



TRANSCOM 2017

**12th international scientific conference of young scientists
on
sustainable, modern and safe transport**

under the auspices of

**Tatiana Čorejová
Rector of the University of Žilina**

BOOK OF ABSTRACTS

High Tatras, Grand Hotel Bellevue
31 May - 2 June 2017
Slovak Republic

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



Conference chairmen

Čelko Ján, University of Žilina, Slovak Republic

Bokůvka Otakar, University of Žilina, Slovak Republic

Conference scientific committee

Abramović Borna, University of Zagreb (HR)

Adamczak Stanisław, Kielce University of Technology (PL)

Bokůvka Otakar, University of Žilina (SK)

Bugaj Martin, University of Žilina (SK)

Bujňák Ján, University of Žilina (SK)

Cacciato Mario, University of Catania (IT)

Dado Milan, University of Žilina (SK)

Dvořák Zdeněk, University of Žilina (SK)

Glesk Ivan, University of Strathclyde (UK)

Guagliano Mario, Politecnico di Milano (IT)

Karpiš Ondrej, University of Žilina (SK)

Kazda Antonín, University of Žilina (SK)

Kunz Luděk, Institute of Physics of Materials, Brno (CZ)

Kuric Ivan, University of Žilina (SK)

Loveček Tomáš, University of Žilina (SK)

Madleňák Radovan, University of Žilina (SK)

Marinov Marin, Newcastle University (UK)

Matuszek Józef, University of Bielsko-Biala (PL)

Melcer Jozef, University of Žilina (SK)

Navarro Moreno, Sevilla University (ES)

Nikolić Ružica, University of Kragujevac (RS)

Plášek Otto, Brno University of Technology (CZ)

Rástočný Karol, University of Žilina (SK)

Řehák David, Technical University of Ostrava (CZ)

Segalini Andrea, University of Parma (IT)

Soviar Jakub, University of Žilina (SK)

Tillová Eva, University of Žilina (SK)

Van Gelder Pieter TU Delft (NL)

White Gareth, University of South Wales (UK)

Wilkinson Peter, Pyrology, British Standards Institution, Leicester (UK)



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Conference organizing committee

Executive secretary Vráblová Helena

Members:

Dulina Ľuboslav	Mózer Vladimír
Grajcariková Petra	Nedeliaková Eva
Hrbček Jozef	Odrobiňák Jaroslav
Hruboš Marián	Orininová Lucia
Kudláč Štefan	Panák Michal
Kuchariková Lenka	Rafajdus Pavol
Kuzmová Mária	Strieška Miroslav
Macurová Janka	Szabo Jaroslav
Márton Peter	Šiser Anton
Mitašová Veronika	Štefancová Vladimíra
Moravčíková Dominika	

Preface

TRANSCOM 2017, the 12th international scientific conference of young European scientists, doctoral students and their tutors, aims to establish and expand international co-operation and contacts. The main purpose of the conference is to provide young scientists with an encouraging and stimulating environment in which they present results of their research to the scientific community. TRANSCOM has been organized regularly every other year since 1995. Between 160 and 400 young researchers and scientists participate regularly in the event. The conference is organized for doctoral students and young scientists up to the age of 35 as well as for their tutors. Young workers are expected to present the results they have achieved.

Topics of TRANSCOM 2017:

- 1 Materials
- 2 Technology
- 3 Construction
- 4 Economics and Management
- 5 Informatics and Safety

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



The conference is organized by the University of Žilina, sited in the North of the Slovak Republic, with about 9 000 graduate and postgraduate students. The university offers Bachelor, Master and Doctoral programmes in the fields of transport, telecommunications, management, information systems, mechanical engineering, civil engineering, electrical engineering, special engineering, forensic engineering, social sciences and in natural sciences.

The 12th international scientific conference of young scientists on sustainable, modern and safe transport TRANSCOM 2017 was held under the auspices of Dr.h.c. prof. Ing. Tatiana Čorejová, PhD., Rector of the University of Žilina.

The 12th international scientific conference of young scientists on sustainable, modern and safe transport TRANSCOM 2017 was held in High Tatras, Slovak Republic on 31. 5. - 2. 6. 2017. 172 papers were contributed and presented by doctoral students and young researchers. We are proud that the event was contributed to and attended by a large number of international participants, in total, 13 countries were represented.

The success of a scientific conference depends primarily on its participants, therefore, we take this opportunity and would like to express our gratitude to all contributors for the papers published in the conference proceedings and their presentations at the event. We would also like to thank the chairs of the sessions, the reviewers, the scientific and organizing committees for their efforts and hard work in making sure that the quality of the conference remains at high level.

All papers were reviewed by two reviewers.

Conference language: English



CONTENTS

Topic1	MATERIALS	15
	VLADISLAV BANIARI, MARIA BLATNICKA, MICHAL SAJGALIK, MILAN VASKO, MILAN SAGA:	
	Measurement and numerical analyses of residual stress distribution near weld joint	16
	DAMIAN BAŃKOWSKI, DANIEL KRAJCARZ, PIOTR MLYNARCZYK:	
	Deburring and smoothing the edges using vibro-abrasive machining	17
	KAMIL BORKO, BRANISLAV HADZIMA, MARTINA NESLUSAN JACKOVA:	
	Corrosion resistance of Domex 700 steel after combined surface treatment in chloride environment	18
	MICHAŁ P. DREWNIOK, GRZEGORZ CYGAN, JACEK GOŁASZEWSKI:	
	Influence of the rheological properties of SCC on the formwork pressure	19
	ZUZANA FLORKOVA, MICHAL JAMBOR:	
	Quantification of aggregate surface texture based on three dimensional microscope measurement	20
	MAŁGORZATA GOŁASZEWSKA, TOMASZ PONIKIEWSKI:	
	Influence of low pressure steam curing on development of strength of mortars based on cement with high-calcium fly ash.....	21
	MATEJ HAJEK, MARTIN DECKY:	
	Homomorphic model pavement with sub base layer of foam concrete	22
	VLADIMIR CHUDACIK, MILAN SMETANA, KLARA CAPOVA:	
	Conductive biomaterial inhomogeneities modeling in electromagnetic nondestructive evaluation.....	23
	EMIL JAHODA, JOZEF KUDELČIK:	
	Internal partial discharge in cavity of polyurethane.....	24
	PATRICIA KADLICOVA, STANISLAVA GASPERCOVA, LINDA MAKOVICKA OSVALDOVA:	
	Monitoring of weight loss of fibreboard during influence of flame.....	25
	DANIEL KAJANEK, FILIP PASTOREK, STANISLAVA FINTOVA, ADRIAN BACA:	
	Study of corrosion behavior of dicalcium phosphate-dihydrate (DCPD) coating prepared by large amplitude sinusoidal voltammetry (LASV) technique on ZW3 magnesium alloy	26
	DANIEL KRAJCARZ, DAMIAN BAŃKOWSKI, PIOTR MLYNARCZYK:	
	The effect of traverse speed on kerf width in AWJ cutting of ceramic tiles	27
	MAROS KRAJCIR, JANA MULLEROVA:	
	3D small-scale fire modeling experiments	28



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

MAROS KRAJCIR, JANA MULLEROVA: 3D small-scale fire modeling testing preparation	29
JAN LAGO, MICHAL JAMBOR, FRANTISEK NOVY, OTAKAR BOKUVKA, LIBOR TRSKO: Giga-cycle Fatigue of AISI 316L after Sensitising of Structure	30
MAGDALENA MAZUR: Assessment of the construction welding process	31
MARIA MINAROVA, JOZEF SUMEC: Alternative calculation of the retardation and relaxation spectra for the viscoelastic response of the solid phase materials	32
PIOTR MLYNARCZYK, DANIEL KRAJCARZ, DAMIAN BAŃKOWSKI: The Selected Properties of the Micro Electrical Discharge Alloying Process Using Tungsten Electrode on Aluminum	33
MONIKA ORAVCOVA, PETER PALCEK, MARIA CHALUPOVA: Surface evaluation of AISI 316L after fatigue failure	34
IZABELA PLISZKA, NORBERT RADEK: Corrosion resistance of WC-Cu coatings produced by electrospark deposition	35
LUBOS REMEK, JAN MIKOLAJ, MILAN SKARUPA: Accelerated Pavement Testing in Slovakia: APT Tester 105-03-01	36
ROBERT ULEWICZ, FRANTISEK NOVY: Fatigue resistance and influence of cutting technology on the mechanical properties of modern steels used in the automotive industry	37
MAREK VEVERICIK, PETER BURY, PETER KOPCANSKY, MILAN TIMKO, ZUZANA MITROOVA: Effect of carbon nanotubes on liquid crystal behavior in electric and magnetic fields studied by SAW	38
DENISA ZAVODSKA, EVA TILLOVA, MARIO GUAGLIANO, MARIA CHALUPOVA, LENKA KUCHARIKOVA: Effects of porosity on the fatigue behaviour of AlZn10Si8Mg casting alloys in a high cycle region	39

Topic 2 TECHNOLOGY 41

STANISŁAW ADAMCZAK, KRZYSZTOF STĘPIEŃ, MATEUSZ WRZOCHAL: Comparative study of measurement systems used to evaluate vibrations of rolling bearings	42
---	----

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



ONDREJ BABIK, ANDREJ CZAN, JOZEF HOLUBJAK, ROMAN KAMENIK, JOZEF PILC:	
Identification of surface characteristics created by miniature machining of dental implants made of titanium based materials.....	43
MICHAL BALLAY, MIKULAS MONOSI:	
Selected aspects of the relationship between scientific - technological development of structures of passenger cars of the recovery and hydraulic equipment fire and rescue corps used in rescue operations	44
JAN DIZO, STASYS STEISUNAS, MIROSLAV BLATNICKY:	
Vibration analysis of a coach with the wheel-flat due to suspension parameters changes	45
TOMAS DODOK, NADEZDA CUBONOVA, MIROSLAV CISAR, IVAN KURIC, IVAN ZAJACKO:	
Utilization of strategies to generate and optimize machining sequences in CAD/CAM.....	46
MARIO DRBUL, ANDREJ CZAN, MICHAL SAJGALIK, MARIANNA PIESOVA, KRZYSZTOF STĘPIEŃ:	
Influence of normal vectors on the accuracy of product's geometrical specification	47
ŁUKASZ GORYCKI, STANISŁAW ADAMCZAK, WŁODZIMIERZ MAKIEŁA, MATEUSZ WRZOCHAL:	
Investigation the influence of the curvature ratio on the frictional moment in rolling bearings	48
VLADIMIR HAUSER, OLENA NOZHENKO, KATERYNA KRAVCHENKO, MARIA LOULOVA, JURAJ GERLICI, TOMAS LACK:	
Proposal of a steering mechanism for tram bogie with three axle boxes	49
VLADIMIR HAUSER, OLENA NOZHENKO, KATERYNA KRAVCHENKO, MARIA LOULOVA, JURAJ GERLICI, TOMAS LACK:	
Impact of three axle boxes bogie to the tram behavior when passing curved track	50
HUBERT IGLIŃSKI, MACIEJ BABIAK:	
Analysis of the potential of autonomous vehicles in reducing the emissions of greenhouse gases in road transport.....	51
JAROSLAV ILONCIAK, LUBOS STRUHARNANSKY, JOZEF KUCHTA:	
Modular concept of auxiliary converters for diesel electric locomotives	52
EVA JANCARIKOVA, JAN MIKOLAJ, PETER DANISOVIC:	
Risk and incidents assessment in Slovak road tunnels	53
REMIGIUSZ JASIŃSKI, JAROSLAW MARKOWSKI, JACEK PIELECHA:	
Probe positioning for the exhaust emissions measurements	54



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

ROMAN KAMENIK, JOZEF PILC, DANIEL VARGA, JURAJ MARTINCEK, MAREK SADILEK:	
Identification of tool wear intensity during miniature machining of austenitic steels and titanium	55
NIKOLA KANTOVA, MICHAL HOLUBCIK, JOZEF JANDACKA, ALEXANDER CAJA:	
Comparison of particulate matters properties from combustion of wood biomass and brown coal	56
PAVEL KARLOVSKY, JIRI LETTL:	
Application of MRAS algorithm to replace the speed sensor in induction motor drive system	57
MATUS KORFANT, MARIAN GOGOLA:	
Possibilities of using traffic planning software in Bratislava	58
TOMASZ KOZIOR, CZESŁAW KUNDERA:	
Evaluation of the influence of parameters of FDM technology on the selected mechanical properties of models	59
RADIM LENORT, DAVID STAS, DAVID HOLMAN, PAVEL WICHER:	
A3 method as a powerful tool for searching and implementing green innovations in an industrial company transport	60
IVICA LJUBAJ, TOMISLAV JOSIP MLINARIĆ, DINO RADONJIĆ:	
Proposed solutions for increasing the capacity of the Mediterranean Corridor on section Zagreb - Rijeka	61
WŁODZIMIERZ MAKIEŁA, DAMIAN GOGOLEWSKI:	
Variability evaluation of signal in two-dimensional wavelet decomposition using fractal dimension	62
JAROSLAW MARKOWSKI, JACEK PIELECHA, REMIGIUSZ JASIŃSKI:	
Model to assess the exhaust emissions from the engine of a small aircraft during flight	63
PAVOL MARTIKAN, ANDREJ CZAN, JOZEF HOLUBJAK, DANIEL VARGA, JURAJ MARTINCEK, TATIANA CZANOVA:	
Verification of new method of determining the roughness parameters for rotational turning with non-linear cutting edge	64
HANA NERADILOVA, GABRIEL FEDORKO:	
Simulation of the supply of workplaces by the AGV in the digital factory	65
NOWAKOWSKI ŁUKASZ, WIJAS MARTA:	
Finishing surface after regeneration with laser cladding	66
ŁUKASZ J. ORMAN, ANDREJ KAPJOR, MARTIN VANTUCH:	
Boiling heat transfer phenomenon on different structural coatings	67

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



MATEJ PALACKA, PETER VICIAN, MICHAL HOLUBCIK, JOZEF JANDACKA:	
The energy characteristics of different parts of the tree.....	68
ANTONS PATLINS:	
Improvement of sustainability definition facilitating sustainable development of public transport system	69
TIBOR PETROV, MILAN DADO, KARL ERNST AMBROSCH:	
Computer Modelling of Cooperative Intelligent Transportation Systems	70
MARIANNA PIEŠOVA, ANDREJ CZAN, MICHAL SAJGALIK,	
TATIANA CZANOVA, ROBERT CEP:	
Experimental quantification of the austenitic phase in steels using the Average peak method of x-ray diffractometry.....	71
PETR PICHLIK, JIRI ZDENEK:	
Dependence of locomotive adhesion force estimation by a Kalman filter on the filter settings.....	72
POŁKA MARZENA, PTAK SZYMON:	
Impact of biomass implementation on coal burning installations.....	73
MARZENA POŁKA, SZYMON PTAK, ŁUKASZ KUZIORA:	
The use of UAV's for search and rescue operations	74
LUCIA RADACOVSKA, MICHAL HOLUBCIK, RADOVAN NOSEK,	
JOZEF JANDACKA:	
Influence of bark content on ash melting temperature.....	75
STEFAN REZNÍČAK, MARCEL NOVOMESTSKÝ, HELENA SMATANOVÁ,	
ANDREJ KAPJOR, MILAN MALCHO:	
Measuring the thermal output of the piping system.....	76
JAN SIAZIK, MILAN MALCHO:	
Accumulation of primary energy into natural gas hydrates	77
TOMAS SKRUCANY, MARTIN KENDRA, MILAN SKORUPA, JURAJ GRENCIK,	
TOMASZ FIGLUS:	
Comparison of chosen environmental aspects in individual road transport and railway passenger transport	78
PAVEL SOVICKA, MATEJ PACHA, PAVOL RAFAJDUŠ:	
Model railway traction performance measurements and analysis.....	79
LUBOS STRUHARNANSKY, JAN VITTEK, PAVOL MAKYS,	
JAROSLAV ILONCIÁK:	
Vector control techniques for traction drive with induction machines - comparison.....	80
DENIS ŠÍPUS, BORNA ABRAMOVIĆ:	
The possibility of using public transport in rural area	81
MILAN SKORUPA , MARTIN KENDRA:	
Proposal of backbone public transport lines in the Upper Saris region	82



TRANSCOM 2017, 31 May – 2 June 2017 High Tatras, Grand Hotel Bellevue, Slovak Republic

VLADIMIR TLACH, IVAN KURIC, DARINA KUMICAKOVA, ALEXANDER RENGEVIC:	
Possibilities of a Robotic End of Arm Tooling Control within the Software Platform ROS	83
MILAN VETERNIK, MARIAN GOGOLA:	
Examining of correlation between demographic development of population and their travel behaviour	84
PETER VICIAN, MATEJ PALACKA, PETER DURCANSKY, JOZEF JANDACKA:	
Determination of optimal position of solar trough collector.....	85
WLODARCYK K., KOWALCZYK J., ULBRICH D., SELEH J.:	
A review of non-destructive evaluation methods of prototype module of drying line used to receive RDF fuel from waste recycling	86
EMIL WROBLEWSKI, ANTONI ISKRA, MACIEJ BABIAK:	
Geometrical structures of the stepped profile bearing surface of the piston	87
ZDENKA ZAHUMENSKA, JOZEF GASPARIK:	
Supporting the connection the logistics centers to rail network	88
LUCIA ZAUSKOVA, ANDREJ CZAN, MICHAL SAJGALIK, MARIO DRBUL, ZDENKA RYSAVA:	
Triaxial measurement of residual stress after high feed milling using x-ray diffraction	89

