



Faculty of Automotive  
and Construction  
Machinery Engineering  
Warsaw University of Technology



University of Žilina



Armed Forces Academy  
of general M. R. Štefánik  
in Liptovský Mikuláš



Faculty of Mechanical  
Engineering  
Lublin University of Technology

# XVI International Technical Systems Degradation Conference



Liptovský Mikuláš, 19 - 22 April 2017



SDS Slovenská  
dopravná spoločnosť  
pri Slov. akadémii vied,  
Žilina



Polish Society  
of Tribology



The Maintenance  
Fundamentals Section  
of the Committee  
on Machine Building  
of the Polish Academy  
of Sciences



Polish Society  
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Diagnostics



Automotive  
Industry  
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16<sup>th</sup> INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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## CONFERENCE PROGRAMME of 16<sup>th</sup> ITSDC

### 19.04.2017 (Wednesday)

13<sup>00</sup>-14<sup>30</sup> – Registration (Armed Forces Academy of General M. R. Štefánik)

14<sup>30</sup>-14<sup>35</sup> – Opening ceremony of XVI ITSDC

14<sup>35</sup>-16<sup>15</sup> – Plenary session – VEHICLES – S1

16<sup>15</sup>-16<sup>30</sup> – Coffee Break

16<sup>30</sup>-18<sup>10</sup> – Plenary session – STUDENTS SOCIETES – S2

### 20.04.2017 (Thursday)

14<sup>30</sup>-15<sup>50</sup> – Plenary session – DIAGNOSTICS – S3

15<sup>50</sup>-16<sup>00</sup> – Coffee Break

16<sup>00</sup>-16<sup>40</sup> – Special session – “FIRST STEP TO...” – S4

16<sup>40</sup>-18<sup>30</sup> – Poster session of „*IN STATU NASCENDI*” works

### 21.04.2017 (Friday)

14<sup>30</sup>-16<sup>10</sup> – Plenary session – AGRICULTURES AND VEHICLES  
MECHATRONICS – S5

16<sup>10</sup>-16<sup>30</sup> – Coffee Break

16<sup>30</sup>-18<sup>10</sup> – Plenary session – MAINTENANCE – S6

### 22.04.2017 (Saturday)

9<sup>00</sup>-12<sup>00</sup> – Summarizing session and closing of the Conference



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## **SESSION 1 - VEHICLES (S1)**

**(Chairmen: prof. D. Barta / prof. S. Radkowski)**

- 14:35 **Roman POPROCKÝ, Jana GALLIKOVÁ, Vladimír STUHLÝ**  
FMEA ANALYSES OF COMBUSTION ENGINE AND ASSIGNMENT  
OCCURRENCE INDEX FOR RISK VALUATION
- 14:55 **Matúš RIEČIČIAR, Peter DROPPA**  
PLANETARY GEARBOXES USED OF MOBILE TECHNICS
- 15:15 **Petr KLOUDA Jan BLATA, David ŠEDĚNKA, Lubomír KAŠIAR,  
Peter VOLNA**  
DEGRADATION OF THE STATE OF A BALL TRACK AT THE ZP 6600
- 15:35 **Artur JANKOWIAK, Marek KOWALCZYK, Paweł GRABOWSKI**  
FATIGUE DEGRADATION OF WELDED STRUCTURAL COMPONENTS OF  
OPEN-PIT MACHINES
- 15:55 **Peter PERUN**  
COMPARISON OF VIBRATIONS MODELS OF SMALL ARMS BARRELS



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## **SESSION 2 - STUDENT SOCIETIES (S2)**

**(Chairmen: prof. J. Matej / prof. J. Maćzak)**

- 16:30 **Stanisław RADKOWSKI, Łukasz CHODECKI, Patryk GALEWSKI, Maciej SŁOMCZYŃSKI**  
USING NONLINEAR BACKSTEPPING METHOD IN ACTIVE SUSPENSION CONTROL OF THE QUOTER-CAR MODEL
- 16:50 **Michał TROJGO, Lech KNAP, Jędrzej MAĆZAK**  
THE MEASURING SYSTEM FOR IDENTIFYING REAL PARAMETERS OF POWERSHIFT TRANSMISSION
- 17:10 **Jacek DYBAŁA, Jarosław SEŃKO, Maciej PARAFINIAK, Tomasz NOWAK**  
SLOW ARISING, CRACK PROPAGATION AND DELAMINATION, IN EPOXY-CARBON AND EPOXY-GLASS COMPOSITES
- 17:30 **Marek JAŚKIEWICZ, Jacek JASKÓLSKI**  
THE ANALYSIS OF SAFETY ON THE POLISH ROADS BETWEEN 2001 AND 2013
- 17:50 **EC Test Systems**  
EC TEST SYSTEMS COMPANY PRESENTATION



