



Joint
European Conference on Tribology
and
Final Conference of COST 532 action: Triboscience and Tribotechnology

ECOTRIB 2007

12.-15. June 2007
Grand Hotel Union
Ljubljana, Slovenia

Final Program

11.6. Monday

14:00 – 18:00 IEA IA-AMT Executive Committee Meeting (Chairman: S. Hsu)
(Red Saloon)

12.6. Tuesday

9:00 – 16:00 International Energy Agency (IEA) Technical Symposium: Implementing Agreement on Advanced Materials (Chairman: S. Hsu)
(Silver Saloon I)

Session I: Surface texturing and Ecomaterials

Welcoming remarks by Stephen Hsu & Kenneth Holmberg

“Advanced elastohydrodynamic lubrication modeling of engineered surfaces”
Prof. Jane Wang, Northwestern University, Evanston, IL, USA

“Challenges in 3-D Characterization of Textured Surfaces”
Prof. Gwidon Stachowiak, University of Western Australia, Australia.

“Trends in Ecomaterials development,”
Prof. Soo Wahn Lee, Sun Moon University, Korea

“Ecomaterials: corrosion prevention of magnesium alloys,”
Dr. Wenyue Zheng, National Research Council of Canada

Lunch

Session II. Nanomaterials characterization and testing

“Carbon composite materials for light-weighting,”
Prof. Alan Wheatley, University of Sunderland, UK

“Measurement issues in nanomaterials,”
Prof. Stephen Hsu, George Washington University, USA

“Comprehensive Nano-Mechanical Characterization of Nano-Films”,
Dr. Norm Gitis and Jun Xiao, Center for Tribology, Inc., Campbell, CA, USA

“Nanomechanical property measurement using nanoindenter”
Hysitron, USA (to be confirmed)

“Nanomechanical property measurement using AFM”
Veeco Instruments, USA (to be confirmed)

Nanomaterials measurement international round robin meeting

12.6. Tuesday

- 9:00 – 16:00 WEMESURF Research Training Network meeting** (Chairman: B. Podgornik)
(*Red Saloon*)
Program to be announced
- 13:30 – 16:00 EUREKA: ENIWEP Umbrella Steering Group Meeting** (Chairman: J. Vižintin)
(*Silver Saloon II*)
- 16:00 – 20:00 COST 532 Management Committee Meeting** (Chairman: K. Holmberg)
(*Red Saloon*)
- 18:00 – 20:00 Conference Registration & cocktail**
(*Garden Hall*)

13.6. Wednesday

- 8:00 Registration**
- 9:00 – 10:25 ECOTRIB 2007/COST 532 Conference Opening**
(*White Hall*)
Jože Vižintin, Chairman of the Conference »**Welcome address**«
Kenneth Holmberg, COST 532 Manager: »**European Tribology Joint Research in the COST Programme**«
Marija Kosec, Slovenian Academy of Engineering Science
- 9:30 – 9:45 **Friedrich Franek**, Austrian Tribology Society
- 9:45 – 10:00 **Roberto Bassani**, Italian Tribology Association – Tribology group of AIMETA
- 10:00 – 10:15 **Mitjan Kalin**, Slovenian Society for Tribology
- 10:15 – 10:25 **Jan Meneve**, EUREKA: ENIWEP Umbrella
- 10:25 – 10:50 Coffee Break
- 10:50 – 12:30 Plenary Session** (Chairmen: J. Vižintin, R. Bassani, F. Franek)
(*White Hall*)
- 10:50 – 11:35 **K. Kato (Tohoku University, Japan)** »*Tribological Properties and Mechanisms of Ceramics and Hard Coatings*«
- 11:35 – 12:20 **S. Hsu (George Washington University, USA)** »*The role of surface textures on adhesion and friction from mm scale to nanoscale*«
- 12:20 – 12:30 Open Discussion
- 12:30 – 14:00 Lunch
- 14:00 – 17:30 Afternoon Parallel Sessions**
- Tribology in Metalworking** (Chairman: S. Hogmark)
(*White Hall*)
- NanoTechnologies & NanoTribology** (Chairman: S. Hsu)
(*Silver Saloon*)
- Modeling in Tribology I** (Chairmen: E. Ciulli / R. Bassani)
(*Red Saloon*)
- 17:30 – 19:00 Poster session** (Posters on display till 15.6. afternoon)
(*Garden Hall*)
- 20:00 Reception at the University of Ljubljana** (gathering at 19:45 in Hotel lobby)

14.6. Thursday

9:00 – 12:30 Morning Parallel Sessions

Surface Engineering I (Chairman: K. Holmberg)
(*White Hall*)