Topic 3 CONSTRUCTION 91

STANISŁAW ADAMCZAK, KRZYSZTOF STEPIEŃ, URSZULA KMIECIK- SOŁTYSIAK:	
A concept of an application of couples comparing method to the comparison of roundness profiles.....	92
PETER BARAN, MIŁOS BREZANI, PAVOL KUKUCA, PAVOL STASTNIAK:	
Basic dynamical analysis and comparison of balancing systems of non-conventional piston machine FIK	93
MAREK BISTAK, STEFAN MEDVECKY, SLAVOMIR HRCEK:	
The above-ground weighbridge, T	94
KINGA BROZDA, JACEK SELEJDAK, PETER KOTES:	
The analysis of beam reinforced with FRP bars in bending	95
PETRA BUJNAKOVA, MIROSLAV STRIESKA:	
Development of precast concrete bridges during the last 50 years in Slovakia	96
MARCEL CACO, ROBERT KOHAR, SLAVOMIR HRCEK, RASTISLAV TRIBULA, PETER SCERBA:	
Use the method of TRIZ in optimizing automated machine for ultrasonic welding	97

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



LUCIA FIGULI, ZUZANA ZVAKOVA, CHIARA BEDON: Design and analysis of blast loaded windows	98
LUKASZ FILAR, JERZY KAŁUŻA, MAREK WAZOWSKI: Bridge load tests in Poland today and tomorrow – the standard and the new ways in measuring and research to ensure transport safety	99
LUDOVIT FILLO, MAREK CUHAK, MARIA MINAROVA: Resistance of Concrete Slender Columns.....	100
DASA FULLOVA, DANIELA DURCANSKA, JITKA HEGROVA: Impact of asphalt mixture composition on particulate matter production.....	101
STANISLAV GRAMBlickA, ROBERT KOHAR, MARIAN STOPKA: Dynamic analysis of mechanical conveyor drive system	102
SIMON HOLODA, PAVOL PECHO, MICHAL JANOVEC, MARTIN BUGAJ: Modification in structural design of L-13 "Blanik" aircraft's wing to obtain airworthiness	103
SASA M. KALINOVIĆ, JELENA M. DJOKOVIĆ, RUZICA R. NIKOLIĆ: Influence of windows geometrical parameters on calculations of the heat conduction coefficient.....	104
MARIUSZ KOSTRZEWSKI, RAFAŁ MELNIK: Numerical dynamics study of a rail vehicle with differential gears.....	105
MARIUSZ KOSTRZEWSKI: Implementation of distribution model of an international company with use of simulation method	106
MONIKA KUBZOVA, VIT KRIVY, KATERINA KREISLOVA: Influence of chloride deposition on corrosion products.....	107
LADISLAV MICHALKA, IVAN SILACI: The transformation of transport and public spaces of the selected rural settlement	108
MARTIN MOCILAN, MILAN ZMINDAK, PETER PECHAC, PETER WEIS: CFD simulation of hydraulic tank	109
MARTIN MRUZEK, IGOR GAJDAC, LUBOS KUCERA, TOMAS GAJDOSIK: The possibilities of increasing the electric vehicle range.....	110
PETER PECHAC, MILAN SAGA, PETER WEIS: Feasibility study of using artificial neural networks for approximation of n-dimensional objective functions in memetic algorithms for structural optimization.....	111
EWA ROSTEK, MACIEJ BABIAK, EMIL WROBLEWSKI: The influence of oil pressure in the engine lubrication system on friction losses	112
SELECH J., ULBRICH D., WLODARCZYK K., KOWALCZYK J., ADAMKIEWICZ J. : The prototype of stream amplifier used in transport of polydisperse medium.....	113



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

ZUZANA STANKOVICOVA, VLADIMIR DEKYS, PAVOL NOVAK, BOHUMIR STRNADEL: Detection of natural frequencies using IR camera.....	114
TOMASZ STASKIEWICZ, BARTOSZ FIRLIK: Influence of tram wheel profile geometry on wear intensity	115
STOKŁOSA JOZEF, JAŚKIEWICZ MAREK, WIĘCKOWSKI DARIUSZ: Modelling the longitudinal dynamics of long freight trains on Broad Gauge Metallurgical Railway Line	116
MARIAN STOPKA, ROBERT KOHAR, STANISLAV GRAMBlickA, RUDOLF MADAJ: Dynamical analysis of 3D printer's powertrain.....	117
JAN STEININGER, SLAVOMIR HRCEK, BRANISLAV KRCHNAVY: The design of universal loading device for a grinding machines.....	118
MARIA TOMASIKOVA, MICHAL TROPP, TOMAS GAJDOSIK, LESZEK KRZYWONOS, FRANTISEK BRUMERICIK: Analysis of transport mechatronic system properties	119
MICHAL TROPP, MARIA TOMASIKOVA, RONALD BASTOVANSKY, LESZEK KRZYWONOS, FRANTISEK BRUMERICIK: Concept of deep drawing mechatronic system working in extreme conditions	120
PETER WEIS, LUBOS KUCERA, PETER PECHAC, MARTIN MOCILAN: Modal analysis of gearbox housing with applied load	121

Topic 4 ECONOMICS AND MANAGEMENT 123

ROBERT BEREZNY, VLADIMIR KONECNY: The impact of the quality of transport services on passenger demand in the suburban bus transport	124
MONIKA BUCKOVA, MARTIN KRAJCOVIC, MILAN EDL: Computer simulation and optimization of transport distances of order picking processes	125
ANDREA COREJOVA, MARIA ROSTASOVA, TATIANA COREJOVA: Knowledge transfer model and spin-off company set up in significant academic centres in Taiwan.....	126
PETER DORCAK, PETER MARKOVIC, FRANTISEK POLLAK: Multifactor analysis of online reputation of selected car brands	127
PAWEŁ DROŹDZIEL, MONIKA WIŃSKA, RADOVAN MADLENAK, PAWEŁ SZUMSKI: Optimization of the post logistics network and location of the local distribution center in selected area of the Lublin province.....	128

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



LUKAS FALAT, MARTIN HOLUBCIK:	
The Influence of Marketing Communication on Financial Situation of the Company – A Case from Automobile Industry	129
PATRIK FERENC, MICHAL VARMUS, JOSEF VODAK:	
Stakeholders in the various field and relations between them	130
IVALDO DE MELO FERREIRA, RAPHAEL TOBIAS DE VASCONCELOS BARROS, JAKUB SOVIAR:	
Brazilian waste management: Belo Horizonte's case study of sustainable management	131
RADOVAN FURMANN, BEATA FURMANNOVA, DOROTA WIĘCEK:	
Interactive design of reconfigurable logistics systems	132
MIROSLAV FUSKO, MIROSLAV RAKYTA, FRANTISEK MANLIG:	
Reducing of intralogistics costs of spare parts and material of implementation digitization in maintenance	133
KATARINA GASOVA, KATARINA STOFKOVA:	
E-Government as a quality improvement tool for citizens' services	134
MARTINA GASOVA, MARTIN GASO, ANDREJ STEFANIK:	
Advanced industrial tools of ergonomics based on Industry 4.0 concept	135
INGO GESTRING:	
Life cycle and supply chain management for sustainable bins	137
TOMAS GREGOR, MARTIN KRAJCOVIC, DARIUSZ WIĘCEK:	
Smart Connected Logistics.....	138
KATARINA GUBINIOVA, GABRIELA PAJTINKOVA BARTAKOVA, JULIANA MRUSKOVICOVA, SILVIA TRELOVA:	
Appraisal of driving forces in the reverse distribution channel in the Slovak Republic	139
BEATA HOLKOVA, LUKAS FALAT:	
Statistical Learning as a Tool for Optimizing the Level of Excise Tax of Mineral Oils in Slovakia	140
MARTIN HUDAK, EVA KIANICKOVA, RADOVAN MADLENAK:	
The importance of e-mail marketing in e-commerce.....	141
DENISA JANASOVA, VERONIKA BOBANOVA, STANISLAVA STRELCOVA:	
Networking of small and medium enterprises into clusters in the Slovak Republic	142
MATEJ KOVALSKY, BRANISLAV MICIETA:	
Support planning and optimization of intelligent logistics systems.....	143
MIROSLAVA KRAMAROVA, LUBOSLAV DULINA, IVANA CECHOVA:	
Forklift workers strain of spine at industrial logistics in depending on human work posture	144



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

LADISLAV KRKOSKA, MILAN GREGOR, JOZEF MATUSZEK: Simulation of human effect to the Adaptive Logistics System used in public facilities	145
JOZEF KUBAS, VIKTOR SOLTES, JAN MISIK, ZUZANA STOFKOVA: Efficiency of using financial resources and their impact on security in a local context	146
STEFAN KUDLAC, JOZEF MAJERCAK, CEZARY MAŃKOWSKI: The proposal of coordination the rail and bus passenger transport on the relation Zilina – Ruzomberok.....	147
VILIAM LENDEL, DOMINIKA MORAVCIKOVA, MARTIN LATKA: Organizing Innovation Activities in company.....	148
THOMAS LIEBETRUTH: Sustainability in performance measurement and management systems for supply chains.....	149
MARIA MATUSKOVA, MATEJ PECHOTA, LUCIA MADLENKOVA: The trend of cost of universal services provided by national postal operator and correlation between price of letter mail and amount of sent letter mails in Slovakia.....	150
IVETA MEDVECKA, VLADIMIRA BINASOVA, LIBOR KUBINEC: Planning and performance evaluation of the manufacturing organizations	151
MARKO PEDAN, MILAN GREGOR, DARIUSZ PLINTA: Implementation of Automated Guided Vehicle system in healthcare facility.....	152
FRANTISEK PETRO, VLADIMIR KONECNY: Calculation of emissions from transport services and their use for the internalisation of external costs in road transport	153
TATIANA POTKANOVA, MARIA DURISOVA: Specificities identification of value management of companies providing transport services	154
TATIANA POTKANOVA, LUKAS FALAT: Suggested credit score of municipalities as a tool for more efficient city management	155
MAREK POTKANY, LUCIA KRAJCIROVA: Cost reporting of the transport company and its use in decision-making	156
JAKUB SOVIAR, MARTIN HOLUBCIK, JOSEF VODAK: Cooperation management on construction business market in the Slovak republic – an Insight from a Company	157
NATALIA STALMASEKOVA, TATIANA GENZOROVA, TATIANA COREJOVA, LUCIA GASPEROVA: The impact of using the digital environment in transport.....	158

TRANSCOM 2017, 31 May – 2 June 2017
 High Tatras, Grand Hotel Bellevue, Slovak Republic



IVANA SULIROVA, LUDMILA ZAVODSKA, MIROSLAV RAKYTA, VERA PELANTOVA:
 State-of-the-art approaches to material transportation, handling and warehousing 159

AGNIESZKA SZUMILAS, PAWEŁ PACH:
 Review of parking policies in the case of medium-sized Polish cities..... 160

VLADIMIRA STEFANCOVA, EVA NEDELIAKOVA, CARLOS LOPEZ-ESCOLANO:
 Connection of dynamic quality modeling and Total Service Management in railway transport operation 161

ANNA TOMOVA, MATUS MATERNA:
 The directions of on-going air carriers' hybridization: Towards peerless business models? 162

PETER VARJAN, DOMINIKA ROVNANIKOVA, JOZEF GNAP:
 Examining changes in GDP on the demand for road freight transport 163

LUKAS VARTIAK, MIRIAM JANKALOVA:
 The Business Excellence assessment 164

VLADIMIR VAVRIK, MILAN GREGOR, PATRIK GRZNAR:
 Computer simulation as a tool for the optimization of logistics using automated guided vehicles 165

VLADISLAV ZITRICKY, LENKA CERNA, BORNA ABRAMOVIC:
 The proposal for the allocation of capacity for international railway transport 166

DIANA ZRAKOVA, MILAN KUBINA, GABRIEL KOMAN:
 Influence of information-communication system to reputation management of a company..... 167

Topic 5 INFORMATICS AND SAFETY 168

JOZEF BALAK, PETER ZDANSKY:
 Modelling of transition of system with standby redundancy into failed state 169

PETER DANISOVIC, EVA JANCARIKOVA, JURAJ SRAMEK, MILOS ZUZIAK:
 Fire spread models and Tunnel Traffic & Operation Simulator 170

MILAN DERMEK:
 The parameters of the optimal method of water transport to forest fires 171

MILAN DERMEK, BOHUSLAVA KOZICOVA:
 Deployment of pond system to firefighting in extreme terrain conditions..... 172

MICHAL DURACIK, EMIL KRSAK, PATRIK HRKUT:
 Current trends in source code analysis, plagiarism detection and issues of analysis big datasets..... 173



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

VLADIMIR FALTUS, PAVEL PRIBYL, ONDREJ PRIBYL, LUKAS HRDINA:	
Sustainability of large urban transport structures in terms of traffic and environment	174
ADELAIDA FANFAROVA, LADISLAV MARIS:	
Simulation tool for fire and rescue services	175
PAWEL GROMEK:	
ADR safety system in efficiency conditioning	176
JAN HAVKO, VERONIKA MITASOVA, TOMAS PAVLENKO, MICHAL TITKO, JANA KOVACOVA:	
Financing the disaster resilient city in the Slovak Republic	177
JAN HAVKO, MICHAL TITKO, JANA KOVACOVA:	
Vulnerability of the city infrastructure as a part of the resilient city concept	178
MILOS HERDA:	
Parallel genetic algorithm for capacitated p-median problem	179
KATARINA HOLLA, VERONIKA MITASOVA, TOMAS PAVLENKO:	
Risk assessment model verification in hazardous industrial processes.....	180
MATEJ KADLIC, VLADIMIR MOZER:	
Uncertainties associated with tunnel design fire scenarios.....	181
PETER KELLO, JOZEF HRBCEK, JURAJ SPALEK:	
The tunnel ventilation system in MATLAB in cooperation with TuSim.....	182
JOANNA KOZIOL, PAWEL GROMEK:	
Creating safety in transport – traffic risk approach	183
MICHAL KVET, KAROL MATIASKO:	
Temporal index location in multiple tablespace type definitions	184
MAROS LACINAK, JOZEF RISTVEJ:	
Smart city, Safety and Security	185
DANIEL LORENCIK, ANNA MACIAKOVA:	
Safety of personal vehicles on mountain passes during the winter period.....	186
JULIA MIHOKOVA JAKUBCEKOVA, RADKA PRIVAROVA:	
Risk of emergency supply to the evacuated population of basic foodstuffs	187
MORENO NAVARRO J.G, ISMAIL HILAL:	
GIS modeling for motorways of the sea	188
DUSAN NEMEC, MARIAN HRUBOS, MICHAL GREGOR, EMILIA BUBENIKOVA:	
Visual localization and identification of vehicles inside a parking house.....	189
PITLOVA EVA, KOCIANOVA ANDREA:	
Case study: capacity characteristics comparison of single-lane roundabout and turbo-roundabouts	190
IVANA POBOCIKOVA, ZUZANA SEDLIACKOVA, MARIA MICHALKOVA:	
Application of four probability distributions for wind speed modeling.....	191

TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



RADKA PRIVAROVA, JULIA MIHOKOVA JAKUBCEKOVA:	
Selecting a replacement source of water for emergency supplies in case of Emergency	192
ONDREJ PRIBYL, PAVEL PRIBYL, TOMAS HORAK:	
System for deterministic risk assessment in road tunnels	193
JAN RACKO, JURAJ MACHAJ, PETER BRIDA:	
Wi-Fi fingerprint radio map creation by using interpolation	194
SIMONA SLIVKOVA, DAVID REHAK, VERONIKA NESPOROVA, MICHAELA DOPATEROVA:	
Correlation of core areas determining the resilience of critical infrastructure	195
ANTON SISER, TOMAS LOVECEK, LADISLAV MARIS:	
Simulation of possible assault vectors in an attack using a real-life waterworks object as a use case.....	196
TIBOR TRNOVSZKY, PETER SYKORA, ROBERT HUDEC:	
Comparison of background subtraction methods on near Infra-Red spectrum video sequences	197
TOMAS URICA, ANNA SIMONOVA:	
Simulation of an on-off controller for systems of second order with the use of LabVIEW	198
KATERINA VICHOVA, MARTIN HROMADA, DAVID REHAK:	
The use of crisis management information systems in rescue operations of Fire Rescue Service of the Czech Republic	199



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



Topic1 MATERIALS

Reviewers:

Belan Juraj
Bokuvka Otakar
Brodnan Miroslav
Bujnak Jan
Celko Jan
Daskova Jaroslava
Domanski Tomasz
Drusa Marian
Guagliano Mario
Hadzima Branislav
Hurta Stanislav
Janousek Ladislav
Kolisko Jiri
Konecna Radomila
Kubissa Wojciech
Kudrna Jan
Kucharikova Lenka
Liptakova Tatiana
Markovicova Lenka

Mazur Magdalena
Melo Ivan
Mica Lumir
Moravcik Martin
Nikolic Ruzica
Novy Frantisek
Pudis Dusan
Rikovsky Vladimir
Stehlik Dusan
Tanski Tomasz
Tarjanyi Norbert
Tarjanyiova Gabriela
Tilova Eva
Uhrick Milan
Ulewicz Robert
Vasko Alan
Vejmelkova Eva
Zatkalikova Viera
Zmindak Milan



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Measurement and numerical analyses of residual stress distribution near weld joint

Vladislav Baniari^a, Maria Blatnicka^a, Michal Sajgalik^b,
Milan Vasko^a; Milan Saga^a

^a*Department of Applied Mechanics, Faculty of Mechanical Engineering, University of Zilina, Univerzitna 1, 010 26 Zilina, Slovak Republic*

^b*Department of Machining and Manufacturing Technologies, Faculty of Mechanical Engineering, University of Zilina, Univerzitna 1, 010 26 Zilina, Slovak Republic*

Abstract

The aim of this paper is experimental X-ray verification of residual stresses in high strength steel materials after welding and numerical approximation of all stress components on the surface of the specimen. Welding of plates with square notch without thermal preprocessing or postprocessing can cause normal and tangential stresses in basic material. These stress functions will be evaluated near weld joint. The following numerical analyses can show the type and the size of loadings that can be transferred with this type of joined constructions.

