



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

# XVII International Technical Systems Degradation Conference



Liptovský Mikuláš, 4 - 7 April 2018



POLISH ACADEMY OF SCIENCES



SOS Slovenská  
dopravná spoločnosť  
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XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

## CONFERENCE PROGRAMME of 17<sup>th</sup> ITSDC

### 04.04.2018 (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>-15<sup>55</sup> – Plenary session – VEHICLES – S1

15<sup>55</sup>-16<sup>10</sup> – Coffee Break

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

### 05.04.2018 (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

### 06.04.2018 (Friday)

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

16<sup>30</sup>-16<sup>50</sup> – Coffee Break

16<sup>50</sup>-18<sup>50</sup> – Plenary session – MAINTENANCE – S6

### 07.04.2018 (Saturday)

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



XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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

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

- 14:35 **Jana GALLIKOVÁ, Peter VOLNA, Vladimír STUHLÝ**  
THE MODEL OF RAIL VEHICLE RELIABILITY CALCULATION
- 14:55 **Anna TIMOFIEJCZUK, Wojciech MOCZULSKI, Marek ADAMCZYK,  
Krzysztof CYRAN, Ana GARCIA, Marcin JANUSZKA, Petr NOVAK,  
Angel RODRIGUEZ**  
A ROBOTIZED SYSTEM FOR INSPECTING COAL MINE AREAS AFFECTED  
BY CATASTROPHES. ACTUAL IMPLEMENTATION
- 15:15 **Miroslav BLATNICKÝ, Ján DIŽO, Dalibor BARTA, Paweł DROŹDZIEL**  
MECHANICAL RACK SYSTEM DESIGN
- 15:35 **Ján DIŽO, Miroslav BLATNICKÝ, Jozef HARUŠINEC**  
ANALYSIS OF STRUCTURAL PROPERTIES OF THE MODIFIED FREIGHT  
WAGON BOGIE FRAME USING SIMULATION COMPUTATIONS



XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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

**(Chairmen: prof. A. Timofiejczuk/ prof. W. Skarka)**

- 16:10 **Bartłomiej MICHNA, Mateusz TYCZKA, Ryszard SKOBERLA**  
OPTIMIZATION OF ENERGY CONSUMPTION STRATEGY- THE EXAMPLE  
OF H2AC COMPETITION
- 16:30 **Mateusz SMARDUCH, Andrzej JAŁOWIECKI**  
A SCALE INFLUENTIAL ON AERODYNAMIC PHENOMENON ON THE  
EXAMPLE OF THE ULTRA-EFFICIENT VEHICLE
- 16:50 **Bogumił CHILIŃSKI, Mateusz ŻURAWSKI, Ewa ZAWADZKA,  
Dominik RODAK**  
BEKKERTEAM - PRESENT IS ON THE EARTH, FUTURE IS ON THE MARS
- 17:10 **Mateusz POPOWSKI, Jan R. MOSKALEW**  
DESIGN OF INDIVIDUAL-WHEEL DRIVE FOR ELECTRIC VEHICLE
- 17:30 **Paweł KORDOS, Cezary SARNOWSKI, Henryk KOMSTA**  
ANALYSIS OF THE REASONS OF CRITICAL FAILURES OF INTERNAL  
COMBUSTION ENGINES AFTER LONG-TERM OPERATION
- 17:50 **EC Test Systems**  
EC TEST SYSTEMS COMPANY PRESENTATION



XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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

**(Chairmen: prof. P. Drożdziel/ prof. S. Brol)**

14:30 **Andrzej KATUNIN, Dominik WACHLA**

SELF-HEATING BASED LOW-FREQUENCY VIBROTHERMOGRAPHY AS A  
NEW APPROACH FOR NONDESTRUCTIVE TESTING OF POLYMERIC  
COMPOSITE STRUCTURES