Lubricants & Lubrication I (Chairmen: B. Kus / B. Hrobat)
(*Silver Saloon*)

Modeling in Tribology II (Chairman: F. Franek)
(*Red Saloon*)

12:30 – 14:00 Lunch

14:00 – 17:10 Afternoon Parallel Sessions

Surface Engineering II (Chairman: A. Erdemir)
(*White Hall*)

Applications I (Chairman: B.R. Höhn)
(*Silver Saloon*)

Lubricants & Lubrication II (Chairmen: A. Arnšek / M. Svoljšak)
(*Red Saloon*)

17:10 – 18:00 ENIWEP Workshop: Surface Texturing for Tribological Applications

Chairman: J. Meneve
(*Silver Saloon*)

19:00 Conference Dinner
(*Union Hall*)

15.6. Friday

9:00 – 12:30 Morning Parallel Sessions

Functional & Bio Materials I (Chairmen: M. Kalin / V. Leskovšek)
(*White Hall*)

Application II (Chairman: A. Pauschitz)
(*Silver Saloon I*)

Condition Monitoring & Diagnostics I (Chairman: J. Vižintin)
(*Red Saloon*)

12:30 – 14:00 Lunch

14:00 – 17:00 Afternoon Parallel Sessions

Functional & Bio Materials II (Chairman: L. Blunt)
(*White Hall*)

Surface Engineering & Applications III (Chairperson: A. Igartua)
(*Silver Saloon I*)

Condition Monitoring & Diagnostics II (Chairman: L. Gelman)
(*Red Saloon*)

17:10 Closure of the Conference – J. Vižintin, E. Ciulli
(*White Hall*)

13.6. Wednesday 14:00 – 17:30

White Hall: Tribology in metalworking (Chairman: S. Hogmark)

- 14:00-14:30 Invited: N. Bay (Technical University of Denmark, Denmark)**
»Performance of environmentally friendly lubricants for sheet metal forming«
- 14:30-14:50 **Oils for Internal Thread Molding - Description of a Test-Methodology**
C. Monetti (AC²T Research, Austria)
- 14:50-15:10 **Comparison of two test methods for evaluation of forming tool materials**
M. Hanson (Uppsala University, Sweden), A. Gård, S. Hogmark, J. Bergström
- 15:10-15:30 **Finite Element Modeling of Wear in Deep Drawing Process Considering Anisotropy**
A.R. Shahani, I. Salehinia (K.N.T. University of Technology, Iran)
- 15:30-15:50 Break
- 15:50-16:10 **PACVD duplex coating for wear protection of drop forging dies**
V. Leskovšek (Institute for Metals and Technology, Slovenia), M. Jenko, B. Podgornik, J. Vižintin
- 16:10-16:30 **Wear propagation of PVD AlCrN coated HSS hob**
J. Gerth (Uppsala University, Sweden), U. Wiklund, M. Larsson
- 16:30-16:50 **Stamping with coated tools**
B. Zajec (Hidria Rotomatika, Slovenia), B. Podgornik, J. Vižintin
- 16:50-17:10 **Conceptual tribo-energetic analysis of cutting tool protective coating delamination in dry cutting of hard-to-cut aero engine alloys**
H.A. Abdel-Aal (University of Wisconsin-Platteville, USA), M. Nouari, M. El Mansori
- 17:10-17:30 **Tribocorrosion effects in CMP of tungsten**
J. Stojadinović (Ecole Polytechnique Fédérale de Lausanne, Switzerland), S. Mischler, D. Bouvet, M. Declercq

Silver Saloon: Nanotechnologies & NanoTribology (Chairman: S. Hsu)

- 14:00-14:30 Invited: P. Kappsa (Ecole Central de Lyon, France)**
»Nanotribology : current research in LTDS«
- 14:30-14:50 **Tribology of nano composite materials in electrical contacts**
B. Andre (Uppsala University, Sweden), E. Lewin, Å. Kassman-Rudolphi, U. Jansson
- 14:50-15:10 **Self-lubricating nanocomposite tribological coatings of MoS₂ doped multilayered TiAlCrN films with composition-modulated interfaces (COST-CH13)**
D. Biro (University Petru Maior, Romania), P.B. Barna, J. Meneve, L. Szekely, A. Devenyi
- 15:10-15:30 **Tribofilm formation and tribological properties of nanocomposite TiC and TiAlC coatings**
M. Lindquist (Uppsala University, Sweden), O. Wilhelmsson, U. Jansson, U. Wiklund
- 15:30-15:50 Break
- 15:50-16:10 **Differences in contact surface- and test-temperatures and their effects on reactions between a-C:H coatings and oil additives**
M. Kalin (University of Ljubljana, Slovenia), J. Vižintin, E. Roman
- 16:10-16:30 **Tribocorrosion behaviour of Ni-SiC nanostructured composite coatings obtained by electrodeposition (COST-CH10)**
L. Benea (Dunarea de Jos University, Romania), F. Wenger, P. Ponthiaux, J.P. Celis
- 16:30-16:50 **Tribological and tribocorrosive properties of the electroplated nanocomposite coatings**
B. Szeptycka, J. Senatorski (Institute of Precision Mechanics, Poland)
- 16:50-17:10 **Tribological properties of solid lubricant coatings on base of tungsten disulphide nanoparticles**
E. Ilie (Polytechnic University of Bucharest, Romania), C. Tita