Keywords: high strength steel; weld joint; residual stress; X-ray verification; numerical analysis; Finite Element Method (FEM)



Deburring and smoothing the edges using vibro-abrasive machining

Damian Bańkowski^a, Daniel Krajcarz^a,
Piotr Młynarczyk^a

^a*Kielce University of Technology, Kielce, Poland, EU*

Abstract

The paper presents an analysis of the applicability of vibro-abrasive machining for smoothing sharp edges and deburring. The basic conditions for the formation of burrs in machining and shapes of burrs on the edges of objects machined, at the exit of the tool have been defined. Possible ways of removing burrs are quoted. The results of research of deburring and smoothing, rounding sharp edges using vibro-abrasive machining are presented. To illustrate the surface taper ratio and edge the optical microscope Nikon Eclipse MA 200 with the image analysis system NIS 4.20 was used. The effect of treatment time on the final effect of removing burrs from aluminum tube after cutting with band saw was defined.

Keywords: fine machining; vibro-abrasive; rotofinish; tumbling; burrs removing



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Corrosion resistance of Domex 700 steel after combined surface treatment in chloride environment

Kamil Borko^a, Branislav Hadzima^{a,b},
Martina Neslusan Jackova^b

^a*Department of Materials engineering, Faculty of Mechanical, University of Zilina, 010 26
Zilina, Slovakia*

^b*Research Centre, University of Zilina, 010 26 Zilina, Slovakia*

Abstract

Nowadays is a trend to use high strength structural materials, especially high strength steels. The most positive advantage of the high strength steels is a reduction of the total constructions and machines weight by reducing the thickness of supporting cross section while retaining the required characteristics (e.g. tensile strength, yield strength, ductility, etc.). However, the usage of high strength steels does not lead to increase of corrosion resistance of steel constructions and machines. A proper selection of surface treatments combination can increase the corrosion resistance of high strength steels by several times. The purpose of this paper was to evaluate the effect of various surface treatment combinations (grinding, phosphating and shot peening) on corrosion resistance of Domex 700 high strength steel by electrochemical tests. The selected electrochemical environment was 0.1M NaCl which corresponds to chloride concentration in seaside atmosphere. Electrochemical characteristics were determined by linear polarization tests (LP). From the obtained results it is clear, that the surface pretreatment by shot peening deteriorates the corrosion resistance of HSLA Domex 700 steel and subsequently created phosphate layer too.

Keywords: corrosion resistance; domex, steel; surface treatment



Influence of the rheological properties of SCC on the formwork pressure

Michał P. Drewniak^a, Grzegorz Cygan^b, Jacek
Gołaszewski^b

^a*Department of Engineering, University of Cambridge, Trumpington Street, Cambridge,
CB2 1PZ, United Kingdom*

^b*Faculty of Civil Engineering, Silesian University of Technology, 5 Akademicka Street, 44-
100 Gliwice, Poland*

Abstract

Formworks for self-compacting concrete (SCC) are commonly designed under the assumption of full hydrostatic pressure. However, current research shows that SCC's design pressure could be reduced, if the concrete's rheological properties were taken into account. Knowing the relationship between the properties and the pressure, we can prevent formwork overdesign. This research was based on the assumption that fresh concrete can be described as a Bingham fluid. This paper presents the correlations between static and dynamic yield stress, and lateral formwork pressure. Measured rheological parameters were compared to standard technical concrete tests. Formwork pressure were determined on the element imitating a column with dimensions of 0.20x0.20m and a height of 1.20 m with two casting speeds 1 and 7m/h. Three types of cement, 2 superplasticizers, and 2 w/c ratios were used. A correlation between rheological parameters and pressure reduction over time was observed. Based on our results we propose a methodology and testing sequence applicable in practice.

Keywords: SCC; fresh concrete; rheological properties; formwork pressure



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Quantification of aggregate surface texture based on three dimensional microscope measurement

Zuzana Florkova^a, Michal Jambor^b

^aResearch centre, University of Zilina, Univerzita 8215/1, Zilina SK-010 26, Slovak Republic

^bDepartment of materials engineering, University of Zilina Univerzita 8215/1, Zilina SK-010 26, Slovak Republic

Abstract

At the present time, the usage of optical microscopy allows extension of aggregate surface texture detection methods. Three-dimensional data outputs of the aggregate particles can be obtained by these methods and provide additional opportunities in the field of texture evaluation. In this paper, the new approach for quantification of aggregate particle texture is described. Aggregate particles with different texture were scanned by the stereomicroscope and the data files with three-dimensional information were exported. The MicroSYS program was developed to determine new three-dimensional texture evaluating parameter. The Z-plane volume difference characteristic represents aggregate surface texture as a percentage difference between two volumes (aggregate volume and wrapping volume).

Keywords: optical microscopy; aggregate; texture; three-dimensional



Influence of low pressure steam curing on development of strength of mortars based on cement with high-calcium fly ash

Małgorzata Gołaszewska^a, Tomasz Ponikiewski^a

^a*Silesian University of Technology, Faculty of Civil Engineering, Akademicka 5, Gliwice 44-100, Poland*

Abstract

Due to sustainable development policy, concrete additives such as high-calcium fly ash (HCFA) are nowadays used more often than ever and in wider range of possible uses. Therefore, research into characteristics of HCFA and its influence on the properties of cement and concrete is extremely relevant in current concrete technology. In this paper, Authors present the results of research into influence of low-pressure steam curing on compressive strength of mortars with HCFA. Samples of five different cements (CEM II/B-M(S-W) 10/20, CEM II/B-M(S-W) 20/10, CEM II/B-W, CEM II/B(V - W), CEM II/B(LL-W)) were steam-cured in temperatures 40°C, 60°C and 80°C. Conducted compressive strength tests confirmed the possibility of using cements with HCFA in mortars undergoing low-pressure steam curing in this aspect.

Keywords: low pressure steam curing; high-calcium fly ash; mortars; compressive strength



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Homomorphic model pavement with sub base layer of foam concrete

Matej Hajek^a, Martin Decky^a

*^aDepartment of Highway Engineering, Faculty of Civil Engineering, University of Zilina,
Univerzitna 8215/1, 010 26 Zilina, Slovakia*

Abstract

Nowadays, it is necessary to develop new building materials, which are in accordance with the principles of the following provisions of the Roads Act: The design of road is a subject that follows national technical standards, technical regulations and objectively established results of research and development for road infrastructure. The foam concrete, as a type of lightweight concrete, offers advantages such as low bulk density, thermal insulation and disadvantages that will be reduced by future development. The contribution focuses on determination of the flexural strength of test specimens Poroflow 17-5 in combination with various basis weights of the underlying geotextile. Based on the achieved material characteristics, the tensile strength in bending of previously used road construction materials was compared to innovative alternative of foam concrete and the suitability for the base layers of pavement roads was determined. The executed assessment is according to the methodology of assessing the existing asphalt pavements in Slovak Republic. Based on the results obtained from the research, a model was created to analyze the state of stress in structural layers of foam concrete.

Keywords: foam concrete; flexural strength; test experiment equipment



Conductive biomaterial inhomogeneities modeling in electromagnetic nondestructive evaluation

Vladimir Chudacik^a, Milan Smetana^a, Klara Capova^a

^a*Department of Electromagnetic and Biomedical Engineering, Faculty of Electrical Engineering, University of Zilina, Univerzitna 1, 010 26 Zilina, Slovak Republic*

Abstract

A three-dimensional numerical modeling is an appropriate tool for analyzing and estimating of the physical material properties in general. This article is focused on the modeling of inhomogeneities in the austenitic stainless steels, which are used as biomaterials. These materials can interact with a biological tissue inside a human body. In addition, these steels are also widely used in many industry and transport sectors. Three fundamental inhomogeneity models were created for this purpose. The models correspond to the real inhomogeneities that may occur in these materials (fatigue and stress-corrosion cracks). Third model is the artificial one, used as the reference sample. The all models are investigated by the eddy current testing method which is theoretically well-known and described for investigation of conductive biomaterials. The results of numerical simulation are presented and discussed in this paper.

Keywords: Non-destructive evaluation; eddy current testing; austenitic biomaterial



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Internal partial discharge in cavity of polyurethane

Emil Jahoda^a, Jozef Kudelcik^a

*^aDepartment of Physics, Faculty of Electrical Engineering, University of Zilina, Univerzitna
1, 010 26 Zilina, Slovakia*

Abstract

Parameters and time development of internal partial discharges in insulation material - polyurethane were studied. The internal defect was created by a needle, which was moved back by 1 mm in order to create an air filled cavity in addition to the micro-cavity at the tip of the needle. In the experiment polyurethane pattern was stressed by high AC voltage and parameters of the partial discharges until breakdown of insulation material were recorded. The discharge activity generated in the air cavity, the point of the greatest stress degrades gradually the insulation. This degradation is connected with growth of an electrical tree, which parameters are described. The apparent charge magnitude, voltage and the time of occurrence of each PD event were recorded by LDS- 6.

Keywords: Partial discharge; charge; polyurethane



Monitoring of weight loss of fibreboard during influence of flame

Patricia Kadlicova^a, Stanislava Gaspercova^a,
Linda Makovicka Osvaldova^a

^aUniversity of Zilina, Faculty of Security Engineering, Ul. 1. maja 32, 01 026 Zilina, Slovakia

Abstract

Choice of building materials today is influenced by numerous factors. One of the important factor except to good physical and mechanical properties is also the environmental impact. Just the organic processed of fibreboard is significantly different from other commonly used thermal insulation materials. In addition to good features the fibreboard has also in terms of fire protection poor quality and that it is a combustible material. It is for this reason that we have decided to make a fire test of fibreboard. As the test method, we chose a weight loss in the heat sources, and by delaying the time depending on the heat sources and the type of fibreboard. The theoretical part of the paper deals with the description of the material examined and the test methodology. The practical part consists of evaluation testing. Samples tested were two types of fibreboard, which is mainly used as thermal insulation material floating floors. The first test material is a fibreboard produced by pressing wood chips in a single layer. The other test materials consisted of pressed fibreboard in the form of thinner plates and then glued of several layers into a single unit. In addition to tracking the speed of weight loss, depending on the density of the samples we were compared and depending on the duration of action of flame and rate of weight loss of the sample.

Keywords: thermal insulation; fibreboard; weight loss; rate of burning



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Study of corrosion behavior of dicalcium phosphate-dihydrate (DCPD) coating prepared by large amplitude sinusoidal voltammetry (LASV) technique on ZW3 magnesium alloy

Daniel KajANEK^{a,b}, Filip Pastorek^a, Stanislava Fintova^c,
Adrian Baca^a

^aUniversity of Zilina, Research centre, Univerzitna 8215/1, 010 26 Zilina, Slovak Republic

^bUniversity of Zilina, Faculty of Mechanical Engineering, Univerzitna 8215/1, 010 26 Zilina, Slovak Republic

^cInstitute of Physics of Materials AS CR, Žitkova 22, 616 62 Brno, Czech Republic

Abstract

This study is focused on corrosion behavior of dicalcium phosphate-dihydrate (DCPD) coating electrodeposited by large amplitude sinusoidal voltammetry (LASV) technique on ZW3 magnesium alloy in sodium sulphate solution. The electrochemical characteristics of coated and non-coated samples were evaluated by potentiodynamic polarization (PD) tests in 0.1M Na₂SO₄ solution at the temperature of 22±1 °C. The PD curves were analyzed using Tafel extrapolation method. The analyzed values of the corrosion potential and corrosion current density obtained from PD tests proved that DCPD coating can effectively increase corrosion resistance and slow down degradation of ZW3 magnesium alloy in chosen environment.

Keywords: magnesium alloy; calcium phosphate; corrosion resistance; potentiodynamic polarization test



The effect of traverse speed on kerf width in AWJ cutting of ceramic tiles

Daniel Krajcarz^a, Damian Bańkowski^a, Piotr
Młynarczyk^a

*^aKielce University of Technology, Aleja Tysiąclecia Państwa Polskiego 7, Kielce, 25-314,
Poland*

Abstract

This article describes experiments performed to assess the effectiveness of abrasive waterjet (AWJ) traverse used to cut ceramic tiles. As the process does not involve high forces, it is important to select the correct traverse speed to obtain the required kerf width while keeping the efficiency of the cutting process high. The study focused on determining the influence of the traverse speed on the kerf width in ceramic tiles. The kerf width is one of the crucial parameters in AWJ cutting. Cutting with a high traverse speed can create tapered edges on the kerf. The experiments involved measuring the kerf width to determine the most suitable process parameters in the AWJ cutting of ceramic tiles. The top and bottom kerf widths were measured using optical microscopy images.

Keywords: waterjet cutting; ceramic tiles; garnet; surface quality



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

3D small-scale fire modeling experiments

Maros Krajcir^a, Jana Mullerova^a

^aUniversity of Zilina, Faculty of Security Engineering, 1.Maja 32, 010 08 Zilina, Slovak Republic

Abstract

The paper deals with problematic of fire experiments connected to Flashover phenomena. Real 3D experiments in small-scale need to be prepared in sense of exactness by exact calculations. The thermocouples are installed in three layers horizontally, and in five layers vertically. The heat flux of 15 or 20 kW.m⁻² need to be reached to reach the flashover condition. After that the 600°C can be reached as a minimal temperature and open fire escapes through the open vents. The measurements by Almemo station are continuously made, than data are to be statistically interpreted and conclusions are made.

Keywords: small-scale modelling; flashover; modelling principles



3D small-scale fire modeling testing preparation

Maros Krajcir^a, Jana Mullerova^a

^aUniversity of Zilina, Faculty of Security Engineering, 1.Maja 32, 010 08 Zilina, Slovak Republic

Abstract

The paper deals with problematics of small-scale fire tests – the preparation phase including mathematic π - non-dimensional groups in order to make a functional small-scale model representing the full scale modelling in the effective way. Exact calculation for suitable material need to be done to represent real walls with certain thickness and fire resistance. The interior represented by the cribs made mostly of wood, polymer and other materials common in rooms or offices need to be prepared in sense of their amount, position and porosity. After that the construction of the small-scale model can be started with respect to all the dimensions, amount and proportion of material calculations.

Keywords: Small-Scale Modelling; Preparation; Calculation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Giga-cycle Fatigue of AISI 316L after Sensitising of Structure

Jan Lago^a, Michal Jambora, Frantisek Novy^a,
Otakar Bokuvka^a, Libor Trsko^b

^aDepartment of Materials Engineering, Faculty of Mechanical Engineering, University of
Zilina, Slovakia

^bResearch Centre of the University of Zilina, Slovakia

Abstract

Giga-cycle fatigue ($10^7 < N < 10^{10}$ cycles) is subject of interest of the most important research centres in the world. This interest is involved by existing fatigue fractures of real mechanical parts after more than billions cycles and with growing demands on reliability and safety of structural components. Stainless austenitic steels are used in transport devices which are operated for long time at high temperatures. During operation at higher temperatures in these steels can occur microstructural changes, as result of sensitisation which can cause embrittlement. Authors present their own experimental results about fatigue resistance of sensitised austenitic stainless steel AISI 316L in the very high cycle region ($N = 2 \times 10^6 \div N = 5 \times 10^9$ cycles). Fatigue tests were carried out on the ultrasonic fatigue testing machine ($f = 20$ kHz) with symmetrical push-pull loading ($R = -1$) and at temperature $20 \pm 5^\circ\text{C}$. In the very high cycle region was observed continuous decrease of fatigue strength and there was no effect of sensitisation recorded on the fatigue properties.

Keywords: Giga-Cycle Fatigue; Austenitic Stainless Steel; Sensitisation; AISI 316L



Assessment of the construction welding process

Magdalena Mazur^a

^a*Czestochowa University of Technology, Faculty of Management, 42-201 Czestochowa,
Poland*

Abstract

The paper presents the stages of quality control of welding processes, which is implemented through: visual inspection, testing, measurement using a checking apparatus, patterns and comparison of the results with clasped values (acceptance criteria). These activities are carried out to determine the compatibility of the produced welded joint with the objectives of quality resulting from the technology qualification process. The aim of the study is to analyze the level of quality manufacturing processes carried out in the company relating to the production of welded structures including analysis of the used materials quality.