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## **SESSION 3 - DIAGNOSTICS (S3)**

**(Chairmen: prof. P. Droździel/ prof. P. Droppa)**

- 14:30 **Rafał WRÓBEL, Krystian SZEWCZYŃSKI, Andrzej KUBIK,  
Przemysław MARZEC**  
RESEARCH OF WELDED CONNECTIONS USED IN SHEET METAL CAR  
BODY AND MEASUREMENT OF STRENGTH OF MATERIALS
- 14:50 **Andrzej KUBIK, Zbigniew STANIK, Szymon SURMA,  
Tomasz HANISZEWSKI, Rafał WRÓBEL**  
EXPERIMENTAL STUDY OF LUBRICANTS USED IN RAILWAY  
TURNOUTS
- 15:10 **Jan MATEJ**  
A WAY TO IMPROVE THE DYNAMIC PROPERTIES OF A RAILWAY  
WAGONS IN STATIONARY MOVEMENT ON A STRAIGHT AND  
CURVED TRACK
- 15:30 **Ján DIŽO, Miroslav BLATNICKÝ, Stasys STEIŠŪNAS**  
INVESTIGATION OF NEGATIVE EFFECTS OF THE RAIL VEHICLE  
RUNNING WITH WHEEL DEFECTS BY MEANS OF COMPUTER TOOL



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**SESSION 4 - Special session “FIRST STEP TO...” – (S4)**

**(Chairmen: prof. S. Radkowski / prof. T. Figlus)**

16:00 **Jakub LORENCKI**

FAULT SIGNAL ANALYSIS OF SWITCHED RELUCTANCE MOTOR

16:20 **Łukasz ZIELIŃSKI, Marcin JASIŃSKI, Krzysztof SZCZUROWSKI**

USING INFORMATION FROM EMPIRICAL RESEARCH INTO  
MATHEMATICAL MODEL TO ASSESS THE PROBABILITY OF KNOCK



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**POSTER SESSION**  
**„IN STATU NASCENDI” works**

**(Chairmen: prof. J. Mączak / dr inż. M. Jasiński)**

1. **Krzysztof BANDURSKI, Marcin FRAN CZUK, Damian WAL CZAK, Łukasz ZIELIŃSKI**  
ANALYSIS OF THE COMPOSITION OF EXHAUST GASES IN A DUAL FUEL ENGINE
2. **Dalibor BARTA, Miroslav BLATNICKÝ, Ján DIŽO, Paweł DROZDZIEL**  
MODERN METHODS OF SIMULATING WELDING FOR DIAGNOSING FATIGUE LIFESPAN
3. **Lukáš BRIDIK**  
THE INTERACTION OF A BULLET CHARGE 12.7X108 MM AND ARMOX 600T
4. **Adrian CHMIELEWSKI, Szymon GONTARZ, Robert GUMIŃSKI, Jędrzej MA CZAK, Stanisław RADKOWSKI**  
DIAGNOSTICALLY TARGETED PARAMAGNETIC TEST STAND FOR STUDYING COMPLEX LOAD CONDITIONS
5. **Peter DROPPA, Štěpán PAVLOV**  
THERMO VISION DIAGNOSTICS OF MOBILE TECHNICS
6. **Tomasz FIGLUS**  
TESTS OF TIMING GEAR DYNAMICS USING FEM MODELS
7. **Tomasz FIGLUS, Jozef GNAP, Tomáš SKRÚCANÝ, Branislav ŠARKAN**  
METHOD OF FILTRATION OF COMBUSTION ENGINE ACOUSTIC SIGNAL USING DENOISING AND ENTROPY
8. **Tomasz FIGLUS, Łukasz KUCZYŃSKI**  
SELECTION OF AN OPTIMAL SEMI-TRAILER FOR CARRYING LONG OVERSIZE LOADS WITH TAKING INTO ACCOUNT AN ANALYSIS OF DAMAGE INCURRED DURING OPERATION
9. **Marcin FRAN CZUK, Damian WAL CZAK, Łukasz ZIELIŃSKI**  
THE CONCEPT OF BUILDING A DEVICE FOR THE AUTOMATIC VEHICLE’S DYNO TESTING DURING THE SPECIFIED DRIVING CYCLES INCLUDED IN THE STANDARDS APPROVAL
10. **Paweł GRABOWSKI, Artur JANKOWIAK**  
FATIGUE GROWTH ANALYSIS OF MULTIPLE COPLANAR CRACKS USING REAL AND SUBSTITUTE CRACK CONTOUR
11. **Wiesław GRZESIKIEWICZ, Michał MAKOWSKI**  
NUMERICAL INVESTIGATION OF VEHICLE VIBRATION WITH MAGNETO-RHEOLOGICAL DAMPERS
12. **Marek JA ŚKIEWICZ, Jacek JASKÓLSKI**  
MODERNIZATION OF THE JOINTS OF THE CRASH-TEST DUMMY
13. **Leszek JURDZIAK, Ryszard BŁA ŻEJ, Tomasz KOZŁOWSKI, Agata KIRJANÓW**  
SENSOR FOR THE MEASUREMENT OF THE BELT THICKNESS AND EVALUATION OF THE CHANGES IN THE CROSS-SECTION AND LONGITUDINAL SECTION OF THE BELT