13.6. Wednesday 14:00 – 17:30

Red Saloon: Modeling in tribology I (Chairmen: E. Ciulli / R. Bassani)

14:00-14:30 Invited: R. Larsson (Luleå Technical University, Sweden)

»Modelling the effect of surface roughness on lubrication in all regimes«

14:30-14:50 A Theoretical Study of Junction Growth

V. Brizmer (Technion, Israel), Y. Kligerman, I. Etsion

14:50-15:10 Three dimensional stress analysis of TiN, DLC, and MoS₂ coated contacts by FEM modelling (COST-TS3)

H. Ronkainen (VTT, Finland), K. Holmberg, A. Laukkanen, S. Varjus, K. Wallin, J. Koskinen

15:10-15:30 Elasticity Terminus of Spherical Micro-Contacts under Adhesive Traction

Y. Kadin (Technion, Israel), Y. Kligerman, I. Etsion

15:30-15:50 Break

15:50-16:10 Experimental investigation of contact area during unloading of elastic-plastic loaded spherical contact

A. Ovcharenko (Technion, Israel), G. Halperin, I. Etsion

16:10-16:30 Adhesive wear model for a spherical contact

J. Salib, Y. Kligerman (Technion, Israel), I. Etsion

16:30-16:50 Quantitative characterization of tribodesorption of gases

R.A. Nevshupa (ICMM-CSIC, Spain), E. Roman, J.L. de Segovia

16:50-17:10 Analytical approach for wear prediction of metallic and ceramic materials in tribological applications

H. Kloss (BAM, Germany), R. Waesche

17:10-17:30 Experimental extrapolation model for friction and wear of polymers on different testing scales

P. Samyn (Ghent University, Belgium), J. Quintelier

14.6. Thursday 9:00 – 12:30

White Hall: Surface Engineering I (Chairman: K. Holmberg)

- 9:00-9:30 Invited 1: A.Erdemir (ARGONE Lab., USA)**
»Design of Novel Nanocomposite Coatings for Extreme Tribological Appl.«
- 9:30-9:50 **Mechanical and tribological properties of sputtered Mo-Se-C coatings (COST-CH1)**
T. Polcar (ICEMS, Portugal), M. Evaristo, M. Stueber, A. Cavaleiro
- 9:50-10:10 **Characterisation of ZrO₂ layers deposited on Al₂O₃ coating (COST-TS10)**
S. Jakovljević (Faculty of Mechanical Engineering and Naval Architecture, Croatia), J. Meneve, L. Pedisić
- 10:10-10:30 **Temperature driven lubricant migration on tribological surfaces**
S. Klien (V-Research, Austria), C.H. Surberg, W. Stehr
- 10:30-10:50 Break
- 10:50-11:10 **Surface treatment of elastomers to improve the tribological properties against metal counterbodies**
B. Verheyde, A. Vanhulse, M. Rombouts, J. Meneve (VITO, Belgium), E. Roman, L. Martinez, Y. Huttel, M. Wangenheim
- 11:10-11:30 **Tribological performance of duplex coating with ion implantation after-treatment (COST-TS15)**
B. Škorić (University Novi Sad, Serbia), D. Kakaš, A. Miletić, G. Favaro
- 11:30-11:50 **Contact fatigue of duplex treated low alloyed steels (COST-TS8)**
J. Suchanek (Czech Technical University, Czech Rep), P. Jurei, R. Michalczewski, E. Zdravecka
- 11:50-12:10 **Complex wear measurement on thin coatings by the cratering method**
E. Bemporad, E. Comis, M. Sebastiani (University of Rome, Italy), F. Carassiti, B. Palumbo
- 12:10-12:30 **Corrosion and wear behaviour of multilayer Cr/CrN PVD coatings (COST-CH6)**
A. Igartua (Tekniker, Spain), R.Bayón, X. Fernández, I. Ciarsolo

