hall	
Session 3	Chair: Alexandru Radulescu, Blaža Stojanović
09:00÷09:15	Erosion by cavitation and hard alumina particles on AISI 304 stainless steel with SiC coating, Manuel Vite-Torres, Mayra S. Tovar-Oliva, Arturo Villanueva- Zavala, Ezequiel A. Gallardo- Hernández, José F. Márquez- Santiago, Pedro Sanchez-Tizapantli, Carlos A. Lasorsa, México
09:15÷9:30	Effect of sliding speed and normal load on the coefficient of friction of aluminum hybrid composites Blaža Stojanović, Slavica Miladinović, Ivan Miletić, Lozica Ivanović, Sandra Gajević, Serbia
9:30÷10:00	Company Presentation Tribology Company UTS Scientific Instruments in Trabzon, Gencaga Purcek, Turkey
10:00÷10:15	Phonon origin of energy dissipation in velocity-dependent atomic friction Chengdong Sun ,Yan Zhang, Yunfei Chen, China
10:15÷10:30	Antifrictional effect of laser surface texturing on titanium alloy in the biological environment Tadas Matijošius, Aušra Selskienė, Pavels Onufrijevs, Juozas Padgurskas, Lithuania, Latvia
10:30÷10:45	Nanomodification of PVD and IBAD coatings by ion implantation B. Skoric, P. Terek, L. Kovacevic1, V. Terek, Z. Bobic, Serbia
10:45÷11:00	Coffee break
Session 4	Chair: Valentin Kamburov, Mara Kandeva
11:00÷11:15	Importance of electrical lubricant properties for electromobility and for modern drivetrains Dani Bechev, Valeriya Mikhaylova, Bulgaria,
11:15÷11:30	Thrust bearings test rig new material heteropolymers (htp) tribo-parameters EV project Paul Olaru, Romania
11:30÷11:45	SPECIFIC FEATURES OF AN UPDATED METHODOLOGY FOR STUDYING THE PROCESSES OF FRICTION AND WEAR IN AGRICULTURAL MACHINERY PARTS OPERATING IN AN OIL ENVIRONMENT WITH ADDITIVES IN RECIPROCATING MOTION, Evgeni Kehayov, Karlis Pigoznis, Georgi Komitov, Bulgaria, Latvia.
11:45÷12:00	SPECIFIC FEATURES OF AN UPDATED METHODOLOGY FOR STUDYING THE PROCESSES OF FRICTION AND WEAR OF REINFORCED PARTS OF AGRICULTURAL MACHINERY OPERATING IN AN ABRASIVE ENVIRONMENT Karlis Pigoznis, Evgeni Kehayov, Georgi Komitov, Latvia, Bulgaria
12:00÷13:30 Lunch break	

Friday, 27 September, 2024, Afternoon, Tsvetan Lazarov Hall	
Session 5	Chair: <i>Nikolaos M. Vaxevanidis, Alexandru Radulescu</i>
13:30÷13:45	Experimental researches on rheological properties of biogreases, Irina Radulescu, Alexandru Valentin Radulescu, Romania
13:45÷14:00	Comparative analysis of properties of laser welded steel layers on substrate - stavax esr steel, Miroslav Simov, Velko Rupetsov, Gabriela -Eugenia Iacobescu, Bulgaria, Romania
14:00÷14:15	Warpage compensation in plastic parts by pre-adjusting the shapes, using moldex 3D simulation software, Miroslav Simov, Bulgaria
14:15÷14:30	Investigation of tribological properties of age-hardened Cu-Co-Be alloy under electrical current carrying conditions Harun Yanar, Turkey
14:30÷14:45 Coffee break	
Session 6	Chair: <i>E. Hakan Kaleli, Emilia Assenova</i>
14:45÷15:00	Experimental investigation to estimate static characteristics and relative surface displacement in 88% tin coated bearing Mehala Kadda, Bendaoud Nadia, Boukhatmi Hadi, Bendaoud Mohamed Habib, Algeria, France
15:00÷15:15	Design and construction of test benches for gas-diesel cycle engines Atanasi Tashev, Bulgaria
15:15÷15:30	Ohmic and iron losses vs mechanical load capacity of an active magnetic bearing considering the effects of length, air gap and bias current Vasileios-Menelaos Koufopanos, Andreas Andrikopoulos, Pantelis G. Nikolakopoulos , Greece
15:30÷15:45	Design and construction of a test stand for experimental research of the hydro-abrasive wear of surface welded dredger ship's cutter tools in underwater operation) Kalin Georgiev Lyutskanov, Bulgaria
13:30÷17:30 Friday, 27 September, 2024, Afternoon	
Online Session <i>10 min each paper</i> Chair: <i>Mihail Zagorski</i> <i>Platform: Teams (authors that are presenting online will receive an invitation link)</i>	