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14. **Grażyna KARMEŁUK Krzysztof SZCZUROWSKI**  
ELECTRIC VEHICLE AS ENERGY BUFFER IN A SMART BUILDING SYSTEM
15. **Łukasz KONIECZNY**  
FREE VIBRATION METHOD IN THE EVALUATION OF THE TECHNICAL CONDITION OF CAR SHOCK ABSORBERS
16. **Roman KRÓL, Sebastian BĄK**  
STRESS INTENSITY FACTORS FOR TWO SURFACE COPLANAR CRACKS UNDER UNIFORM MODE I STRESS DISTRIBUTION
17. **Andrzej KUBIK, Sebastian WIERZBICKI, Krystian SZEWCZYŃSKI, Przemysław MARZEC**  
INFLUENCE OF TEMPERATURE ON THE SEMI-PROFESSIONAL WEAR THE CNC CONTROL SYSTEM, DEPENDING ON THE TYPE OF MATERIAL AND MACHINING PARAMETERS
18. **Łukasz KURKUS**  
CONTROL OF THE FREE PISTON ENGINE ON THE BASIS OF THE ANALYSIS OF ACCELERATION OF THE PISTON
19. **Kamil LUBIKOWSKI, Jędrzej MAĆZAK, Stanisław RADKOWSKI**  
OPTIMAL POINT WORK OF SEMICONDUCTOR THERMOELECTRIC GENERATOR AS A SOURCE OF ELECTRICITY
20. **Kamil LUBIKOWSKI, Jędrzej MAĆZAK, Przemysław SAĆZEK**  
APPLICATION OF PHOTOVOLTAIC PANELS IN THE BUSES OF THE PUBLIC TRANSPORT
21. **Piotr MRÓZ, Sebastian BROL**  
IMPACT OF CONTROL ALGORITHM FOR CHARACTERISTICS OF PNEUMATIC-HYDRAULIC DRIVE
22. **Eva POPARDOVSKÁ, Vladimír POPARDOVSKÝ**  
VEHICLE SUSPENSION CONTROL BASED ON PID CONTROLLER ADAPTED BY FEED-FORWARD NEURAL NETWORK
23. **Jarosław SEŃKO**  
SIMULATION OF VIBRATION FOR THE FOUR-WHEELED MOBILE PLATFORM
24. **Grzegorz SŁUŻALEK, Joanna ZAWADZKA**  
MATERIAL PROBLEMS IN 3D PRINTING
25. **Grzegorz SŁUŻALEK, Joanna ZAWADZKA**  
3D PRINTING IN ROBOTIC CONSTRUCTION IN EXAMPLE ROBOTIC ARM
26. **Agnieszka SZEGDA, Sebastian BROL**  
OPERATING MAGNETIC CHARACTERISTICS OF THE CAR WHEEL WITH RADIAL TYRES
27. **Michał TROJGO**  
EVENT DATA RECORDER FOR ROAD VEHICLES
28. **Michał TROJGO, Łukasz ZIELIŃSKI, Krzysztof SZCZUROWSKI**  
DESIGN AND CONSTRUCTION OF THE TEST BENCH FOR CAR ECUS
29. **Hubert Cezary TRZEWIK, Krzysztof SZCZUROWSKI**  
PROPOSAL OF LEARNING MODEL OF BUILDING WITH INTELLIGENT ENERGY MANAGEMENT SYSTEM