Silver Saloon: Lubricants & Lubrication I (Chairmen: B. Kus / B. Hrobat)

- 9:00-9:30 Invited 1: M. Jech (AC²T Research, Austria)**
»Lubricant performance characterisation using nanoscale wear volume analysis by coherence technology«
- 9:30-9:50 **Isomer specific tribological behaviour of hydroxyquinolines**
R. Kolm, C.A. Pieczetowski, I.C. Gebeshuber (Vienna University of Technology, Austria)
- 9:50-10:10 **Review on tribological behaviour of DLC coatings in presence of oils under boundary lubrication conditions**
I. Velkavrh (University of Ljubljana, Slovenia), M. Kalin, J. Vižintin
- 10:10-11:30 **Layered nanostructures of transition metal dichalcogenides and their intercalation nanosystems as new lubricant additives: concept and high-tech design (COST-TS5)**
K.E. Grinkevych (Frantsevich Institute for Problems of Materials Science, Ukraine), L.M. Kulikov, I.A. Lyubinin, L.G. Akselrud
- 10:30-10:50 Break
- 10:50-11:10 **Tribological behavior of tungsten doped DLC coating under oil lubrication**
B. Kržan (University of Ljubljana, Slovenia), F. Novotny-Farkas, J. Vižintin
- 11:10-11:30 **The investigation of PVD/CVD coatings and environmentally friendly lubricants in heavy-loaded rolling and sliding contacts (COST-TS2)**
R. Michalczewski (Institute for Sustainable Technologies, Poland), W. Piekoszewski, M. Szczerek, W. Tuszynski
- 11:30-11:50 **The Development and Use of Less Hazardous and More Environmentally Friendly HFA fluids - and their practical application in Slovenian Coal Mining**
N. Broekhof (Quaker Chemical Corporation, UK), B. Kus
- 11:50-12:10 **Argument for using vegetable oils in lubricant mixtures**
L. Pop (West University of Timisoara, Romania), C. Puscas, R. Nutiu
- 12:10-12:30 **A new generation of Lubricant based on ionic liquid**
A. Schneider (AC²T Research, Austria), N. Doerr, A. Pauschitz

14.6. Thursday 9:00 – 12:30

Red Saloon: Modeling in Tribology II (Chairman: F. Franek)

- 9:10-9:30 **Modeling of Shear Thinnig Effects in EHD Lubrication of Combustion Engine Journal Bearings**
V. Caika (AC²T, Austria), G. Offner, S. Bukovnik, W.J. Bartz
- 9:30-9:50 **Oil Flow and Thermal Numerical Simulation in leading edge groove thrust bearing**
N.P. Belfiore (University of Rome, Italy), F. Di Domenico, M. Massone
- 9:50-10:10 **Numerical and Experimental Investigation of ThermoElastoHydroDynamic point contacts**
M. Carli (University of Pisa, Italy), K.J. Sharif, E. Ciulli, H.P. Evans, R.W. Snidle
- 10:10-10:30 **The Effects of Material Inclusions on EHL**
T.V. Slack (Purdue University, USA), N. Raje, F. Sadeghi
- 10:30-10:50 Break
- 10:50-11:10 **Soft Elasto Hydrodynamic Lubrication with Laser Surface Texturing**
A. Shinkarenko (Technion, Israel), Y. Kligerman, I. Etsion
- 11:10-11:30 **Statistical analysis of wear data of 1060 steel**
A. Akbar, F. Shuaeib, A. Younis (University of Garyounis, Libya)
- 11:30-11:50 **Radiation of Body Waves Induced by the Sliding of an Elastic Half-Space Against a Rigid Surface**
A.B. Majekodunmi (The Polytechnic Ibadan, Nigeria)

14.6. Thursday 14:00 – 17:10

White Hall: Surface Engineering II (Chairman: A. Erdemir)

14:00-14:30 Invited 2: S. Hogmark (Uppsala University, Sweden)

»Surface modifications in tribological contacts«

14:30-14:50 Laser surface texturing research at Technion (COST-ES8)

I. Etsion (Technion, Israel)

14:50-15:10 The effect of surface texturing on thin EHD lubrication films (COST-ES11)

I. Krupka, M. Hartl (Brno University of Technology, Czech Republic)

15:10-15:30 The effect of boundary films on dented surfaces operated under thin EHD lubrication (COST-ES11)