14:50 **Bogdan ŻÓŁTOWSKI, Mariusz ŻÓŁTOWSKI**

SELECTION OF ENERGY PROPAGATION MEASURES IN VIBRATION  
DIAGNOSTIC AND MODAL ANALYSIS METHODS

15:10 **Łukasz JEDLIŃSKI, Jakub GAJEWSKI**

COMPARISON OF FEATURE SELECTION METHODS IN MACHINE  
DIAGNOSTICS

15:30 **Jędrzej MĄCZAK**

GEAR DIAGNOSTICS



XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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

**(Chairmen: prof. S. Radkowski / prof. B. Żółtowski)**

- 16:00 **Omar AL-QARAGHULI, Maciej SŁOMCZYŃSKI, Stanisław RADKOWSKI**  
SIMULATION MODEL AS A BASIS OF VERIFICATION OF EXPERIMENT  
RESULTS
- 16:20 **Jędrzej MAĆZAK, Krzysztof SZCZUROWSKI, Krzysztof WIĘCŁAWSKI**  
ANALYSIS OF CURRENT-VOLTAGE WAVEFORMS IN CONTROL OF THE  
GAS INJECTOR



XVII INTERNATIONAL TECHNICAL SYSTEMS DEGRADATION CONFERENCE

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

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

1. **Vladimír POPARDOVSKÝ, Samuel GAVORA, Martin HANULÍK**  
NEURAL NETWORK MODEL OF VEHICLE SUSPENSION
2. **Peter PERUN, Dominik GARAI**  
INFLUENCE OF VARIANCE OF BULLET WEIGHT TO MUZZLE VELOCITY
3. **Miroslava CÚTOVÁ, Jozef ČERŇAN, Karol SEMRÁD**  
EXPERIMENTAL EVALUATION OF CERAMIC ELEMENTS DEGRADATION DURING ROLLING CONTACT FATIGUE TESTING
4. **Jakub PASZEK, Ryszard SKOBERLA**  
DESIGN OF POWER TRANSMISSION SYSTEM OF THE URBAN CONCEPT CLASS VEHICLE
5. **Aleksandra MUSIOŁ, Ryszard SKOBERLA**  
DESIGN OF THE ENERGY-EFFICIENT VEHICLE BRAKING SYSTEM
6. **Adrian KUBIESA, Andrzej JAŁOWIECKI, Mateusz WĄSIK, Andrzej SOKOŁOWSKI**  
A STEERING SYSTEM'S PARAMETERS IDENTIFICATION FOR THE H2AC COMPETITION PURPOSES
7. **Mateusz MERTIN, Andrzej JAŁOWIECKI**  
PERSONALISED OBJECTS DESIGN PROCESS ON THE EXAMPLE OF AN ULTRA-EFFICIENT ELECTRIC VEHICLE'S SEAT
8. **Mateusz DRESZER, Andrzej JAŁOWIECKI**  
THE H2AC CAR'S CHASSIS PLATE TOPOLOGICAL OPTIMIZATION PROCESS
9. **Karolina IWAŃSKA, Krzysztof SŁOCKI, Andrzej JAŁOWIECKI**  
REVIEW OF A PLASTIC CAR BODY MANUFACTURING TECHNIQUES FOR THE H2AC COMPETITION
10. **Michał ZUBA, Andrzej KATUNIN**  
MULTIPLE DAMAGE IDENTIFICATION IN COMPOSITE BEAMS USING FRACTAL DIMENSION-BASED ALGORITHM
11. **Dominik WACHLA, Andrzej KATUNIN**  
STATISTICAL ANALYSIS OF FEATURES DESCRIBING THE SELF-HEATING TEMPERATURE PROFILES OF POLYMERIC COMPOSITES
12. **Joyraj CHAKRABORTY, Andrzej KATUNIN**  
AUTOREGRESSIVE MODEL-BASED CHANGES DETECTION IN CONCRETE STRUCTURES USING ULTRASONIC SENSORS
13. **Wojciech MOCZULSKI**  
ROBOTIZED INSPECTION OF WINDMILLS
14. **Jan WARCZEK**  
ANALYSIS OF THE POSSIBILITIES OF ENERGY HARVESTING IN COMMERCIAL VEHICLE SUSPENSIONS