Keywords: welding process; quality control; FMEA method (Failure Mode and Effect Analysis); manufacturing process



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Alternative calculation of the retardation and relaxation spectra for the viscoelastic response of the solid phase materials

Maria Minarova^a, Jozef Sumec^a

^aSlovak University of Technology, Faculty of Civil Engineering, Radlinskeho 11, Bratislava, 81105, Slovak Republic

Abstract

It is a well-known fact that rheology operates within the material science. Viscoelastic models represent various materials' mechanical behavior as building materials, polymers, tissues. The constitutive relation of the model can be used for the prediction of the materials behavior. As each viscoelastic model consists of several Hookean elastic (H) and Newton viscous (N) matters, interconnected serially or in parallel, for constitutive equation deriving of the resulting model, the coupling of the elementary constitutive equations of (H) and (N) is performed with regard to configuration of the entire model. Within the creep and relaxation tests, the spectra of the retardation and relaxation are yielded. These spectra are important in hereditary integrals and Prony's series for materials that perform the hysteresis. As the mathematical tool the theory of ordinary differential equations systems is used.

Keywords: Rheological model; linear viscoelasticity; retardation, relaxation spectra; conditional stiffness; differential operator



The Selected Properties of the Micro Electrical Discharge Alloying Process Using Tungsten Electrode on Aluminum

Piotr Młynarczyk^a, Daniel Krajcarz^a, Damian Bańkowski^a

^aKielce University of Technology, Aleja Tysiąclecia Państwa Polskiego 7, Kielce, 25-314, Poland

Abstract

This paper presents a brief study of the effect of micro electro-discharge alloying (EDA) using tungsten electrode on the aluminum. The layers were investigated with metallographic methods and EDS analyses. Using the EDS analysis, types of alloying elements and the extent of diffusion from the electrode into to aluminum alloy were identified.

The paper deals also with a method of investigating traces made by micro electro-discharge alloying using scanning profilometer (SP) and optical microscopy with the image analysis system.

The results of investigations showed that there is a possibility of obtaining the satisfying layer between the aluminum and wolfram electrode using micro EDA.

Keywords: EDM; EDA; ESD; scanning profilometer; surface layer;



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Surface evaluation of AISI 316L after fatigue failure

Monika Oravcova^a, Peter Palcek^a, Maria Chalupova^a

^a*University of Zilina, Faculty of Mechanical Engineering, Department of Material Engineering, Univerzita 8215/1, 010 26 Zilina, Slovakia*

Abstract

Austenitic stainless steels are characterized as high corrosion resistant materials with high biotolerance and relatively high strength. They can be made strong by cold working and also can be made soft enough to be easily formed [1]. By cold working plastic deformation occurs. Austenitic steels are deformed by slipping and twinning during plastic deformation. The deformed region is presented by deformation twins and slip deformation [2]. This article presents an analysis of fracture surface of AISI 316L after three-point bending test. The fracture was evaluated by scanning electron microscopy. The fatigue behavior on microstructure was investigated and microhardness measurement under the originated crack was performed after cyclic loading on initial and sensitized specimens. Under the crack the zone of plastic deformation can be found.

Keywords: austenitic stainless steel; three-point bending test; plastic deformation; microhardness measurement



Corrosion resistance of WC-Cu coatings produced by electrospark deposition

Izabela Pliszka^a, Norbert Radek^a

^aTechnical University of Kielce, 1000-lecia Państwa Polskiego 7, PL-25314 Kielce, Poland

Abstract

The main objective of the present work was to determine the influence of laser treatment on corrosion resistance of coatings deposited on C45 carbon steel by the electro-spark deposition process. The studies were conducted using WC-Cu electrodes produced by the powder metallurgy route. The technology uses the phenomena of electrode material erosion and spark discharge between the electrodes, leading to the formation of a surface layer with characteristics different from those of the substrate. The use of these protective layers provides optimum resistance to corrosion.

Keywords: WC-Cu coating; corrosion; electro-spark deposition; laser treatment



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Accelerated Pavement Testing in Slovakia: APT Tester 105-03-01

Lubos Remek^a, Jan Mikolaj^a, Milan Skarupa^a

*^aZilinska Univerzita, Stavebna fakulta, Katedra technologie a manazmentu stavieb,
Univerzitna 8215/1, 01026 Zilina, Slovakia*

Abstract

This article presents the APT (Accelerated Pavement Testing) facility constructed and operated by University of Zilina. The machine is designated as APT tester 105–03–01. The article describes tester's technical properties, operational capabilities, sensory equipment embedded in the pavement and data gathering procedures. The device has several unique design solutions that make it stand out from similar facilities in the world:

The principle of fixed linear APT facility with loading unit not positioned in a fixed frame, but instead, moveable along a guiding rail to better simulate traffic loading.

Loading unit consisting of fixed and movable frame held by support connected by joints for better simulation of suspension like those found on truck axles.

The construction of the electric motor, gear box and frequency inverter and its mounting system on the loading unit.

Frequency converter controlled acceleration and deceleration and speed during the movement.

Hydraulic stabilization system stabilizing the movable frame preventing the load to tip the loading unit in the acceleration and deceleration stage.

Autonomous hydraulic system placed on the outer frame able to lift the loading unit and allows for free manipulation without acting on the pavement.

Keywords: Accelerated Pavement Testing; Pavement Performance; Pavement Management System



Fatigue resistance and influence of cutting technology on the mechanical properties of modern steels used in the automotive industry

Robert Ulewicz^a, Frantisek Novy^b

^a*Czestochowa University of Technology, Al. Armii Krajowej 19B, Czestochowa 42-201, Poland*

^b*University of Zilina, Univerzitna 1, 010 26 Zilina, Slovak Republic*

Abstract

Automotive industry is the one of the most rapidly developing sector of engineering. Using of new, progressive materials can make significant benefits because of growing durability and reducing weight of structural parts, which can lead to the materials and fuel savings. In this article authors present basic mechanical properties of high strength low alloyed steel (HSLA) and compares several types of different cutting technics in terms of changing mechanical properties in the areas near the cuts. The fatigue properties of Hardox 400 steel in the high and ultrahigh-cycle range were determined also. Authors compares results of their own experimental works and subsequently discuss these results and their possible effect on the design process. The paper includes analysis of application possibilities new types steels in the design of structural parts of semi-trailers chassis.

Keywords: HSLA; HARDOX 400; fatigue; technology of cutting



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Effect of carbon nanotubes on liquid crystal behavior in electric and magnetic fields studied by SAW

Marek Vevericik^a, Peter Bury^a, Peter Kopcansky^b,
Milan Timko^b, Zuzana Mitroova^b

^a*Department of Physics, Faculty of Electrical Engineering, University of Zilina, Univerzitna 1, 010 26 Zilina, Slovakia*

^b*Institute of Experimental Physics, Slovak Academy of Sciences, Watsonova 47, 040 01 Kosice, Slovakia*

Abstract

The effect of multi-walled carbon nanotubes (MWCNT) and functionalized MWCNT (MWCNT/Fe₃O₄) on structural changes in thermotropic liquid crystal (6CHBT) was studied using the attenuation measurement of surface acoustic wave (SAW) propagating along the liquid crystal. Both kinds of nanoparticles of low volume concentration (1×10^{-4}) were added to the liquid crystal during its isotropic phase. Pure 6CHBT liquid crystal was used for the comparison of structural changes and orientational coupling of the liquid crystals molecules with both types of carbon nanotubes. These observations proved, that the doping process significantly affected the behavior of liquid crystal in applied electric and magnetic fields, and indicated potential application.

Keywords: liquid crystal; carbon nanotubes (MWCNT); structural changes; surface acoustic wave



Effects of porosity on the fatigue behaviour of AlZn10Si8Mg casting alloys in a high cycle region

Denisa Zavodska^a, Eva Tillova^a, Mario Guagliano^b,
Maria Chalupova^a, Lenka Kucharikova^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Materials Engineering, Univerzitna 8215/1, 010 26 Zilina, Slovak Republic

^bPolitecnico di Milano, Department of Mechanics, Via La Masa 1, 20156 Milan, Italy

Abstract

The fatigue behaviour of AlZn10Si8Mg cast alloy used in an automotive industry and consequently effect of porosity was investigated for present study. The study was exploring for a lifetimes as long as 10⁶ cycles using rotating bending fatigue device operating at 30 Hz, at a room temperature 20±5 °C. The tested specimen's fracture surfaces and fracture profiles were observed with the use of a scanning electron microscope (SEM) and optical microscope to determine the fatigue crack initiation sites and porosity. A correlation was made between the sample fatigue life and the distribution of the pores and Fe-rich needle-like phases which initiated the fatigue crack. It was shown that fatigue life decreases as the surface pore size increases and that the crack initiation site contains multiple pores or consists of a spongy structure. Main factor for decreasing the fatigue life are these castings defects since 90 % of the samples examined tended to fracture as a result of the casting defects.

Keywords: AlZn10Si8Mg cast aluminium alloy; fatigue behaviour; surface porosity



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



Topic2 TECHNOLOGY

Reviewers:

Badura Stefan	Janota Ales	Papucik Stefan
Barta Dalibor	Jarina Roman	Patsch Marek
Bubenikova Emilia	Kaduchova Katarina	Pilat Peter
Bulej Vladimir	Kapitulik Jan	Pilc Jozef
Caja Alexander	Kapjor Andrej	Prazenica Michal
Camaj Juraj	Kendra Martin	Pribyl Ondrej
Cernecky Jozef	Kohar Robert	Rafajdus Pavol
Cilikova Maria	Konar Radoslav	Remek Lubos
Cisar Miroslav	Konecny Vladimir	Sapieta Milan
Cubonova Nadezda	Kuba Michal	Simonova Anna
Czan Andrej	Kubina Milan	Smatanova Helena
Drbul Mario	Kukuca Pavol	Soukup Josef
Drgona Peter	Kumicakova Darina	Spalek Juraj
Dubravka Peter	Lack Tomas	Stancek Jan
Dzurenda Ladislav	Lenhard Richard	Stefan Papucik
Gasparik Jozef	Lizbetin Jan	Stefanik Andrej
Gerlici Juraj	Madlenak Radovan	Strenitzerova Mariana
Gogola Marian	Majercak Jozef	Svetlik Jozef
Gregor Michal	Makovicka Osvaldova	Thomitzek Adam
Gregor Milan	Linda	Ulewicz Robert
Handrik Marian	Malcho Milan	Uricek Juraj
Hlavna Vladimir	Mesko Jozef	Vantuch Martin
Holubcik Michal	Mician Milos	Vasko Milan
Holubjak Jozef	Musak Marek	Vittek Jan
Hrbcek Jozef	Nedeliakova Eva	Vodak Josef
Hrcek Slavomir	Nemec Patrik	Zitricky Vladislav
Chudzikiewicz	Nosek Radovan	Zrak Andrej
Andrzej	Novy Frantisek	



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Comparative study of measurement systems used to evaluate vibrations of rolling bearings

Stanisław Adamczak^a, Krzysztof Stępień^a,
Mateusz Wrzochal^a

*^aKielce University of Technology, Faculty of Mechatronics and Mechanical Engineering,
al. Tysiąclecia Państwa Polskiego 7, Kielce 25-314, Poland*

Abstract

The vibrations generated by the rolling bearings have a significant impact on the quality, durability and reliability of the machines and mechanical devices. In addition, the bearings can be a source of vibrations which intensify the loudness of devices and produce significant and adverse reactions. The basic parameters describing the amplitude of the vibration of rolling bearings are: displacement, velocity and acceleration. In the global bearings technology especially favored by manufacturers, are measurement systems to measure the velocity of vibration. The level of vibration (which is determined by measuring the amplitude of velocity) can be expressed in specific units closely related to the rotational speed of the bearing. This unit is Anderon (linear unit, expressed in microns per second) or less used VL (logarithmic unit). Recently, for measurements of velocity of roller bearings vibrations are applied not only electrodynamic sensors, but also a laser vibrometers. To juxtapose the results obtained by various methods and devices, it is necessary to conduct comparative researches

Keywords: Ball bearings; vibrations; measurements



Identification of surface characteristics created by miniature machining of dental implants made of titanium based materials

Ondrej Babik^a, Andrej Czan^a, Jozef Holubjak^a,
Roman Kamenik^a, Jozef Pilc^a

*^aDepartment of Machining and Manufacturing Technology, University of Zilina, Univerzitná
1, 010 26 Zilina*

Abstract

One of the most important characteristic of dental implant made of biomaterials is ability to create correct interaction between implant and bone tissue. Since most of the implant surface is in direct contact with bone tissue, shape and integrity of said surface has great influence on successful osseointegration. The most implemented material in manufacturing of dental implants is titanium of different grades of pureness. Among other characteristics that predetermine titanium as ideal biomaterial, titanium shows high mechanical strength making precise miniature machining increasingly difficult. The article deals with resulting quality, integrity and characteristics of dental implants surface after machining.

Keywords: titanium; surface roughness; dental implan; osseointegration



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Selected aspects of the relationship between scientific - technological development of structures of passenger cars of the recovery and hydraulic equipment fire and rescue corps used in rescue operations

Michal Ballay^a, Mikulas Monosi^a

^aFaculty of Security Engineering, University of Zilina, 1. Maja 32, 010 26 Zilina

Abstract

The paper points to links between the scientific - technological development of structures of passenger cars of the recovery and hydraulic equipment used in rescue operations in the Fire and Rescue Service. At the same time it presents the results of an experiment that aimed to determine the time dependence of cutouts on the type and size of materials used in passenger cars. The experiment was applied to the pillars A and B and is based on the possibility of approach to optimizing technical procedures for rescue operations in road accidents in road transport.

*Keywords:*hydraulic extrication equipment; structural components car; experiment



Vibration analysis of a coach with the wheel-flat due to suspension parameters changes

Jan Dizo^a, Stasys Steisunas^b, Miroslav Blatnický^a

^aUniversity of Zilina, Univerzitna 8215/1, Zilina 010 26, Slovak Republic

^bVilnius Gediminas Technical University, J. Basanaviciaus Str. 28, LT-10223 Vilnius,
Lithuania

Abstract

This article is focused on the vibration analysis of the coach, which wheel is damaged by the wheel-flat. Analyses are carried out in multibody software and results are evaluated in terms of influencing suspension parameters change on accelerations output signals. The article consists of two parts. The first part is aimed on the problem of damaged wheels origin and its consequence during rail vehicle running on tracks during real operation. There is also included the system of forces and accelerations measurement during rail vehicle running on the given track section. The second part is focused on the assessment of selected measured parameters of a rail vehicle with wheel-flat which are obtained from computer simulations. As evaluation parameters signals accelerations in the selected location during passenger car running on the straight track for various stiffness of coil spring of the primary and secondary suspension were assessed.

Keywords: rail vehicle; damaged wheel; multibody system; computer modelling



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Utilization of strategies to generate and optimize machining sequences in CAD/CAM

Tomas Dodok^a, Nadezda Cubonova^a, Miroslav Cisar^a,
Ivan Kuric^a, Ivan Zajacko^a

*^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Automation and
Production Systems, Univerzitna 1, 010 26 Zilina, Slovak Republic*

Abstract

At present some CAD/CAM systems allow to create strategies or macros to accelerate the process of creation NC programs. The article deals with the development of experimental strategies in the CAD/CAM system. These strategies allow to remove repetitive tasks and allow to accelerate the process of creation the NC programs for machine tools. Feature analysis contained basic types of features and additional attributes of features. This feature analysis is based on possibilities of CAD/CAM system.

Keywords: Edgcam Strategy Manager; Strategies; NC program; Optimisation



Influence of normal vectors on the accuracy of product's geometrical specification

Mario Drbul^a, Andrej Czan^a, Michal Sajgalik^a,
Marianna Piesova^a, Krzysztof Stępień^b

^a*Department of Machining and Manufacturing Technologies, Univerzitna 8215/1, 010 26
Zilina, Slovak republic*

^b*Department of Mechanical Technology and Metrology, Faculty of Mechatronics and
Machine Design, Kielce University of Technology, Poland*

Abstract

Today, there is high demand of quality evaluation of products in terms of dimensional control through 3D measurement technology in automatized production environment. Each product has a geometric surface structure formed by a series of geometric elements, e.g. shape, dimensions, which together generate the actual integral surface. To determine the size of the product on 3D coordinate measuring machine, we need to associate the expected ideal geometric elements (e.g. line, cylinder) to non-ideal (integrated) real surface. The paper deals with the normal vectors, which have to be taken into account at each measured product and the creation of the measuring program, because incorrect choice of these vectors can influence the measuring process in such way, that result will not be the true value of the measurement of geometric elements.