M. Hartl, I. Krupka (Brno University of Technology, Czech Republic)

15:30-15:50 Break

15:50-16:10 An Alternative Cylinder Wall Texture Pattern: A First Assessment

K. Tønder (Norwegian Univ. Science and Technology, Norway)

16:10-16:30 Comparison on F2 Softgauges for Surface Texture

T.K. Li (University of Huddersfield, UK), X. Jiang, L. Blunt, P. Scott, S. Xiao

16:30-16:50 Surface texturing using pulsed air arc treatment

A. Moshkovith, V. Perfiliev, K. Yutujyan, D. Gindin, N. Parkansky, R. Boxman, L. Rapoport (Holon Institute of Technology, Israel)

16:50-17:10 Influence of different surface preparation on roughness parameters, friction and wear

M. Sedlaček (University of Ljubljana, Slovenia), B. Podgornik, J. Vižintin

Silver Saloon: Applications I (Chairman: B.R. Höhn)

14:00-14:30 Invited 1: A. Igartua (Tekniker, Spain)

»Biolubricants and Triboreactive Materials for Automotive Applications«

14:30-14:50 Effects of Lubricating Base Stocks on Bearing Performance of Automobile Engines

T. Katafuchi (Idemitsu Kosan Co. Ltd., Japan), M. Kasai

14:50-15:10 Torsional vibrations of wet clutches: influence of mechanical parameters (COST-TS7)

W. Ost (Ghent University, Belgium), P. De Baets, M. Loccufier

15:10-15:30 Friction processes in automotive disc brakes in the presence of hard abrasive particles (COST-TS9)

A. Polak, J. Grzybek, S. Oleksowicz (Cracow University of Technology, Poland)

15:30-15:50 Break

15:50-16:10 Cam and Roller Follower Tribology (COST-ES1)

M. Olsson, B. Jacobson (Lund University, Sweden)

16:10-16:30 Comparison of test methods to determine diesel fuel lubricity

P.L. de Vaal (University of Pretoria, South Africa), D. Phillpotts

16:30-16:50 Rolling wear behaviour of DLC coatings under dry and lubricated contacts

M. Kalin, J. Vižintin (University of Ljubljana, Slovenia)

16:50-17:10 Unsteady oil film forces in porous bearings: analysis of parameter effects on the rotor linear stability

V. D'Agostino, A. Ruggiero, A. Senatore (University of Salerno, Italy)

14.6. Thursday 14:00 – 17:10

Red Saloon: Lubricants & Lubrication II (Chairmen: A. Arnšek / M. Svoljšak)

14:00-14:30 Invited 2: E. Ciulli (University of Pisa, Italy)

»Friction and film thickness studies in non-steady state EHL contacts«

14:30-14:50 The influence of the slide-to-roll ratio on the friction coefficient and film thickness of EHD point contacts under steady state and transient conditions

E. Ciulli, K. Stadler (University of Pisa, Italy), T. Draexl

14:50-15:10 The Role of Viscosity Index Improvers in Formulation of Transmission Fluids

C. Wincierz (RohMax Additives GmbH, Darmstadt, Germany)

15:10-15:30 Influence of grease composition on rolling contact wear: an experimental study

V. Mota, L.A. Ferreira (University of Porto, Portugal)

15:30-15:50 Break

15:50-16:10 Correlation between friction and flow of lubricant greases in a new tribometer device.

P. Heyer (Anton Paar Germany, Germany), J. Laeuger

16:10-16:30 Comparative study of the testing methods using four ball machine

C. Spanu (University of Galati, Romania), I. Stefanescu, M. Ripa

16:30-16:50 Determination of flash point for flammable/combustible liquids

D. Scarpete (University of Galati, Romania), M. Ripa, L. Deleanu

16:50-17:10 Flammability testing in risk assessment

L. Deleanu (University of Galati, Romania), M. Mipa, A. Drug

15.6. Friday 9:00 – 12:30

White Hall: Functional & Bio Materials I (Chairmen: M. Kalin / V. Leskovšek)