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**15. Jan WARCZEK**

THE APPLICATION OF PCA TO DEVELOP A VIBRATION PATTERN OF THE LPG INJECTOR

**16. Rafał BURDZIK, Robert JAWORSKI, Łukasz KONIECZNY, Adam MAŃKA**

COMPARATIVE ANALYSIS OF TEMPERATURE DISTRIBUTIONS IN MOTOR CHAMBERS OF VARIOUS TYPES OF BUS VEHICLES

**17. Wojciech SKARKA**

DEVELOPMENT OF ELECTRIC VEHICLES IN THE CONTEXT OF SMART POWER PROJECTS

**18. Roman BARCZEWSKI, Mateusz WRÓBEL, BARTOSZ JAKUBEK**

INFORMATIVITY ANALYSIS OF VIBROACOUSTIC SIGNALS OF ASYNCHRONOUS ELECTRIC MOTOR

**19. Sebastian BĄK, Arkadiusz KWAŚNIEWSKI**

ASSESSMENT OF SOIL COMPACTION FACTOR BASING ON VIBROACOUSTIC SIGNAL ANALYSIS

**20. Paweł GRABOWSKI, Artur JANKOWIAK**

FATIGUE LIFE EVALUATION OF ELEMENTS CONTAINING MULTIPLE SURFACE CRACKS – COMPARISON OF REAL AND SUBSTITUTE CRACKS CONTOUR MODELLING

**21. Artur JANKOWIAK, Paweł GRABOWSKI**

SELECTED PROBLEMS OF FATIGUE RESOURCE ASSESSMENT DURING LONG-LASTING EXPLOITATION OF OPEN-PIT MACHINE STRUCTURAL COMPONENTS