Keywords: GPS; normal vector; coordinate measuring



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Investigation the influence of the curvature ratio on the frictional moment in rolling bearings

Łukasz Gorycki^a, Stanisław Adamczak^a,
Włodzimierz Makiela^a, Mateusz Wrzochal^a

*^aDepartment of Manufacturing Engineering and Metrology, Kielce University of
Technology, 25-314 Kielce al. Tysiąclecia Państwa Polskiego 7, Tel. 41 34-24- 434,*

Abstract

The article presents the results of the impact coefficient of the curvature ratio on the frictional moment in rolling bearings. Using the least squares method and the MatLab software to designated a numerical mathematical model of linear dependence of the resistance frictional moment from curvature ratio. Calculations take into account the theoretical and actual values of the curvature ratio. Analysis of the results showed that even the smallest change in the curvature ratio causes a significant difference in the frictional moment. In conclusion, attention was drawn to the act that given by the bearings manufacturer the theoretical values wrap distinctly different from the actual values, which may hinder the theoretical determination of the frictional moment as a function of the curvature ratio.

*Keywords:*Ball bearings; frictional moment; coefficient of friction; curvature ratio



Proposal of a steering mechanism for tram bogie with three axle boxes

Vladimir Hauser^a, Olena Nozhenko^a,
Kateryna Kravchenko^a, Maria Loulova^a,
Juraj Gerlici^a, Tomas Lack^a,

^a*Faculty of Mechanical Engineering, University of Zilina, Univerzitna 8215/1, 010 26
Zilina. Slovak Republic.*

Abstract

Passing of vehicles along curved track is a serious technical problem, which needs special attention. It is especially actual in the environment of urban lines, where it is necessary to pass a track of small radius. There is a significant strain of track as well as tram's bogies. It results in excessive wear in rail-wheel contact. Considerable is also the noise caused by operation on such track. Behavior of the vehicle when riding along track curve is influenced by the wheelset guidance design. If the wheelset guidance is able to set the wheelsets in track curve to a radial position, mitigation of the negative phenomenon can be expected. This paper deals with a design of a mechanism for setting wheelsets in a track curve to a radial position for tram cars. Dynamical analysis of a simplified tram car model was performed. Courses of monitored values of bogie with and without designed mechanism are compared.

Keywords: Creep velocities in wheel - rail contact; simulation analysis; wheelset steering mechanism



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Impact of three axle boxes bogie to the tram behavior when passing curved track

Vladimir Hauser^a, Olena Nozhenko^a,
Kateryna Kravchenko^a, Maria Loulova^a,
Juraj Gerlici^a, Tomas Lack^a

*^aFaculty of Mechanical Engineering, University of Zilina, Univerzitna 8215/1, 010 26
Zilina. Slovak Republic.*

Abstract

Ride of vehicles along curved track is a serious technical problem, which for the long term requires attention of vehicle engineers as well as track designers. It is especially interesting to observe behavior of tram cars passing a curved track, because they should be able to pass arcs up to 17 meter radius. Ride of a vehicle along such strongly curved track is nowadays accompanied by significant wear in rail-wheel contact, increased bogie and track stress and by generation of noise. One of the key causes of this unfavorable phenomenon is an increase of slip velocities in rail-wheel contact. This paper is based on simulation analysis, which compares different ways of minimizing slip velocities and thus mitigating the impacts of passing vehicles on the track as well as on the car itself. Bogies with and without wheelset steer possibility were analyzed. Both bogies were also analyzed with wheel profiles of different delta R function course.

Keywords: Creep velocities in wheel - rail contact; simulation analysis; passing of vehicle through transition curves; wheelset steering mechanism



Analysis of the potential of autonomous vehicles in reducing the emissions of greenhouse gases in road transport

Hubert Igliński^a, Maciej Babiak^b

^a*Poznań University of Economics and Business, Poznań 61-875, Poland*

^b*Poznan University of Technology Institute of Combustion Engines and Transport, Poznań, 60-965, Poland*

Abstract

Continuous and dynamic growth in demand for road transport, especially in developing countries, causes increase of greenhouse gases (GHG) emissions. At the same time the emissions of toxic components of exhaust gases harmful to human health and the environment enhance – particulate matter, nitrogen oxides, carbon monoxide and others. In particular, GHG emission and increase their concentration in the atmosphere, where road transport is the largest issuer in the transport sector, become one of the most important global problems. So far actions towards reducing energy consumption and emissions have not caused a decrease in global emissions. One of the key reasons for this is the presence of Jevons paradox, where the combined demand for transport grew faster than underwent the efficiency improvement of energy consumption and emissions reduction. One of the main reason for this is that vehicles offered on the market (especially cars) are characterized by an increase in weight and engine power. Broad implementation of autonomous vehicle (AV) can be a turning point in terms of reducing emissions of GHG. The aim of authors of this paper is to analyze the potential for AV to reduce GHG emissions from road transport. The analysis includes not only technical and technological issues, but also organizational and in the management of transport demand.

Keywords: Autonomous vehicles; greenhouse gases emission; greenhouse gases reduction.



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Modular concept of auxiliary converters for diesel electric locomotives

Jaroslav Ilonciak^a, Lubos Struharnansky^{a,b}, Jozef
Kuchta^a

^a*EVPU a.s., Trencianska 19, Nova Dubnica 01851, Slovak Republic*

^b*Department of Power Electrical System, Faculty of electrical Engineering, University of
Zilina, Univerzitna 1, Zilina*

Abstract

Nowadays almost every modern diesel electric locomotive includes auxiliary converters. Auxiliary converters and drives are an integral part of the main traction drives. Auxiliary converters provides cooling of main drives, traction motors, diesel engine, charging the vehicle's batteries and feeding of control circuits in entire locomotive. Auxiliary converters for diesel electric locomotives consists of inverters, chargers, alternator exciters and DC/DC converters of different voltage levels. Due the fact of the equal working principles of individual converters groups, certain amount of power classes has been designed and developed. Also for these groups of converters has been developed universal parameterized control software. The main advantage of parameterization and power classes for individual converters groups is simple design. This feature simply allows to build up complete auxiliary converter for a specific customer application. It is also possible to design and integrate smart converters, which automatically set correct required parameters in locomotive immediately after connecting.

Keywords: Auxiliary converter; charger; exciter; inverter; CAN bus



Risk and incidents assessment in Slovak road tunnels

Eva Jancarikova^a, Jan Mikolaj^a, Peter Danisovic^a

^aUniversity of Zilina, Faculty of Civil Engineering, Univerzitna 8215/1, 010 26 Zilina, Slovakia

Abstract

Tunnels are specific engineering structures, which are constructed in order to shorten transport routes and improve road safety. Therefore, safe operation of tunnel is very important. Tunnel Traffic & Operation Simulator of the University of Zilina in combination with unique softwares allows a research of the possible operating conditions during a normal service and model emergency situations. Risk analysis of road tunnels is in Slovakia managed by technical specifications TP 041 (TP 02/2011) „Risk analysis for Slovak road tunnels“ where is defined precise methodology of risk analysis with regard to safety of road tunnels users. This technical specifications, based on the Austrian tunnel risk analysis model TuRisMo, defines and explains exactly a risk model to calculate risk in road tunnels.

Keywords: tunnel, risk analysis, incidents, simulator, graph



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Probe positioning for the exhaust emissions measurements

Remigiusz Jasiński^a, Jaroslaw Markowski^a,
Jacek Pielecha^a

^aPoznan University of Technology, Piotrowo Street 3, Poznan 60-965, Poland

Abstract

Emission of harmful compounds in the exhaust gases depends on the operating conditions of the engine and its technical condition. Therefore, the legislative activity is focused on the introduction of new diagnostic and research procedures. The preferred method is using probes with plurality of holes for multi-gas sampling from the entire cross-section of exhaust stream. This method appears to be vitiated by an error caused by averaging dilution and sampling gas from the very beginning of the measurement path. The results of measurements contained in the article are related to changes in the concentration of harmful substances in exhaust gases depending on the distance from the axis of the jet. In the article the disadvantages of this the methods were highlighted and the single-point measurement method was proposed.

Keywords: Turbine engine; exhaust emissions; probe positioning



Identification of tool wear intensity during miniature machining of austenitic steels and titanium

Roman Kamenik^a, Jozef Pilc^a, Daniel Varga^a,
Juraj Martincek^a, Marek Sadilek^b

^aUniversity of Zilina, Univerzitná 8215/1010 26 Zilina - Slovakia

^bTechnical University of Ostrava, 17. listopadu 15/2172, 708 33 Ostrava - Poruba - Czech
Republic

Abstract

Implementation and contribution of miniature machining is currently rapidly increasing in biomedical industry, machining of austenitic steels and titanium particularly. Machinability of materials with increased level of toughness depends on factors that are important in the final state of surface integrity. There are requirements for high precision in miniature machining with measures varying in microns. If we want to guarantee machining precision, it is necessary to identify tool wear intensity in interaction with given materials. During long-term cutting process, different cutting wedge deformations occur, leading in most cases to a rapid wear and destruction of the cutting wedge. The article dealt with experimental monitoring of tool wear intensity during miniature machining.

Keywords: miniature machining; titanium alloys; tool wear



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Comparison of particulate matters properties from combustion of wood biomass and brown coal

Nikola Kantova^a, Michal Holubcik^a,
Jozef Jandacka^a, Alexander Caja^a

*^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Power
Engineering, Univerzitna 1, 010 26 Zilina, Slovakia*

Abstract

The combustion leads to pollution with particulate matters (PM). These emissions are considered to cause the greatest harm to human health. Particulate pollutants consist of the following substances: carbon, ammonium, metals, organic materials, nitrates and sulfates. This article deals with analysis of the particulate matters samples from wood biomass and brown coal. The analyses were carried out by elemental determinator and thermogravimetric analyzer. Thermogravimetric analyzer determines the composition of organic, inorganic, and synthetic materials. The elemental determinator is used to determine carbon, hydrogen, nitrogen and sulfur in organic matrices. Further analysis compares the size distribution of these samples. Size distribution was determined by using of vibratory sieve shaker machine. The shape of particles was observed by stereo microscope and density was also determined such as a ratio of their weight and volume. It is important to analyze chemical and physical properties of PM in order to decrease their concentration during combustion process.

Keywords: particulate matter; thermogravimetric analysis; elemental analysis; size distribution



Application of MRAS algorithm to replace the speed sensor in induction motor drive system

Pavel Karlovsky^a, Jiri Lettl^a

*^aDepartment of Electric Drives and Traction, Czech Technical University in Prague,
Faculty of Electrical Engineering,
Technicka 2, 166 27 Prague, Czech Republic*

Abstract

Sophisticated control of induction motor drive requires knowledge of the rotor angular velocity. In order to obtain the speed information an optical sensor is usually utilized. However, it is not always advantageous because of the whole drive robustness decrease caused by the speed sensor inclusion. The paper presents some simulation and measurement results in case of the MRAS (Model Reference Adaptive System) method employing in attempt to eliminate the induction motor drive speed sensor. The operation principle is explained and a mathematical model of the drive system is created. The MRAS method influence on the drive behaviour is examined in simulation environment and experimentally. Finally, the experimental results and comparison of the drive behaviour with and without the speed sensor are discussed.

Keywords: MRAS; sensorless speed determination; induction motor drive



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Possibilities of using traffic planning software in Bratislava

Matus Korfant^a, Marian Gogola^a

*^aUniversity of Zilina, Faculty of Operation and Economics of Transport and
Communications, Department of Road and Urban Transport, Univerzitna 1, 010 26 Zilina,
Slovakia*

Abstract

This paper presents activities, which is PTV software, a traffic planning software (mostly VISSIM and VISSUM) in Bratislava used for, presents real data and results of projects, which helped to become the traffic in the capital city more fluent. Using this software helps also to keep sustainable mobility of the capital city on high level and brings the city closer to the West European cities.

Keywords: simulation; intersection; VISSIM.



Evaluation of the influence of parameters of FDM technology on the selected mechanical properties of models

Tomasz Kozior^a, Czesław Kundera^a

*^aKielce University of Technology, Faculty of Mechatronics and Mechanical Engineering,
Department of
Manufacturing Engineering and Metrology, al. Tysiąclecia Państwa Polskiego 7, 25-314
Kielce, Poland*

Abstract

The paper presents experimental results the influence of location and direction of the models on the virtual platform on their selected mechanical properties such as Young's modulus and stress relaxation during uniaxial compression tests. Cylindrical samples were manufactured using the Dimension 1200es machine realizing the fused deposition modeling technology (FDM).. The samples were located on the machine platform at different angles to the printing direction. The material used for the construction of samples was ABS P430. Tests relaxation were made in accordance with ISO 3384: 2002 standard. Tests were performed using the testing machine Inspect Mini.

Keywords: FDM; ABS; Relaxation; Mechanical Properties



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

A3 method as a powerful tool for searching and implementing green innovations in an industrial company transport

Radim Lenort^a, David Stas^a, David Holman^a,
Pavel Wicher^a

^aSKODA AUTO University, Na Karmeli 1457, Mlada Boleslav, 293 01, Czech Republic

Abstract

The A3 method is a systematic problem solving and continuous improvement approach, which was first employed at the company Toyota. The paper presents possibilities of using the method for searching and effectively implementing green innovations in an industrial company transport. Advantages and potential problems related to the method utilization are identified on the basis of a case study focused on technological innovations in SKODA AUTO internal transport.

Keywords: A3 method; green transport; innovations



Proposed solutions for increasing the capacity of the Mediterranean Corridor on section Zagreb - Rijeka

Ivica Ljubaj^a, Tomislav Josip Mlinarić^a, Dino Radonjić^b

^a*Faculty of Transport and Traffic Sciences, University of Zagreb, Vukelićeva 4, 10000
Zagreb, Croatia*

^b*PPD Transport d.o.o., Ulica kneza Branimira 22, 10000 Zagreb, Croatia*

Abstract

This paper analyzes all the bottlenecks on the railway line M 202 along the section of the European Mediterranean Corridor, which is a part of the corridor located in the Republic of Croatia. Upon the identification and analysis of these bottlenecks, new technical and technological solutions will be put forward for increasing the capacity of the railway line, i.e. the sections with bottlenecks. The researched bottlenecks on the observed section will be quantified according to the technological indicators of timetable quality and several other parameters (travel time, the manner in which trains depart in certain directions and the maximum utilization of the existing capacity). The potential solutions will be assessed by determining the railway infrastructure fees. A simulation software tool OpenTrack will be used for potential technological solutions.

Keywords: Mediterranean corridor RH2; bottlenecks; utilizing railway track capacity; simulation of technological process; simulation analysis; Opentrack



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Variability evaluation of signal in two-dimensional wavelet decomposition using fractal dimension

Włodzimierz Makieła^a, Damian Gogolewski^a

*^aKielce University of Technology, Faculty of Mechatronics and Mechanical Engineering,
Department of
Manufacturing Engineering and Metrology, al. Tysiąclecia Państwa Polskiego 7, 25-314
Kielce, Poland,*

Abstract

The paper presents the possibilities of using the fractal dimension to evaluate the signals in wavelet decomposition process. The tests have been carried out on samples produced by face milling process for the six types of materials. It has been shown that the fractal dimension enables characterize signal irregularities in quantitatively and qualitatively way.

Keywords: fractal dimension; wavelet transform; geometrical product specifications



Model to assess the exhaust emissions from the engine of a small aircraft during flight

Jaroslaw Markowski^a, Jacek Pielecha^a,
Remigiusz Jasiński^a

*^aPoznan University of Technology Institute of Combustion Engines and Transport, Poznań,
60-965, Poland*

Abstract

Evaluation of the exhaust emissions from aircraft engines applies to turbine engines with high values of thrust and power. This assessment is conducted on the basis of the guidelines contained in the standards introduced by ICAO Annex 16. It concerns the procedure for stationary tests according to the Landing/Take-off cycle (LTO). This test includes operating parameters of the engine corresponding to approach, landing, airport operations and take-off. Such procedures do not apply to small aircraft with piston engines. Therefore, a number of research and testing of exhaust emissions from aircraft piston engines were made. On the basis of these works, model to determine the exhaust emissions from piston engines during the flight of the aircraft was developed. The model is presented in this article.

Keywords: autonomous vehicles; greenhouse gases emission; greenhouse gases reduction



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Verification of new method of determining the roughness parameters for rotational turning with non-linear cutting edge

Pavol Martikan^a, Andrej Czan^a, Jozef Holubjak^a,
Daniel Varga^a, Juraj Martincek^a, Tatiana Czanova^a

*^aDepartment of Machining and Manufacturing Technology, Faculty of Mechanical
Engineering - University of Zilina, Univerzitna 1, 010 26 Zilina, Slovakia*

Abstract

Technology of rotational turning is a progressive chip machining technology with a defined tool geometry, which in some cases can replace conventional finishing technologies with undefined geometry of the cutting tools.

The paper deals with the influence of the cutting parameters of the rotational turning on the surface roughness after machining and comparing the roughness parameters with the theoretical roughness calculation. Since this is a new machining technology with new kinematic structure with atypical geometry of the cutting tool, the paper deals with the measurement methodology of the certain roughness parameters on machined surface after rotary turning with nonlinear cutting edge.

Executed experimental tests and their evaluation are verified with the method of roughness parameters determination and results show, how the real process correlate with implementation of empirical relations.