Online Session Papers

Balkantrib 2024

- 1. Development of FDM additive production technique for metal production and investigation of mechanical properties**
Mohamad Saber Hereh, Cem Sinanoğlu, Turkey
- 2. Tribology and informatics**
Lachezar Grigorov, Bulgaria
- 3. Taber Rotary Abrasion Properties of Mg Matrix SiC, B4C Reinforced Composites Prepared by Ball Milling**
Esen DAĞAŞAN BULUCU, Serdar AKAY, Turkey.....
- 4. Prediction of instantaneous friction along the tooth of a gear in mixed lubrication**
A. Bouzana, F. Belarifi, T.DA Silva Botelho, Algeria.....
- 5. Considerations on the use of din 2696/1996 compared to other rules on metal gaskets**
M. M. Istrate, N. Popa, V.D. Popescu, M.T. Popescu, Romania.....
- 6. Considerations concerning the calculation of sealing forces in a lenticular gasket joint**
Maria Mihaela Istrate, Nicolae Popa, Valentin Dumitru Popescu, Marian-Teodor Popescu, Romania.....
- 7. Considerations concerning the calculation of sealing forces in a biconical gasket joint**
Maria Mihaela Istrate, Nicolae Popa, Marian-Teodor Popescu, Valentin Dumitru Popescu, Romania.....
- 8. Tribology & sustainability: A case study**
Pankaj Tomar, India.....
- 9. A data-driven approach in estimating the comprehensive contact analysis for ball-socket hip implants**
K.Nitish Prasad, P.Ramkumar, India.....
- 10. Surface roughness of ultrafine-grained Ti-13Nb-13Zr alloy induced using anodic oxidation**
Dragana Mihajlović, Sanja Stevanović, Veljko Đokić, Serbia.....
- 11. Effect of graphite powder and oil impregnation on alumina layer wear**
A. Adjeloua, ELHADI Zoubai, N. Boualem, A. Raid, Algeria.....
- 12. Impact of regular relief patterns on the tribological properties of shaft surfaces**
Oleksandr Valentinovich Markov, Bulgaria.....
- 13. A model for studying the viscosity of Newtonian fluids**
Georgi Dobrev, Bulgaria.....
- 14. Mathematical modelling of corrosion behaviour of aluminium alloys EN AW-2011 and EN AW-2024 under different environmental parameters**
Iva Naydenova, Kalina Kamarska, Radoslava Terzieva, Bulgaria.....
- 15. Microstructure, hardness and wear behavior of plasma nitrided R260 grade rail steels under different N₂+H₂ gas mixtures**
Ahmet Deveci, Harun Mindivan, Turkey.....
- 16. Improving impact sliding wear resistance of R260 grade rail steel subjected to plasma nitriding process**
Ahmet Deveci, Harun Mindivan, Turkey.....
- 17. Effect of plasma nitriding process on dry sliding wear behaviour of HVOF-sprayed AISI 316L and AISI 420 stainless steel coatings using preliminary statistical analysis**

- Züleyha Taskan, Elif Ozturk , Selman Tezcan, Harun Mindivan, Turkey.....
- 18. Effect of low temperature pack aluminizing process on wear behaviour of Ti6Al4V alloy using Taguchi method**
Aysenur Egercioglu Yazici, Selman Tezcan, Harun Mindivan, Turkey.....
- 19. Enhancing tribological properties of transmission fluids with SIO2 nanoparticles**
María J.G. Guimarey, Francisco Gallástegui, Óscar Giner-Rajala, Alejandro Varela, Alfredo Amigo, Spain.....
- 20. Mechanical properties of titanium oxide thin films deposited by magnetic field sputtering at different parameters**
Sengul Danisman, Emin Ersoy, Ayşenur Atlı, Ahmed Cagri Sayin, Cagatay Yilmaz , Sinan Kesriklioglu, Turkey.....
- 21. Effect of TiN coated and uncoated carbide end mills on the machining of ST52 steel**
Sengul Danisman, Emin Ersoy, Ahmet Öngen, Mehmet Şahin, Ahmed Cagri Sayin, Cagatay Yilmaz, Sinan Kesriklioglu, Turkey.....
- 22. Investigation of the tribological characteristics of surface-welded aluminium-bronze layers after dry, semi-dry and liquid friction**
Nikolay Valchev, Tatyana Mechkarova , Apostol Ucherdzhiev , Yaroslav Argirov, Bulgaria.....
- 23. Effect of post-processes on tribological behavior of additively manufactured PA12 parts**
Binnur Sagbas, Beyza Gavcar, Turkey.....
- 24. Tribological analysis of engine oils of different viscosity**
Dragan Dzunic, Zivana Jovanovic Pesic, Vladimir Kocovic, Slobodan Mitrovic, Serbia.....

Saturday, 28 September 2024, 10:00-14:00: Cultural Program