- 9:00-9:30 Invited 1: L. Blunt (University of Huddersfield, UK)**
»The role of Tribology and Metrology in the Latest Development of Bio-materials«
- 9:30-10:00 Invited 2: S. Jahanmir (Mohawk Innovative Technology & MiTiHeart Corporation, USA) »Tribology in the Bionic Age«**
- 10:00-10:20 Experimental characterisation of wear behaviour of materials for dental restorations**
H. Kloss (BAM, Germany), R. Waesche, D. Klaffke, H.G. Graeber
- 10:20-10:50 Break**
- 10:50-11:10 Study of friction and wear behaviour of polyoxymethylene and short glass fiber reinforced polyoxymethylene composite under dry and water lubrication conditions**
H. Unal, A. Mimaroglu (Faculty of Engineering, University of Sakarya, Turkey), U. Sen, A. Ozel
- 11:10-11:30 Comparative study of the tribological behaviour of self-lubricating W-S-C and Mo-Se-C sputtered coatings (COST-CH1)**
T. Polcar, M. Evaristo, A. Cavaleiro (ICEMS, Portugal)
- 11:30-11:50 Application of diamond-like carbon coatings to elastomers frictional surfaces**
L. Martinez (ICMM-CSIC, Spain), L. Alvarez, R. Nevshupa, Y. Huttel, J. Mendez, E. Roman, E. Mozas, J.R. Valdes, Y. Gachon, C. Heau, F. Faverjon
- 11:50-12:10 Comparison of self-mated hardmetal coatings under dry sliding conditions up to 600°C (COST-CH8)**
L.M. Berger (Fraunhofer Institute IWS, Germany), S. Saaro, M. Woydt
- 12:10-12:30 Tribological investigations of materials for water hydraulics**
F. Majdič, J. Pezdirnik, M. Kalin (University of Ljubljana, Slovenia)

Silver Saloon I: Applications II (Chairman: A. Pauschitz)

- 9:00-9:30 Invited 2: B.R. Höhn (Technical University Munich, Germany)**
»Improvements for noises and efficiency by gears«
- 9:30-9:50 Improvement of micropitting performance of power transmission gears (COST-TS3)**
H. Ronkainen (VTT, Finland), T. Ahlroos, R. Parrika, J. Virta, S. Varjus
- 9:50-10:10 Minimised gear lubrication by a minimum oil-air flow rate (COST-TS1)**
B.R. Höhn, K. Michaelis, H.P. Otto (FZG, Germany)
- 10:10-10:30 Effects of oil kind on tribological characteristics of automotive gears (COST-TS16)**
Z. Vukadinović (R&D Centre Automobile Institute Zastava, Serbia), D. Josifović, J. Vižintin
- 10:30-10:50 Break**
- 10:50-11:10 The high performance of surface engineered gears**
K. Mao (Brunel University, UK), Y. Sun, A. Bloyce, H. Dong, T. Bell
- 11:10-11:30 Wear mechanisms of the aluminium/polymer system of a pneumatic clutch actuator**
F. Riddar (Uppsala University, Sweden), Å. Kassman-Rudolphi, S. Jacobson, S. Hogmark
- 11:30-11:50 Study of a high speed electrospindle with air bearings**
G. Belforte, T. Raparelli, V. Viktorov, A. Trivella, F. Colombo (Politecnico di Torino, Italy)
- 11:50-12:10 Effect of Water Cotamination on the Diffused Content of Hydrogen under Stress in AISI-52100 Bearing Steel (COST-CH3)**
T. Imran, B. Jacobson (Lund University, Sweden)
- 12:10-12:30 Tribological aspect of lubricating grease choice for rolling bearings**
R. Rakić, Z. Rakić (NIS-Petrol, Naftagas promet, Serbia)

15.6. Friday 9:00 – 12:30

Red Saloon: Condition monitoring & Diagnostics I (Chairman: J. Vižintin)

- 9:10-9:30 **Rotor whirl damping by dry friction suspension systems**
F. Sorge (University of Palermo, Department of Mechanics, Italy)
- 9:30-9:50 **evaluation of wavelet packet analysis and empirical mode decomposition for detection of transients in vibration signals**
B. Suhač, J. Vižintin (University of Ljubljana, Slovenia)
- 9:50-10:10 **Machine condition monitoring systems and predictive maintenance applications**
L. Radovanovic (Technical Faculty “Mihajlo Pupin”, Zrenjanin, Serbia), Z. Adamovic
- 10:10-10:30 **Analysis of the noisiness of an automotive water pump**
M. Antonini (University of Brescia, Italy), R. Faglia, M. Pedersoli, C. Remino
- 10:30-10:50 Break
- 10:50-11:10 **Diagnosing of tribo-failures of vacuum machinery using combined neural networks and spectral analysis of tribodesorption**
M.V. Korovin (Bauman Moscow State Technical University, Russia), R.A. Nevshupa
- 11:10-11:30 **New calculation-experimental complex of tools for forecasting and control of friction and wear of tribosystems and managing tribosystems’ operation indicators**
V.N. Khovanskiy (Moscow State University of Railway Engineering, Russia)
- 11:30-11:50 **TRIBOLOGY Theory in Practice – A Process Industry Experience**
A.K. Patra, V.R. Shankar (Visakhapatnam Steel Plant, India)
- 11:50-12:10 **Research of breaking mechanism of materials of heavy loaded friction systems**
A.M. Pashayev, A.Kh. Dzhanakhmedov (Azerbaijan State Oil Academy, Azerbaijan)
- 12:10-12:30 **Test Methods for the Characterisation of Different Designed Tribomaterials**
I. Godor, F. Grün (University of Leoben, Austria), W. Eichlseder