Keywords: Rotational Turning; Hard Machining; Roughness Parameter; Non-Linear Cutting Edge



Simulation of the supply of workplaces by the AGV in the digital factory

Hana Neradilova^a, Gabriel Fedorko^b

^a*College of Logistics Prerov, Palackeho 25, 750 02 Prerov, Czech Republic*

^b*Faculty BERG, Technical University of Kosice, Park Komenskeho 14, 042 00 Kosice,
Slovak Republic*

Abstract

Industry 4.0 philosophy and the associated method of digital factory require a wide range of tasks and skills to be managed for their successful application and efficient operating. One of the key competencies for their reliable operation is mastering computer simulation of various logistics processes that take place within the enterprise. Among the most important logistics activities in any enterprise belongs the supply process. Currently, there is a major trend in the supply process to use the various automated systems, such as AGV. The paper further describes the process of creating a simulation model of the supply process using the method of additional programming to the needs of implementing various analyses.

Keywords: AGV; simulation; transport; supply



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Finishing surface after regeneration with laser cladding

Nowakowski Łukasz^a, Wijas Marta^a

*^aKielce University of Technology, al. Tysiąclecia Państwa Polskiego 7, 25 – 314 Kielce,
Poland*

Abstract

This article has presented the results of experimental research concerning the regeneration process of flat sheet metal made of C45 steel, which is difficult to weld. The regeneration process included filling the material defect of 20x20x0.75 mm with laser cladding with a powder form additive. Rough machining of the surface with cladding has been conducted at a vertical milling center, while the finishing work was performed with a surface grinder. The analysis of obtained results has been performed on the basis of measurements of selected parameters concerning the geometrical structure of the regenerated surface treated with machining.

Keywords: Laser cladding; regeneration of surface; geometric structure of surface; face milling; grinding



Boiling heat transfer phenomenon on different structural coatings

Łukasz J. Orman^a, Andrej Kapjor^b, Martin Vantuch^b

^a*Kielce University of Technology, al. Tysiaclecia P.P.7, 25-314 Kielce, Poland*

^b*University of Zilina, Faculty of Mechanical Engineering, Univerzitna 2, 01026 Zilina, Slovakia*

Abstract

The paper discusses the use of different structural coatings for pool boiling heat transfer. There are a few most common types of such coverings such as meshes, sintered powders and fibers, however, they generally enhance boiling in relation to the smooth surface. The article focuses on wire mesh microstructures due to their advantages for practical use in the design of phase – change heat exchangers.

Keywords: boiling heat transfer; structural coatings



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The energy characteristics of different parts of the tree

Matej Palacka^a, Peter Vician^a, Michal Holubcik^a,
Jozef Jandacka^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Power Engineering, Univerzitna 1, 010 26 Zilina, Slovakia

Abstract

Most popular renewable energy source is biomass. The typical form of biomass is wood. Use of wood for fuel have long tradition in Slovakia. Between a normally trees in Slovakia belongs beech and spruce. This article deals with the energy properties of spruce (*Picea Abies*). On different parts of the tree have been performed experimental measurements. The measured results show that the parts of the tree have potential for to the next application and processing.

Keywords: firewood; ash; spruce cones; calorific value



Improvement of sustainability definition facilitating sustainable development of public transport system

Antons Patlins^a

^aDr.sc.ing., Leading Researcher at Faculty of Power and Electrical Engineering, Institute of Industrial Electronics and Electrical Engineering, Riga Technical University, 12/1 Azenes str., office 503, LV-1048, Riga, Latvia.

Abstract

In the frame of current article it is researched the definition of sustainability facilitating sustainable development of public transport system. This research will give a new look to definition of sustainability, will be the source of new scientific ideas and ways of thinking about the public transport system and its sustainable development. Analysis of definitions and interpretations of sustainable development and sustainability and summarizing of principles of sustainability and sustainable transport system, as well as definition of indicators of environmental sustainability in transport system and assessment of environmental impact indicators for transport in smart city era, which can help to formulate improvements of sustainability definition facilitating sustainable development of transport system, will give a huge positive impact to development of transport area using sustainability principles. Solutions for sustainability are also offered in the article. It is the first article in the new cycle with research and discussions about sustainability and improvement of its definition, about transport system sustainability and related topics.

Keywords: Sustainability; sustainable transport system; public transport; sustainable development



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Computer Modelling of Cooperative Intelligent Transportation Systems

Tibor Petrov^a, Milan Dado^a, Karl Ernst Ambrosch^b

^aDepartment of multimedia and information-communication technologies, Faculty of Electrical Engineering, University of Zilina, Univerzitna 8215/1, 010 26 Zilina, Slovakia

^bUniversity Science Park, University of Zilina, Univerzitna 8215/1, 010 26 Zilina, Slovakia

Abstract

The Cooperative Intelligent Transportation Systems (C-ITS) are one of the most important parts of intelligent transportation support. The possibilities of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication modelling and computer simulation are presented in this paper. The results of V2V and V2I communications simulation, with regard to expected C-ITS services are shown. Gathered results are evaluated in consideration of current and future communication technologies (VANET, 4G, 5G) capabilities.

Keywords: Intelligent Transportation Systems; VANET; Computer modelling; Simulation



Experimental quantification of the austenitic phase in steels using the Average peak method of x-ray diffractometry

Marianna Piesova^a, Andrej Czan^a, Michal Sajgalik^a,
Tatiana Czanova^a, Robert Cep^b

^aDepartment of Machining and Manufacturing Technology, Faculty of Mechanical Engineering - University of Zilina, Univerzitna 1, 010 26 Zilina, Slovakia

^bDepartment of Working and Assembly, Faculty of Mechanical Engineering – VSB Technical University of Ostrava, 17 listopadu 15/2172, 708 33 Ostrava – Czech Republic

Abstract

Uniform austenite remaining in the microstructure of the martensitic transformation is called the residual austenite. It is undesirable structure in components, due to its slow decay causes dimensional instability in these components and reducing the hardness. There is a change in volume and it generate internal stress which often appear as cracks. The residual austenite is highly undesirable component in the molded components, as well as the production of gears and bearing components. The article deals with quantification of residual austenite in steels by using the Average peak method by X-ray diffraction. This method applies four separate peaks to determine the amount of austenite.

Keywords: austenite; retained austenite; X – ray diffraction; XRD



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Dependence of locomotive adhesion force estimation by a Kalman filter on the filter settings

Petr Pichlik^a, Jiri Zdenek^a

*^aDepartment of Electric Drives and Traction, Czech Technical University in Prague,
Faculty of Electrical Engineering, Technicka 2, 166 27 Prague, Czech Republic*

Abstract

A locomotive needs a slip controller to achieve the maximal tractive effort. Many types of methods are used for this purpose. Some methods use a Kalman filter or other type of estimation. These methods can work precisely and reliably. The Kalman filter provides a filtration of an output signal to eliminate the output signals noise when the Kalman filter inputs are noisy, and a filtration level is required. There is a relation between the Kalman filter filtration level and its delay. The Kalman filter delay can reach over 100 milliseconds. The locomotive slip controller has to react in the order of tens of milliseconds to provide an appropriate function. The high level of filtration and low delay are contradictory demands. The key is to find a relation between the Kalman filter delay and filtration through its covariance matrixes. In the paper is investigated the relation between the filtration level and the time delay. The simulations are made in the Matlab software and based on measured data.

Keywords: Slip control; Kalman filter; adhesion; locomotive; railway



Impact of biomass implementation on coal burning installations

Połka Marzena^a, Ptak Szymon^a

^aThe Main School of Fire Safety, Slowackiego 52/54 St., Warsaw 01-629, Poland

Abstract

Growing share of renewable sources of energy in recent years was forced by national legislations of various countries willing to reduce carbon dioxide emission originated from fossil fuels. However, growing number of dust explosions have been recorded, for which co-firing of coal and biomass has been blamed. Multiple research works have been therefore conducted to understand the differences in explosion indices of both biomass and coal dusts. Presented research work aims mainly at determining minimal ignition energy and resistivity of selected biomass dust samples and analyzing its possible impact on biomass implementation into coal power plants.

Keywords: Biomass cofiring; dust explosion; fire safety



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The use of UAV's for search and rescue operations

Marzena Połka^a, Szymon Ptak^a, Łukasz Kuziora^a

^a*The Main School of Fire Service, Slowackiego 52/54 St., Warsaw 01-629, Poland*

Abstract

Modern public services are nowadays capable of conducting complex operations in case of various natural or man-made hazards. In last decades, the responsibilities of the fire services have been significantly extended from 'ordinary' fire-fighting to complex operations including technical rescue, but also chemical, biological, radiological, nuclear rescue. Therefore this crucial public service is being constantly equipped with the newest and the most efficient solutions aiming at optimization of their primary activity, which saves victims lives. Thanks to INSARAG guidelines, activities of certified heavy urban search and rescue groups (HUSAR) are based on solid foundations: knowledge and experience gained during historical events in last decades. However, rapid technological progress might be beneficial. The article describes the MOBNET system, that is currently under development. There was a research work conducted to gather end-user requirements in purpose to create a tailor-made solution supporting traditional activities of USAR teams. The target group of the system has been extended, as other public services might benefit from the system implementation as well. The system will use combined DCT – EGNSS technology to track victims.

Keywords: unmanned aerial vehicles; search and rescue; tracking



Influence of bark content on ash melting temperature

Lucia Radacovska^a, Michal Holubcik^a, Radovan Nosek^a,
Jozef Jandacka^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Power Engineering, Univerzitna 1, 010 26 Zilina, Slovakia

Abstract

One of the important fuel properties is ash melting. Fuel with high ash sintering is not applicable for most of the boilers. Sintering is the process that can occur in the burner and block air flow to the base fuel layer. One of the materials, which can participate on this process, is wood bark. The ash melting from combustion of wood bark has negative impact and lowers the temperature in the process. The melting temperature depends on the chemical composition of ash. Ash melting takes place in several stages: first sign of deformation is gradually melting until complete reflow. In order to analyze the melting process, the various stages are recorded with characteristic temperatures. These temperatures are defined as follow: deformation temperature „DT“, the sphere temperature „HT“, hemispherical temperature „HT“ and the flow temperature „FT“. For reliable operation of boilers is important to know melting temperature of ash. Melting temperature for low meltable ashes is from 1000 to 1200°C, for medium meltable ashes from 1200 to 1450°C and for heavy meltable ashes over 1450°C. During the combustion of wood biomass the temperature should not exceed 1100°C. This article deals with ash content from combustion of wood bark and its ash melting.

Keywords: Ash; wood bark; ashmelting temperature



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Measuring the thermal output of the piping system

Stefan Rezníček^a, Marcel Novomestský^a,
Helena Smatanová^a, Andrej Kapjor^a, Milan Malcho^a

^a *Department of Power Engineering, Univerzitná 8215/1, Zilina 010 26, Slovakia*

Abstract

Thermal output of the piping system is investigated. The system was formed from a tube of circular section, made of multilayer polyethylene - aluminum. It was subsequently wound into a planar spiral. The paper contains the calculation of the thermal output by a mathematical model, which replace the real model. The experimental measurements were measured with a variable distance winding. The paper compare heat output results with experimental measurements.

Keywords: Thermal output; Heat transfer; Piping system



Accumulation of primary energy into natural gas hydrates

Jan Siazik^a, Milan Malcho^a

^a*University of Zilina, Faculty of Mechanical Engineering, Department of Power Engineering, Univerzitna 1, 010 26 Zilina, Slovakia*

Abstract

Hydrates form a potential source of energy which can be used in the coming decades. Hydrates of natural gas make up the interesting features of saving energy. Storage of natural gas, methane in hydrates is particularly advantageous in terms of storage capacity, but also as the aspect of security of gas storage. The gas stored in this case, it is possible at lower temperatures and pressures as compared to other storage technologies. To one cubic meter of hydrate can store approximately 150-170 cubic meters of natural gas according to the thermobaric conditions and the composition of the gas. Article deals with the conditions of hydrates formation and design experimental facility.

Keywords: Hydrates; natural gas; gas storage



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Comparison of chosen environmental aspects in individual road transport and railway passenger transport

Tomas Skrucany^a, Martin Kendra^a, Milan Skorupa^a,
Juraj Grecik^b, Tomasz Figlus^c

^aUniversity of Zilina, Faculty of Operation and Economics of Transport and Communications, Univerzitana 8215/1, Zilina 010 26, Slovakia

^bUniversity of Zilina, Faculty of Mechanical Engineering, Univerzitana 8215/1, Zilina 010 26, Slovakia

^cThe Silesian University of Technology, Faculty of Transport, 8 Krasinskiego Street, Katowice 40-019, Poland

Abstract

Nowadays, the environmental aspects of transport are very actual issues, mainly the energy consumption and GHG production. This paper analyzes and evaluates final energy intensity and GHG production of two passenger transport modes - individual road and railway. Comparison is made for diesel railway vehicle, as well as for passenger cars with different fuel types (gasoline and diesel). The European standard EN 16 258:2012 was used for calculation. The results show the final environmental aspects counted absolutely and also per capita.

Keywords: Energy consumption; fuels; GHG production; simulation; transport vehicle



Model railway traction performance measurements and analysis

Pavel Sovicka^a, Matej Pacha^a, Pavol Rafajdus^a

^aDepartment of Power Electrical Systems, Faculty of Electrical Engineering, University of Zilina, Univerzitna 1, Zilina

Abstract

The purpose of this paper is to introduce measurements and analysis of a 1:8 scale model railroad in order to provide the possibility to use modern locomotive design methods in this application. Tractive force and vehicle speed are necessary for this analysis and therefore a measuring train car has been developed. On-board strain gage and a magnetic encoder are used to obtain the necessary data. Therefore a part of this paper is devoted to describing the usage of these sensors. Obtained data is processed, analyzed and also compared to a full scale railroad.

Keywords: model railroad; large scale models; 1:8 scale; railway performance; traction measuring; tractive force calculation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Vector control techniques for traction drive with induction machines - comparison

Lubos Struharnansky^{a,b}, Jan Vittek^a, Pavol Makys^a,
Jaroslav Ilonciak^b

*^aDepartment of Power Electrical Systems, Faculty of Electrical Engineering, University of
Zilina, Univerzitna 1, Zilina*

^bEVPU a.s., Trencianska 19, Nova Dubnica 01851, Slovak Republic

Abstract

Nowadays trends in railway transportation are improvement of passengers comfort, safety, speed and reliability of transportation. This paper deals with improvement of aforementioned performances from the traction drive view. The most often exploited drives system is the induction motor supplied from inverter therefore strategy of its control has direct influence on reliability. Control techniques exploited in traction drives are ‘field oriented control’ (FOC) and ‘direct torque control’ (DTC). For investigation of the drive performances controlled with these two techniques the parameters of 152 kW induction motor are used. The comparison can be done on various criteria, but in this paper comparison will be focused on influence of key parameters including magnetizing inductance L_m , rotor inductance L_r and rotor resistance R_r . The study is done by simulation using the Simulink. The simulation and evaluation of both control strategies are performed using actual parameters of induction machine fed by an IGBT PWM inverter.

Keywords: FOC; DTC; VC; Induction motor



The possibility of using public transport in rural area

Denis Sipus^a, Borna Abramović^a

*^aUniversity of Zagreb Faculty of Transport and Traffic Sciences, Vukelićeva 4, 10000
Zagreb, Croatia*

Abstract

The accessibility of public transport presents an important indicator of the quality of passenger public transport system. An adequate network between the rural and urban areas is essential for several reasons, particularly for commuting. A comparative analysis of the public transport options in rural areas with the demographic factors of the analysed areas will enable us to determine, and thereby, evaluate the mobility of commuters. This paper presents some results of the case study of Croatian rural area in the county of Sisak-Moslavina.

Keywords: railway; buses; rural area; demography; transport supply; mobility.



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Proposal of backbone public transport lines in the Upper Saris region

Milan Skorupa^a, Martin Kendra^a

*^aUniversity of Zilina, Faculty of Operation and Economics of Transport and
Communications, Department of Railway Transport, Univerzitna 1, 010 26 Zilina, Slovakia*

Abstract

This paper deals with the competitive and economically sustainable model of public transportation service in the Upper Saris region. The paper is focused on both the intraregional transport needs as well as the connection of the region with the outside area – especially with the city of Presov as crucial transport node in terms of connection of the region with the rest of Slovakia. The proposal takes into consideration current state of transport infrastructure, transportation needs of inhabitants, present state of the transport service as well as operational aspects of proposed backbone transport system.

Keywords: public transport; backbone lines; transport service; transfer nodes; region; proposal



Possibilities of a Robotic End of Arm Tooling Control within the Software Platform ROS

Vladimir Tlach^a, Ivan Kuric^a, Darina Kumicakova^a,
Alexander Rengevic^a

*^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Automation and
Production Systems, Univerzitna 1, 010 26 Zilina, Slovakia*

Abstract

The control of industrial robots through the platform ROS represents the new trend in the field of industrial and service robots development. This article is aimed at the current problems related to a control of robotic end effectors and other robotic subsystems within the software platform ROS. The main attention is devoted to the utilization of I/O boards as are Arduino, Raspberry Pi, etc., for control the additional robotic accessories. These I/O boards offer a relative simple solution for creation a communication connection between the system ROS and robotic end effector. The article also presents the next steps of this problem solving that involve a proposal of the pneumatic robotic gripper MHZ2-25D control within the software platform ROS in laboratory conditions of the Department of Automation and Production Systems.