**22. Krzysztof ROKICKI**

MODELS OF KNOWLEDGE IN VEHICLE DIAGNOSTICS USING RELATIONAL DATABASES AND OBJECT-ORIENTED DATA MODELS

**23. Marcin JASIŃSKI, Jędrzej MAĆZAK, Stanisław RADKOWSKI, Krzysztof ROKICKI**

DATABASE SYSTEM TO STORING INFORMATION ABOUT THE LOCATION AND CHARACTERISTICS OF CROP PLANTS AND WEEDS

**24. Krzysztof SZCZUROWSKI**

VEHICLE IN INTELLIGENT TRANSPORT SYSTEM – SUBJECT OR OBJECT

**25. Michał MAKOWSKI, Wiesław GRZESIKIEWICZ**

MATHEMATICAL MODEL OF SYSTEM WITH CONTROLLED DAMPERS OF VIBRATION A VEHICLE

**26. Szymon GONTARZ, Krzysztof ĆWIK, Krzysztof BISKUP**

THE USE OF PASSIVE AND ACTIVE MAGNETIC METHODS IN FORENSIC EXAMINATIONS

**27. Krzysztof ĆWIK, Krzysztof BISKUP, Robert MRÓZ, Tomasz SADOWSKI, Wojciech KOSZAŁKA**

READING CODED INFORMATION FROM CAR KEYS

**28. Robert ZALEWSKI, Bogumił CHILIŃSKI, Dominik RODAK**

THE CONCEPTION OF USING A SEMI-ACTIVE VIBRATION DAMPER IN CREATING THE FATIGUE STRENGTH OF DRIVE SYSTEMS

**29. Robert ZALEWSKI, Bogumił CHILIŃSKI, Mateusz ŻURAWSKI**

PROPOSITION OF DYNAMIC STRUCTURE SHAPING OF SHAFTS WITH VPP



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30. **Jakub LORENCKI**

TITLE INVESTIGATION OF AMPLITUDE AND FREQUENCY MODULATION IN MOTOR DAMAGES

31. **Rafał CZOK, Sebastian BROL**

INFLUENCE OF THE PRESSURE DIFFERENCE IN PNEUMATIC HYDRAULIC SYSTEM ON THE TRACTION PROPERTIES OF THE VEHICLE

32. **Sebastian BROL, Agnieszka SZEGDA**

DESIGN OF CONICAL PENETRATOR FOR TYRE TESTING

33. **Piotr MRÓZ, Sebastian BROL**

INFLUENCE OF STEERING METHOD ON EFFICIENCY OF PNEUMATIC-HYDRAULIC DRIVE

34. **Jacek CABAN, Janusz ZARAJCZYK, Marek SZMIGIELSKI, Beata GÓRNIAK**

HYBRID DRIVE AS A FUTURE IN AGRICULTURAL TECHNOLOGY



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

**(Chairmen: prof. W. Moczulski / prof. A. Katunin)**

- 14:30 **Sebastian BROL, Krystian SKRZYPIEC, Marian BARTOSZUK,  
Adam STAWIARSKI, Mariusz ROSIAK, Łukasz WINCHULA, Piotr MRÓZ,  
Sebastian SDZUJ, Rafal CZOK, Sandra KACZANOWSKA,  
Krzysztof JAKUBCZYK**  
CONTROL OF WELDING OF GUTTER CORNER ALONG ELLIPSOIDAL  
TRAJECTORY
- 14:50 **Szymon GONTARZ, Krzysztof BISKUP, Krzysztof ĆWIK**  
IMPACT OF VEHICLE MODIFICATIONS ON ROAD SAFETY
- 15:10 **Marcin JASIŃSKI, Jędrzej MAĆZAK, Stanisław RADKOWSKI,  
Przemysław SZULIM**  
THE PROBLEM OF SELECTING THE FILTRATION THRESHOLD FOR  
OPTICAL SYSTEM FOR SUGAR BEET /WEED CLASSIFICATION
- 15:30 **Kamil LUBIKOWSKI, Jędrzej MAĆZAK**  
SELECTION OF THE OPTIMAL TEG WORKING POINT
- 15:50 **Grzegorz KLEKOT, Damian MARKUSZEWSKI**  
HYDRAULIC PUMP AS AN ADDITIONAL SOURCE OF NOISE IN THE  
OPERATOR'S CABIN OF THE CATEPILLAR 214B EXCAVATOR
- 16:10 **Andriy MARCHENKO, Serhiy KRAVCHENKO, Mykola TKACHUK, Mykola  
TKACHUK, Mariia SAVERSKA**  
DISCRETE-CONTINUAL STRENGTHENING OF CONTACTING  
STRUCTURAL ELEMENTS: MATHEMATICAL AND NUMERICAL  
MODELING



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

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

16:50 **Lukas BRIDIK**

INTERACTION OF THE CORE OF THE BULLET 7,62X39 MM WITH BALISTIC PROTECTION OF ARMOX

17:10 **Peter PERUN, Bronislava MARCINOVÁ**

THE INFLUENCE OF BULLET PULL FORCE ON MUZZLE VELOCITY

17:30 **Agnieszka SZEGDA, Sebastian BROL**

COMPARISON OF NEW AND USED TYRES

17:50 **Bartosz JAKUBEK, Roman BARCZEWSKI**

THE INFLUENCE OF OIL VISCOSITY ON VIBRATIONS OF TAPERED ROLLER BEARINGS

18:10 **Wojciech RUKAT**

MATHEMATICAL MODEL OF BIO-MECHANICAL SYSTEM: HUMAN-IMPACT DRILL IN ACCORDANCE TO ISO 10068 STANDARD

18:30 **Andrzej JAŁOWIECKI**

THE KNOWLEDGE-BASED ENGINEERING APPLICATION IN AN ULTRA-EFFICIENT VEHICLE DESIGN PROCESS

## PLACE OF THE CONFERENCE

Akadémia Ozbrojených Síł generála M. R. Štefánika.

03101 Liptovský Mikuláš

Demänová 215

GPS: 49.067993, 19.590774