15.6. Friday 14:00 – 17:10

White Hall: Functional & Bio Materials II (Chairman: L. Blunt)

14:00-14:20 **Some aspects about the correlations between the atomic composition, roughness, the static friction coefficient and wear behaviour of Ti-C-Si and Ti-C-O thin-films**

D. Munteanu (Transilvania University, Romania), C. Ionescu, C. Olteanu, B. Borcea, A. Munteanu

14:20-14:40 **Wear and erosion behaviour of boron coated steels**

N.E. Maragoudakis (Technological Institute of Thessaloniki, Greece), N. Stolakis

14:40-15:00 **Fine metal wire mesh feeding system for aerostatic pads**

G. Belforte, T. Raparelli, V. Viktorov, A. Trivella (Politecnico di Torino, Italy)

15:00-15:20 **The composite materials for regeneration of sliding machine components (COST-CH9)**

J. Dasiewicz (Institute for Sustainable Technologies, Poland), Z. Pawelec

15:20-15:40 Break

15:40-16:00 **Multiphase materials: Influence of microstructure and interface properties on wear behaviour**

E. Badisch (AC²T research, Austria), M. Kirchgassner, R. Polak, F. Franek

16:00-16:20 **New conception for creation Al eutectic alloys for tribology application at elevated temperatures (COST-ES5)**

Yu.V. Milman, K.E. Grinkevich (Institute for Problems of Materials Science, Ukraine), N.P. Korzhova, Yu.N. Podrezov, O.M. Barabash, T.N. Legkaya

16:20-16:40 **Dry sliding wear of 332.0 unaged Al-Si alloys**

I. Sevim (Mersin University, Turkey)

Silver Saloon I: Surface Engineering & Applications III (Chairperson: A. Igartua)

14:00-14:20 **Interaction between hard coatings and lubricants (COST-CH5)**

B. Podgornik, J. Vižintin (University of Ljubljana, Slovenia)

14:20-14:40 **Chemical challenges in the synthesis of superhard diamond phase**

B. Udovic (Slovenia)

14:40-15:00 **Atmospheric pressure plasma deposition of organic and hybrid coatings with incorporation of inorganic fullerene-like nanoparticles**

A. Vanhulsel, L. Eersels, R. Rego, D. Havermans, J. Meneve (VITO, Belgium)

15:00-15:20 **Research concerning the achievement of a mechatronic device used for testing the spherical joints**

D. Badoiu, R.G. Ripeanu (Petroleum-Gas University of Ploiesti, Romania)

15:20-15:40 Break

15:40-16:00 **Research on tribological properties of Nylon 1010 composites under tractive rolling friction condition**

Wang Shi-bo (China University of Mining and Technology, China), Ge Shi-rong

16:00-16:20 **Wear resistant PEO coatings on initial and arc sprayed aluminium alloys**

V. Pokhmurskii (Physico-Mechanical Institute of NAS of Ukraine, Ukraine), G.M. Klapkiv, M. Student, H. Pokhmurska, B. Wielage

16:20-16:40 **AES analysis of surface films from boundary lubricated DLC coatings containing tungsten**

D. Hren (Institute of Metals and Technology, Slovenia), M. Jenko, D. Mandrion, J. Vižintin

15.6. Friday 14:00 – 17:10

Red Saloon: Condition Monitoring & Diagnostics II (Chairman: L. Gelman)

13:50-14:20 Keynote: L. Gelman (Cranfield University, School of Engineering, UK)
»Vibro-acoustical fatigue crack monitoring«

14:20-14:40 **A Mechatronic System Applied to Wear Particle Analysis**

V.D. Goncalves (Paulista State University - Campus for Guaratinguetá, Brazil), M.H. Mathias

14:40-15:00 **The use of laser particle sizer technique in the mexican industry as a method for the routine quantification of wear debris**

P. Matadamas (Interdisciplinary Research Centre for Integral Regional Development-Oaxaca, Mexico)

15:00-15:20 **Positron Annihilation Studies of Subsurface Zones in Aluminium, Magnesium and Its Alloys (COST-ES10)**