Keywords: Software platform ROS; robotic end effectors; force-torque sensors; control systems; interfacing I/O boards



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Examining of correlation between demographic development of population and their travel behaviour

Milan Veternik^a, Marian Gogola^a

*^aUniversity of Zilina, Faculty of Operation and Economics of Transport and
Communications,*

Department of Road and Urban Transport, Univerzitna 1, 01026 Zilina, Slovak Republic

Abstract

The transport sector makes economic growth, contributes significantly to the functioning of the Slovak economy and individual regions and creating conditions for optimal economic and social potential. The transport sector is influenced by a wide range of external social and economic factors such as demographics, living standards of the population, urban planning, organization of production, structural changes in society and accessibility to transport infrastructure. The article aimed to examining if there is any correlation between demographic development of population and their travel behaviour. For this purpose were used methods of analysis, synthesis, analogy, comparison, data collection and processing and methods of mathematical statistics.

Keywords: Transport planning; travel behaviour; demography



Determination of optimal position of solar trough collector

Peter Vician^a, Matej Palacka^a, Peter Durcansky^a,
Jozef Jandacka^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Power Engineering, Univerzitna 8215/1, 010 26 Zilina, Slovakia

Abstract

This work deals with the utilization of solar energy using parabolic trough collector. Testing of solar collector manufactured according our own design has taken place in Zilina. Collector consists of firm frame attached to concrete floor, which limits the sun tracking to one axis. Trough of the collector is oriented as east-west position with a small deviation of approximately 10° . To obtain the best performance parameters of the collector, the optimal position of trough to the sunlight must be maintained. The aim of the work is to calculate the tilt angle for specific day and corresponding time of a day.

Keywords: Solar energy; parabolic trough collector; optimal position; tilt angle



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

A review of non-destructive evaluation methods of elements of prototype module of drying line used to receive RDF fuel from waste recycling

Włodarczyk K.^a, Kowalczyk J.^a, Ulbrich D.^a, Seleh J.^a

^a*Poznan Univesity of Technology, M. Skłodowskiej-Curie sq. 5, Poznan 60-965, Poland*

Abstract

The paper presents an overview of non-destructive quality control methods and some examples of test results of elements of prototype module of drying line used to receive RDF fuel from waste recycling. The line is object of considerable size and the authors used to control parts non-destructive methods with should be fully mobile and autonomous. During test the researchers used such methods as ultrasonic and penetration methods. In the article was shown not only the physical basics of used methods, the advantages and limitations of each method, but also test results. The publication contains examples of pulses obtained on the screen of ultrasonic flaw detector along with their interpretation. The results of investigations by liquid penetrant method were presented. The last part of publication is summary, which classified the scope of use of each method presented in the article.

Keywords: Non-destructive testing; ultrasound; penetrant testing



Geometrical structures of the stepped profile bearing surface of the piston

Emil Wroblewski^a, Antoni Iskra^a, Maciej Babiak^a

*^aFaculty of Machines and Transport, Poznan University of Technology, Poznan ul. Piotrowo
3 60-965, Poland*

Abstract

The main node piston-pin-piston rings are most responsible for the formation of mechanical losses. It is advisable to reduce friction losses in the piston-cylinder group lead to an increase in the overall efficiency of the engine and thus reduce the fuel consumption. One way of achieving these objectives is modification of microgeometry of the piston bearing surface which cooperates with the cylinder wall. In this paper the results of simulation for the stepped microgeometry piston bearing surface are presented.

Keywords: Combustion engines; piston; friction



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Supporting the connection the logistics centers to rail network

Zdenka Zahumenska^a, Jozef Gasparik^a

^aUniversity of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Railway Transport, Univerzitna 1, 010 26 Zilina, Slovakia

Abstract

The paper describes the issue of supporting the connection of logistics centers to railtransport. The transitive economics like Slovak Republic and Czech Republic are very opento the development of logistic technologies as well as to build new logistic chains. Theproblem is the decreasing share of modal split for rail transportation what does not meetwith the transport policy of EU. This could be further increased by constructing privatesiding in logistics areas. The key issue is how to connect these centers to the railnetwork, to analyze the legislation and others obstacles for their connection to the railnetwork. The proposal could also be an answer for how to increase the level of support ofrail transport usage in logistic chains.

*Keywords:*Logistic chain; railway network; logistics park; public logistics centers



Triaxial measurement of residual stress after high feed milling using x-ray diffraction

Lucia Zauskova^a, Andrej Czan^a, Michal Sajgalik^a,
Mario Drbul^a, Zdenka Rysava^b

^a*Department of Machining and Manufacturing Technology, University of Zilina, Univerzitna
1, 010 26 Zilina, Slovak Republic*

^b*TE.SI. Laboratory, Department of Industrial Engineering, University of Padova, viale
Porta Adige 45, 45100 Rovigo, Italy*

Abstract

Surface integrity has been an important research topic in the last decades. Machining generates residual stresses in the surface and subsurface layers of the structural elements. The residual stress has a large influence on the functional properties of the components. X-ray diffractometry is a non-destructive method applicable for the measurement of residual stresses in surface and subsurface layers of components. The article deals with the method of triaxial measurement of residual stress after machining the surface of sample by high feed milling technology. Significance of triaxial measuring is the capability of measuring in different angles so it is possible to acquire stress tensor containing normal and shear stress components acting in the spot of measuring, using a Cartesian coordinate system. For comparison, a simple measurement of residual stresses in the point indicates the stress direction only in normal direction of the measured surface.

Keywords: Residual stress; stress tensor; high feed milling



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



Topic 3 CONSTRUCTION

Reviewers:

Bastovansky Ronald	Lizbetin Jan
Blatnický Miroslav	Lukac Michal
Broncek Jozef	Macus Peter
Bujnak Jan	Makys Pavol
Dekys Vladimir	Malincik Stanislav
Dizo Jan	Martin Zlamal
Durica Pavol	Medvecká Iveta
Endel Stanislav	Mikita Miroslav
Estokova Adriana	Moravcik Martin
Gajdac Igor	Nikolic Ruzica
Gerlici Juraj	Nosek Radovan
Gogola Marian	Novak Pavol
Harusinec Jozef	Odrobinak Jaroslav
Hrcek Slavomir	Papucik Stefan
Huzlik Jiri	Perinkova Martina
Kalincak Daniel	Plinta Dariusz
Kapjor Andrej	Podesva Jiri
Kohar Robert	Rafajdus Pavol
Kopas Peter	Rakin Marko
Kotes Peter	Reiterman Pavel
Kotula Patrik	Sapietova Alzbeta
Kraus Vaclav	Scerba Peter
Krivy Vit	Ulewicz Malgorzata
Krusinsky Peter	Vandlickova Miroslava
Kubiak Marcin	Vasko Milan
Kucera Petr	Vejmelkova Eva
Labaj Jan	Vican Josef
Lazic Vukic	Zarnay Martin
Lenhard Richard	



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

A concept of an application of couples comparing method to the comparison of roundness profiles

Stanisław Adamczak^a, Krzysztof Stepień^a,
Urszula Kmiecik-Sołtysiak^a

*^aKielce University of Technology, Faculty of Mechatronics and Mechanical Engineering,
Department of Manufacturing Engineering and Metrology, 25-314 Kielce, al. Tysiąclecia
Państwa Polskiego7, Poland*

Abstract

A crucial problem in the area of measurements of roundness profiles is a need to compare existing measurement methods. A roundness profile that is obtained through a measurement is a basis for an evaluation of a quality of surface texture of an element with the use of numerical values of preselected parameters. Visual comparison gives only an approximate information on compared profiles and it does not provide any quantitative indicator that would describe coincidence of obtained roundness profiles. The methods that are usually used to a statistical comparison of surface profiles obtained from two different measuring instruments are based on investigating a correlation between two separate sets of measurement data with the use of specific parameters. The couples comparing method is a new concept that permits comparison of roundness profiles. This idea, owing to its methodology, allows comparison of roundness profiles obtained with the use of V-block method with the ones obtained by the radius change method. It is also possible to adjust the couples comparison method to determining optimum parameters of measuring instruments as well as to comparing measuring instruments. Thus, it seems relevant to verify this method under industrial conditions.

Keywords: roundness profiles; comparison of surface profiles



Basic dynamical analysis and comparison of balancing systems of non-conventional piston machine FIK

Peter Baran^a, Milos Brezani^a, Pavol Kukuca^a,
Pavol Stastniak^a

^aUniversity of Zilina, Univerzitna 8215/1, Zilina010 26, Slovak Republic

Abstract

The paper is divided into two main sections. First part deals with description of FIK non-conventional mechanism, main parts and its functionality. Second part deals with measuring system, which is designed to measure dynamic parameters of non-conventional piston mechanism. The concept of measuring system is applied to a special type of piston machine with wobble mechanism, which is used in this instance of Stirling engine type. Analysis compares the three basic states, without balancing mass and with first and second type of balancing mass. Balancing system is determined from the calculation of the dynamic model. Design of balancing system and placement of sensor for acceleration measurement corresponds to the constructional possibilities of prototype model FIK.

Keywords: Stirling engine; FIK mechanism; Balancing system



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The above-ground weighbridge, T

Marek Bistak^a, Stefan Medvecký^a, Slavomir Hrcek^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Design and Machine Elements, Univerzitná 2, Zilina 01026, Slovakia

Abstract

This paper presents the layout of the above-ground weighbridge. There is requirement on the implementation of this device in order to re-measure the weight of the vehicles used for transportation of the steel waste collected to the collecting yard. The weighbridge is used wherever the vehicles must be weighed in order to not exceed the maximum permissible weight established in the legislation with regard to the transport of the goods by road. The advanced CAD / CAE systems used in the design and optimization contributed to carried out a number of modifications of the steel structure, reaching an ergonomic installation, weight saving, greater strength and rigidity of the structure when loaded.

Keywords: Weighbridge; Strain gauge; FEM simulation



The analysis of beam reinforced with FRP bars in bending

Kinga Brozda^a, Jacek Selejdak^a, Peter Kotes^b

^a*The faculty of Civil Engineering Czestochowa University of Technology, Akademicka 3, 42-200 Czestochowa, Poland*

^b*Civil Engineering Faculty University of Zilina, Univerzita 8215/1, 010 26 Zilina, Slovakia*

Abstract

The paper presents the computational analysis of static behavior of simply supported beam reinforced with FRP (Fiber Reinforced Polymers) bars. The available calculation procedures and design assumptions were listed. The design of FRP reinforcement procedures for flexural strength and long-term deflection according to American (ACI 440.1R-06) guidelines were analyzed. Moreover, the analysis of computations of simply supported beam reinforced with CFRP (Carbon Fiber Reinforced Polymers), AFRP (Aramid Fiber Reinforced Polymers) and GFRP (Glass Fiber Reinforced Polymers) bars based on American guidelines were done and compared. The differences between obtained properties dependent on various types of reinforcement were identified.

Keywords: flexural strength; long-term deflection; bent beam; FRP reinforcement; calculation procedures



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Development of precast concrete bridges during the last 50 years in Slovakia

Petra Bujnakova^a, Miroslav Strieska^a

*^aUniversity of Žilina, Department of Structures and Bridges, Univerzita 8215/1, 01026
Žilina, Slovakia*

Abstract

The precast prestressed bridges represent the major part of all highways bridges that were built last decade in Slovakia. This is mainly due to the technical and economic advantages of this type of structures. Despite the well know advantages of precast bridges, there exists a demand for innovative solutions that would improve the competitiveness of this type of structures.

The paper focuses on the recent changes during the last years in design and fabrication process and describes some failures of the first precast prestressed girders in Slovakia.

Keywords: precast prestressed girder; failure condition; high performance concrete



Use the method of TRIZ in optimizing automated machine for ultrasonic welding

Marcel Caco^a, Robert Kohar^b, Slavomir Hrcek^b,
Rastislav Tribula^a, Peter Scerba^a

^aCEIT technical innovation, s.r.o., Univerzitna 8661/6A, Zilina 01008, Slovak Republic

^bUniversity of Zilina, Univerzitna 1, Zilina 01026, Slovak Republic

Abstract

The need to optimize the design of the structural node or the entire technical system returns the structural design or the whole production documentation back to the engineer's drawing board. Incentives to changes may occur in another lifecycle phase of the technical system. If a need to optimize arises, the engineer has more methods to choose from. One of the preferred methods to optimize is the method of TRIZ. We use it to optimize or alternatively to create a new construction design of assembly units for automated branches of ultrasonic welders. By using the method of TRIZ, we eliminate the low stiffness of mounting sonotrode, low variability of setting, low variability of sonotrode placement, we increase the number of combinations of sonotrode mounting and we simplify the construction design, assembly, production and following maintenance.

Keywords: optimalization; technical system; TRIZ method; engineering design



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Design and analysis of blast loaded windows

Lucia Figuli, Zuzana Zvakova^a, Chiara Bedon^b

^a*University of Zilina, Faculty of Security Engineering, Univerzitna 8215/1, 01026 Zilina, Slovakia*

^b*University of Trieste, Department of Engineering and Architecture, Piazzale Europa 1, 34127 Trieste, Italy*

Abstract

The increasing number of terrorist attacks brings the need to research on the blast resistance of buildings and transportation systems. Most of these attacks are lastly concentrated on the so called “soft targets” as railways stations, airports, bus stations, shopping centers, etc. In them, high vulnerability is frequently given by fenestrations or novel glass façade systems in general. In this regard, the paper is focused on the analysis of the dynamic behavior of blast loaded glazing windows. Given a reference specimen geometry and wood or plastic frame representative of traditional or new fenestrations respectively, the blast performance of such system is assessed via analytical SDOF calculations. Refined Finite Element (FE) numerical simulations are then presented and discussed, as a preliminary outcome of further exploratory investigations. Following the actual research study, experimental tests will be in fact carried out on the same fenestration systems.

Keywords: blast loads; dynamic structural performance; glass; SDOF; Finite Element numerical model



Bridge load tests in Poland today and tomorrow – the standard and the new ways in measuring and research to ensure transport safety

Łukasz Filar^a, Jerzy Kałuża^a, Marek Wazowski^a

^aAspekt R&D Laboratory, Chopina 96, Jaworzno 43-600, Poland

Abstract

The standard assumption, some results and final conclusions of authors' research on bridge testing are presented in the paper. The results concern more than two thousands bridge superstructures that have been already tested on site. The stiffness of the bridges as well as their behavior under load tests are described. The following values: superstructure displacement, strain and subsidence of supports have been analyzed by the static load tests. Moreover, the identification of dynamic amplification factor, natural frequency, mode shapes and damping have been analyzed by dynamic bridge testing.

The paper focusses on the dynamic method of control the suspension system forces. Based on registration and analysis of free vibration of a suspender, the authors present quick, non-destructive and reliable test as the contemporary method to improve safety of arch and suspension bridge superstructures.

Keywords: bridge load tests; construction safety; road bridge; railway bridge; construction monitoring; modal analysis; dynamic parameters



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Resistance of Concrete Slender Columns

Ludovit Fillo^a, Marek Cuhak^a, Maria Minarova^a

^a Faculty of Civil Engineering, Slovak Technical University, Radlinskeho 11, Bratislava
81005, Slovak Republik

Abstract

The paper presents a calculation of slender concrete column resistance with a non-linear analysis which takes into account a contribution of second order theory, non-linear distribution of concrete stresses in cross-section and cracking. The Transfer Matrix Method was used as a step by step method for calculation of nodal forces and deformation vectors and modified rigidities of reinforced concrete segments. Also Newton method for searching equivalence of normal forces and bending moments on each step of calculation and central cross-section of column segment is explained in details. Theoretical results are compared with another non-linear software and realized experiment.

Keywords: Non-linear analysis, slender concrete columns, Transfer Matrix Method, Newton method



Impact of asphalt mixture composition on particulate matter production

Dasa Fullova^a, Daniela Durcanska^a, Jitka Hegrova^b

^aUniversity of Zilina, Faculty of Civil Engineering, Department of Highway Engineering,
Univerzitna 8215/1, 010 26 Zilina, Slovakia

^bTransport Research Centre, Lisenska 33a, 636 00 Brno, Czech Republic

Abstract

Road traffic is one of the main sources of particulate matter. Nevertheless, the traffic volume is still increasing and has unpleasant impact on longevity of the pavements and the environment. Vehicle motions cause mechanical wearing of asphalt pavement surface by vehicle tires. The aim of paper is to confirm the abrasion of pavement surface as a source of particulate matter and to verify the impact of the composition of asphalt mixture on particulate matter production. The findings from chemical analyses of basic materials and intercepted particulate matter are applied in the research and used for verification of this impact. The research deals with abrasion of bituminous wearing courses of pavements. Each of the tested samples is specific in its composition - the type of bituminous binder, the amount of bituminous binder, type of aggregate, different lines of aggregate granularity. The particulate matter (PM) measurements were performed in laboratory conditions and the asphalt mixture samples were rutted in wheel tracking machine. The paper presents comparison of rutted asphalt samples in terms of PM mass concentrations and chemical composition. In the asphalt mixture sample with the highest average $PM_{2.5}$ mass concentration ($13.51 \mu\text{g}/\text{m}^3$) the aggregates melaphyre and dolomite were used. On the other hand, the lowest average $PM_{2.5}$ mass concentration ($7.21 \mu\text{g}/\text{m}^3$) was measured for the asphalt mixture with aggregate siliceous limestone.