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30. **Damian WALCZAK, Łukasz ZIELIŃSKI**  
DC/DC CONVERTER TO THERMOELECTRIC GENERATORS
31. **Damian WALCZAK, Łukasz ZIELIŃSKI**  
PROJECT UNIVERSAL CONTROLLER FOR MULTI-FUEL ENGINES
32. **Jan WARCZEK**  
ANALYSIS OF TIRES DAMAGES IN COMMERCIAL VEHICLES
33. **Aleksandra WASZCZUK-MŁYŃSKA, Stanisław RADKOWSKI, Michał WIKARY**  
COMPARISON OF THE ANALYTICAL MODEL OF THE NUMERICAL MODEL FOR DIAPHRAGM RUPTURE CIRCULAR
34. **Mateusz WĄSIK**  
DESIGN OPTIMIZATION OF COMPOSITE FRONT SEAT FOR LIGHTWEIGHT ELECTRIC VEHICLE
35. **Mateusz WĄSIK, Ryszard SKOBERLA, Grzegorz ZIELIŃSKI, Wojciech SKARKA**  
IDENTIFICATION OF OPERATIONAL PARAMETERS OF HYDROGEN CELL FOR LIGHTWEIGHT VEHICLE
36. **Grzegorz ŻAK, Agnieszka WYŁOMAŃSKA, Radosław ZIMROZ**  
APPLICATION OF HEAVY-TAILED DISTRIBUTION FOR LOCAL DAMAGE DETECTION IN THE GEARBOXES AND BEARINGS



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## **SESSION 5 - AGRICULTURES AND VEHICLES MECHATRONICS (S5)**

**(Chairmen: prof. J. Szczepaniak / prof. J. Mączak)**

- 14:30 **Szymon GONTARZ, Jędrzej MAĆZAK, Przemysław SZULIM,  
Krzysztof WIĘCŁAWSKI**  
ADAPTATION OF SENSORY SYSTEMS, IN ORDER TO OPTIMIZE THE  
RECEIVED INFORMATION ON PASSING VEHICLES
- 14:50 **Krzysztof SZCZUROWSKI, Stanisław RADKOWSKI, Jędrzej MAĆZAK,  
Marcin JASIŃSKI, Kamil LUBIKOWSKI, Krzysztof ROKICKI,  
Łukasz ZIELIŃSKI, Damian WALCZAK, Michał TROJGO**  
EFFECTS OF THE PROJECT “ACQUISITION OF INFORMATION ENCODED  
IN ELECTRONIC ASSEMBLIES OF VEHICLES AND WORKING MACHINES  
FOR LEGAL PURPOSES”
- 15:10 **Mateusz SOPOĆKO, Jacek CABAN**  
DEGRADATION OF THE TECHNICAL MEASURES IN AGRICULTURE ON  
THE EXAMPLE OF SELECTED AGRICULTURAL HOLDINGS
- 15:30 **Marcin JASIŃSKI, Jędrzej MAĆZAK, Stanisław RADKOWSKI,  
Przemysław SZULIM, Marcin HEBA**  
OPTICAL SYSTEM FOR SUGAR BEET /WEED CLASSIFICATION
- 15:50 **Tadeusz PAWŁOWSKI, Jan SZCZEPANIAK, Ryszard GRZECHOWIAK,  
Tomasz SZULC**  
THE PROBLEMS OF MONITORING CROPS LEGUMES YIELD



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## **SESSION 6 - MAINTENANCE (S6)**

**(Chairmen: prof. S. Radkowski / prof. P. Droppa)**

- 16:30 **Robert GUMIŃSKI, Stanislaw RADKOWSKI**  
PREDICTION METHODS USED IN RUL ASSESSMENT
- 16:50 **Filip KUCHTA, Kamil LUBIKOWSKI, Jędrzej MAĆZAK**  
TEG MODEL IN MATLAB SIMULINK
- 17:10 **Rafal CZOK, Sebastian BROL**  
TRACTION PROPERTIES OF VEHICLE DRIVEN BY PNEUMATIC-  
HYDRAULIC DRIVE
- 17:30 **Jacek CABAN, Paweł DROŹDZIEL, Paweł KORDOS**  
SELECTED RESULTS FROM RESEARCH ON SELF-IGNITION ENGINE  
START-UP PROCESS
- 17:50 **Ryszard BŁAŻEJ, Leszek JURDZIAK, Tomasz KOZŁOWSKI,  
Agata KIRJANÓW**  
CORE DAMAGES INCREASE ASSESSMENT IN THE CONVEYOR BELT  
WITH STEEL CORDS



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## PLACE OF THE CONFERENCE

Akadémia Ozbrojených Síł generála M. R. Štefánika.

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