J. Dryzek, E. Dryzek (Institute of Nuclear Physics, Poland)

15:20-15:40 Break

15:40-16:00 **Tribo-studies in a Steel Plant**

A.K. Patra, V.R. Shankar (Visakhapatnam Steel Plant, India)

16:00-16:20 **Friction and service life**

Yu.N. Drozdov (IMASH Mechanical Engineering Institute, Russia), V.A. Nadein, S.D. Ivanov, V.N. Puchkov, M.V. Puchov

16:20-16:40 **Modeling the possible effects of face seals deterioration**

N. Popa (University of Pitesti, Romania)

16:40-17:00 **Dynamics of frictional interaction of a fuel rod cladding and spacer grid cell in a fuel assembly**

Yu. Drozdov, S. Ivanov, V. Makarov (FSUE OKB Hidropress, Russia), A. Afanasiev, I. Matvienko, T. Savinova

Posters:

- 1. Effect of Case Hardening and High Temperature Sintering on Subsurface Crack Nucleation during Dry Sliding Wear P/M Steel Powders**
S. Amini (University of Tehran, Iran), K. Hazeli, M. Ghambari, H. Khorsand, S. Amini
- 2. Friction and wear measurements on piston ring and cylinder liner combinations for internal combustion engines (COST-ES2)**
P. Andersson (VTT, Finland)
- 3. Nanostructured coating systems based on amorphous carbon with low internal stress, and good tribological properties (COST-P19)**
P. Bohac (Institute of Physics, Czech Republic), V. Kulikovskiy
- 4. Oxidation stability and tribological properties of non-toxic grease (COST-CH4)**
J. Drabik (Institute for Sustainable Technologies, Poland), E. Pawelec
- 5. Vapor phase synthesis of nanostructured carbon based materials for tribological applications (COST-CH14)**
I. Bujinsters, I. Caretti, O. Sanches, J.M. Albella, C. Gomez-Aleixandre (CSIC, Spain)
- 6. Application of the product of vegetable oil chemical modification as antiwear additive in PAO-based lubricants (COST-CH2)**
M. Makowska (Institute for Sustainable Technologies, Poland), J. Molenda, E. Siwiec, M. Gradkowski
- 7. The nitriding of steels by nitrogen-hydrogen plasma using plasma torch (COST-TS12)**
L. Marcinauskas (Lithuanian Energy Institute, Lithuania), P. Valatkevicius, V. Valincius
- 8. Synthesis of alumina coatings using the ICP enhanced reactive magnetron sputtering system (COST-ES3)**
J. Walkowicz (Institute for Sustainable Technologies, Poland), A.V. Zykov, S.V. Dudin, S.D. Yakovin
- 9. Applications of the multilayer structures "diffusion layer / thin anti-wear coating" obtained by different hybrid methods (COST-ES3)**
J. Smolik, J. Walkowicz (Institute for Sustainable Technologies, Poland)
- 10. Greases for Sliding Springs (COST-TS11)**
M. Maillat (Laboratoire Dubois SA, Switzerland)
- 11A. A Practical Approach to Fault Diagnosis of Transmission System Electromotor in Mahshahr Silo by Vibration Condition Monitoring**
H. Ahmadi (University of Tehran, Iran)
- 11B. Vibration Condition Monitoring Techniques for Fault Diagnosis of Electromotor**
H. Ahmadi, H. Mohammadi (University of Tehran, Iran)
- 12A. Oil Condition Monitoring Technique for Fault Diagnosis on Crane Liebherr LHM-1200**
H. Ahmadi (University of Tehran, Iran)
- 12B. Practical Approach to Choose Best Oil for Dump Truck HD325-5 by Oil Condition Monitoring Technique**
H. Ahmadi (University of Tehran, Iran)
- 13. Influence of filtering in surface roughness characterisation**
G. Fekete, A. Czifra (Budapest Polytechnic, Hungary)
- 14. Asperity analysis of worn surfaces**
A. Czifra (Budapest Polytechnic, Hungary), S. Horvath
- 15. W-Ti-N sputtered thin films: Solution for stamping moulds**
L.M. Vilhena, J.P.Dias, A.Cavaleiro (ICEMS-IPN, Portugal)
- 16. Elastic constants of thin films based on amorphous carbon obtained by LAW method**
P. Bohac (Institute of Physics, Czech Republic), R. Picek, V. Kulikovskiy
- 17. Study of contact fatigue mechanisms of duplex treated low ALLOY steel (COST 532-M7)**
E. Zdravecká (Faculty of Mechanical Engineering Technical University Kosice, Slovakia), A. Gmíterko, J. Tkáčová, S. Fecsu, J. Briančin