Keywords: Particulate matter (PM); mechanical wearing; laboratory tests; bituminous wearing courses; chemical analysis



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Dynamic analysis of mechanical conveyor drive system

Stanislav Gramblicka^a, Robert Kohar^a, Marian Stopka^a

^a*Department of design and mechanical elements, Zilina 010 26, Slovakia*

Abstract

The article deals with the dynamic analysis of the mechanical system of the drive to the conveyor belt. Subject of the investigation is the behavior of the mechanical system at different operating conditions of the activity to the conveyor belt. Analysis of mechanical systems were set data necessary for the compilation of the various simulations of dynamic processes in Matlab. The result of the dynamic analysis are graphical wave forms behaviour of individual working statuses of the conveyor belt.

Keywords: analysis; mechanical system; conveyorbelt; simulations; dynamic proces



Modification in structural design of L-13 "Blanik" aircraft's wing to obtain airworthiness

Simon Holoda^a, Pavol Pecho^a, Michal Janovec^a,
Martin Bugaj^a

^aUniversity of Zilina, Faculty PEDAS, Univerzityna 1, 010 26 Zilina, Slovakia

Abstract

The article deals with structural analysis and the design of the current technical condition of the aircraft L-13 "Blanik". Based on fatal incident and it's further investigation revealed, that one of the reason may have been caused by material fatigue. Therefore majority of this type of aircraft have lost airworthiness. Currently most aero-clubs and aviation schools, mainly in the European Union, North America and Australia, stopped using this type of aircraft. Modification of wing spar gives the opportunity to regain airworthiness. High financial costs of rebuilding the structure, which currently could perform only authorized organizations, are for many aero-clubs and aviation schools unreachable. The aim of this work is to consider safety risks and required flight characteristics in the construction design using a (3D) models and changes in building wings, changes in materials or changes in production technology followed by simulation and mathematical analysis in the time of operation. If acceptable results, we would like to implement them in practice and help to maintain airworthiness for the glider L-13 "Blanik" and integrate it back to common air traffic.

Keywords: Airworthiness; L-13 Blanik; Wing modification



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Influence of windows geometrical parameters on calculations of the heat conduction coefficient

Sasa M. Kalinović^a, Jelena M. Djoković^a,
Ruzica R. Nikolić^{b,c}

^a*Technical Faculty in Bor, University of Belgrade, V. Jugoslavije 12, 19210 Bor, Serbia*

^b*Faculty of Engineering, University of Kragujevac, Sestre Janjić 6, 34000 Kragujevac, Serbia*

^c*Research Center, University of Zilina, Univerzitna 8215/1, 010 26 Zilina, Slovakia*

Abstract

The relationship between the geometrical and thermodynamic variables of windows, of several types, sizes and materials, is presented in this paper. The heat conduction coefficients were calculated, for all the presented windows' types. Results that are presented provide for the possibility to select the optimal construction solution of the window, as well as for the material of the frame and type of the filling, with respect to the best heat conduction coefficient. That, in turn, ensures the optimal energy efficiency of the window structure.

Keywords: heat conduction coefficient; window; frame; filling; energy efficiency



Numerical dynamics study of a rail vehicle with differential gears

Mariusz Kostrzewski^a, Rafał Melnik^a

^a*Warsaw University of Technology, Koszykowa 75, Warsaw 00-662, Poland*

Abstract

The rail vehicles' wheels (such as of the metro cars' and the trams') negotiating tight radius curves are prone to premature wear of tread profiles and flanges. Conventional solutions of the running gear may not provide smooth tight curve negotiation in all cases. The improvement of wheel and rail interaction on the low-radius curves is difficult to achieve by means of conventional running gear design and transmission of tractive moment. In search for the solutions to improve interaction of wheel and rail on small radii curves, the numerical study on a tractive rail car equipped with differential gears was carried out. The aim of the study is to investigate dynamic behavior of a rail vehicle with implementation of such a solution and compare it with conventional one.

Keywords: rail vehicle; differential gear; dynamics; wear



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Implementation of distribution model of an international company with use of simulation method

Mariusz Kostrzewski^a

*^aWarsaw University of Technology, Faculty of Transport, Koszykowa 75, Warsaw 00-662,
Poland*

Abstract

Customers all over the world have great expectations in terms of the delivery and availability of supplied items. It is thought that the most important, both for suppliers and their customers, are short-term orders realisation and flexible services. Simulation methods can be a strongly support for an entrepreneur in decision making process connected to these expectations or short-period and long-period planning. Simulation methods ensure possibilities to test and analyse different kind of “what-if” scenarios of distribution systems such as: potential surplus of orders or other untypical things mostly describes as force majeure. The main aim of the paper is to consider simulation model of distribution system that occur in one international entrepreneur that operates in the area of Poland. The paper consists of literature review, a reference model of the original system with elementary formal notation included and a reference model implementation into simulation software (in form of simulation model), conclusions and potential directions on the model development. The model of the distribution system consists of vertices and edges. Chosen vertices are elementary form of logistics facilities such as warehouses and production facilities such as factories. Meanwhile, edges are real shaped routes between verticals, if they exist.

Keywords: distribution; simulation; high-bay warehouse; HRW



Influence of chloride deposition on corrosion products

Monika Kubzova^a, Vit Krivy^a, Katerina Kreislova^b

^aVSB - TU Ostrava, Department of Building Structures, Ludvika Podeste 1875, 708 00
Ostrava – Poruba, Czech Republic

^bSVUOM Ltd., U Mestanskeho pivovaru 934/4, Prague, Czech Republic, kreislova@svuom.cz

Abstract

The article deals with the influence of atmospheric corrosion and corrosive environment factors on the development of a protective layer of corrosion products of the weathering steel. The main aggressive factors of atmosphere that can negatively affect corrosion rate and the development of corrosion products on the steel surface include sulfates and chlorides. The development of the protective layer of corrosion products on bridge structures designed from weathering steel is monitored by program of experimental atmospheric corrosion tests. Exposed specimens on selected bridges allow to determine the relationship between the thickness of the layer of corrosion products and corrosion losses depending on the time of exposure and local environmental conditions. For the evaluation of protective properties of corrosion layer of the weathering steel indexes PAI is applied. This article presents the part of results of field experimental atmospheric corrosion tests for selected bridge structures in Ostrava. The influence of the amount of chlorides forming insoluble compounds in corrosion products on the protective properties of corrosion layers weathering steel is monitored for these bridges.

Keywords: corrosion products; patina layer; deposition of chlorides; index PAI; elemental analysis; weathering steel



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The transformation of transport and public spaces of the selected rural settlement

Ladislav Michalka^a, Ivan Silaci^a

*^aDepartment of Urbanism and Spatial Planning, Namestie slobody 2911/19, 812 45
Bratislava, Slovakia*

Abstract

The road is natural part of the public spaces in all towns and villages. Public space in an urban zone is used not only for transport by car, but also for other various functions (social, tourist, aesthetic, hygienic, etc.). Therefore, the public spaces must reflect the functional requirements of the surrounding objects and functional areas.

The spatial arrangement of local roads and their equipment must be in harmony with the requirements of the settlement-forming space in which they are located. Current occupancy of a public area with individual motorized transport (dynamic, static) largely deteriorates habitability villages. They also devastate the environment for inhabitants. Village Moravske Lieskove is located in Nove Mesto nad Vahom district. Moravske Lieskove does not suffer from transit traffic through the internal space of the village, because it's not located directly on the State road No. 54. Existing third class roads and local roads in internal space of the village are burdened minimal.

Internal space of the village can fulfil their traditional role and function. But their character and physical conditional do not correspond to the current requirement for rural public spaces. What should be? They are just country public spaces with peaceful lifestyle of the population? Rural environment with its specificities, for their preservation and development requires a different approach in urban design. The basic difference is the scale of the space, in which we move.

Keywords: public space; countryside; village; traffic; transformation; scale



CFD simulation of hydraulic tank

Martin Mocilan^a, Milan Zmindak^a, Peter Pechac^a,
Peter Weis^a

^a*Univerzity of Zilina, Faculty of Mechanical Engineering, Univerzitna 1, 010 26 Zilina ,
Slovak Republic*

Abstract

The aim of this paper is the examination of fluid dynamics in a tank. The use of modern CAD and CFD techniques in the conception and simulation of industrial products has huge applications in the mechanical, automotive and aerospace industries. This paper includes all the steps from treatment of CAD geometry up to the analysis of simulation results. The presented approach involved CAD simplification, meshing of the geometry, CFD simulation and analysis of the simulation results.

A case study of a hydraulic tank partially filled with hydraulic oil was simulated in this paper using Volume of Fluid (VOF) multiphase model. Simulations compared the amplitude of sloshing in tank. In this paper, a part of the project which aims to develop a computer aided methodology for developing/designing of the fuel tanks based on static and dynamic analysis is presented.

Keywords: CFD; Fuel Tank; Sloshing; Fluid-Structure Interaction



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The possibilities of increasing the electric vehicle range

Martin Mruzek^a, Igor Gajdac^a, Lubos Kucera^a,
Tomas Gajdosik^a

^a*University of Zilina, Univerzitna 8215/1, Zilina 010 26, Slovakia*

Abstract

Electric vehicles have a significantly shorter range compared to the conventional vehicles with the internal combustion engine. Hence, it is important to inform the driver of an electric vehicle as accurately as possible about the actual range and how to reduce energy consumption and thus improve range. The paper presents proposed electric vehicle energy usage assist for increasing vehicle range, system implementation and measured data for energy usage assist function. The developed energy assist encourages the driver to modify his driving style in order to be on the powertrain greatest efficiency area. The system informs the driver about the limitations for example caused by weather conditions or low battery state of charge.

Keywords: electric vehicle; range; driving style



Feasibility study of using artificial neural networks for approximation of n-dimensional objective functions in memetic algorithms for structural optimization

Peter Pechac^a, Milan Saga^a, Peter Weis^b

^aUniversity of Zilina, Faculty of Mechanical engineering, Department of Applied Mechanics, Univerzitna 1, Zilina 01001, Slovakia

^bUniversity of Zilina, Faculty of Mechanical engineering, Department of Design and Mechanical elements, Univerzitna 1, Zilina 01001, Slovakia

Abstract

Evaluation of objective function for problems of structural optimization is generally considered as computationally expensive and can take from few seconds to hours or even days. After certain number of solutions has been evaluated during optimization, artificial neural networks (ANNs) can be trained and used to approximate the objective function. The number of training points depends on the character and topology of objective function, but the most important factor is the dimensionality of objective function. Similarly as the performance of optimization algorithms, requirements on training data for ANNs are affected by so called “curse of dimensionality”. To achieve the same precision of ANN approximation over n-dimensional space, the number of training points grows exponentially with the number of dimensions. This paper presents a feasibility study of using ANNs for approximation of objective function for problems solved by structural optimization with respect to the number of optimization variables. The goal of this study was to find the maximum number of dimensions, where it is feasible to use ANNs for approximation of objective function. Test problem with varying number of optimization variables was used to assess the feasibility of using ANN.

Keywords: Objective function approximation; radial basis function; artificial neural networks; memetic algorithms; structural optimization



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The influence of oil pressure in the engine lubrication system on friction losses

Ewa Rostek^a, Maciej Babiak^b, Emil Wroblewski^b

^a*Motor Transport Institute, Centre for Material Testing, Warsaw 03-301, Poland*

^b*Poznan University of Technology Institute of Combustion Engines and Transport, Poznań, 60-965, Poland*

Abstract

The purpose of the internal combustion engine lubrication system is to provide optimal conditions for the oil film formation in all friction couples, such as a piston-cylinder, piston rings-cylinder, main bearings, etc. The oil film is designed to minimize the wear of the elements while ensuring the smallest possible friction losses. Lack of continuity of the oil film, and thus boundary or mixed friction conditions, obviously have a negative effect on the friction losses. However, the continuous oil film, depending on the conditions of its formation, may be characterized by different values of friction losses. One of the factors that may affect the conditions of formation of the oil film is the value of oil pressure in the lubrication system. In the paper the results of researches on friction losses carried out on an engine test bench are presented. The study consisted of measuring the driving torque of the internal combustion engine by an electric machine which is the source of power for the internal combustion engine. The oil temperature, the oil pressure, which was generated by independent from the engine oil pump, and the rotational speed of the crankshaft were the variables during test stand measurement. The article analyzes the results and conclusions are drawn.

Keywords: Combustion engine; friction losses; engine mechanical losses; oil pressure; oil film



The prototype of stream amplifier used in transport of polydisperse medium

Selech J.^a, Ulbrich D.^a, Włodarczyk K.^a, Kowalczyk J.^a,
Adamkiewicz J.^a

^aPoznan University of Technology, M. Skłodowskiej-Curie sq. 5, Poznan 60-965, Poland

Abstract

The paper presents a prototype of the air stream amplifier which can be used in various types of pneumatic transport of granular materials. In the first part of the article the theoretical basis of the issues and examples of currently solutions used in pneumatic transport were discussed. Then design assumptions and requirements that should be fulfilled by prototype of air stream amplifier were set. In the last part of the paper the construction of the device and summary of some results obtained during the test at the selected measuring points were presented.

Keywords: Air stream device; prototype; grains; pneumatic transport



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Detection of natural frequencies using IR camera

Zuzana Stankovicova^{a,b}, Vladimir Dekys^a, Pavol Novak^a,
Bohumir Strnadel^b

*^aDepartment of Applied Mechanics, Faculty of Mechanical Engineering, University of
Zilina, Univerzitna 1, Zilina 010 01, Slovak republic*

*^bCPIT – Centre for Advanced Innovation Technology, Technical University of Ostrava, 17.
listopadu 15/2171, Ostrava 708 33, Czech republic*

Abstract

The paper deals with estimation of natural frequencies using IR camera. The object was excited using random noise and infrared camera registered radiation of the object. The measured data was processed by lock-in thermography, when the lock-in frequency was changed in analyzed frequency's region. The output of lock-in process was analyzed. Natural frequencies were detected on the changes of real parts and amplitudes of output infragrams. The significant symptom is detection of patterns in infragrams.

Keywords: Infrared camera, natural frequencies, lock-in thermography



Influence of tram wheel profile geometry on wear intensity

Tomasz Staskiewicz^a, Bartosz Firlik^a

^a*Poznan University of Technology, pl. Marii Skłodowskiej-Curie 5, 60-965 Poznan, Poland*

Abstract

In this paper authors described methodology and results of multibody system simulations which covered rides of tram model through experimental track with measured geometry. Chosen European tram wheel profiles were examined in terms of intensity of tyre wear. The track was composed of various actual track sections from one of Polish cities. The influence of following parameters on wear was investigated: flangeway clearance, conformity of wheel and rail shapes, number of contact points and equivalent conicity. Performed research allowed the authors to specify the necessary objective function for optimization process of a new light rail vehicle wheel profile, which was briefly described in this paper. Several optimization results were described and discussed regarding wheel tyre wear intensity.

Keywords: urban transport; tram wheel tyre wear; multibody simulation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Modelling the longitudinal dynamics of long freight trains on Broad Gauge Metallurgical Railway Line

Jozef Stoklosa^a, Marek Jaśkiewicz^b,
Dariusz Więckowski^c

^a*University of Economics and Innovation in Lublin, Projektowa 4, Lublin 20-209, Poland*

^b*Kielce University of Technology, Aleja Tysiąclecia Państwa Polskiego 7, 25-001 Kielce*

^c*Automotive Industry Institute, ul. Jagiellońska 55, 03-301 Warszawa*

Abstract

The article presents the results of simulation studies in automatic coupling device type SA-3 of Russian production train consisting of 60 open car wagons of Russian construction and weight 91 tons each. The train moves on the wide track 1520 mm and curve of S type (the radius of curvature of arc is 300 m). Simulation studies were conducted using the Train module of the program to study dynamic multi-elements systems Universal Mechanism UM 6.0.

Keywords: Heavy train; modeling; Universal Mechanism



Dynamical analysis of 3D printer's powertrain

Marian Stopka^a, Robert Kohar^a, Stanislav Gramblicka^a,
Rudolf Madaj^a

^aDepartment of Design and Mechanical Elements, Univerzita 1, Zilina, 01008, Slovakia

Abstract

The current situation on a 3D print field is increasing precision of printers and printing of small parts. We have decided to use reverse philosophy and build 3D printer of big dimensions. This resulted in need of performing a dynamical simulation. The goal of this paper is to perform a dynamical analysis of moving parts of 3D printer and also to find suitable type of powertrain motors. The dynamical analysis will be performed by MSC Adams software, according to „user-friendly interface“.

Keywords: 3D print; dynamical analysis; powertrain;



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The design of universal loading device for a grinding machines

Jan Steininger^a, Slavomir Hrcek^a, Branislav Krchnavy^a

^a*Department of design and mechanical elements, Univerzita 1, Zilina 01008, Slovakia*

Abstract

The article deals with a design of a unified device intended for loading of outer bearing rings into specific types of grinding machines. It contains description of loading devices and analysis of a grinding technology. The main body of article consist of a proposal of series of solutions, their evaluation based on their technical values as well as the selection of the most appropriate version. The proposed device has been based on dimensions and structural design of currently used loading devices.

Keywords: Design; universal loading device; outer bearing ring



Analysis of transport mechatronic system properties

Maria Tomasikova^a, Michal Tropp^a, Tomas Gajdosik^a,
Leszek Krzywonos^b, Frantisek Brumerick^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Univerzitna 1, 010 26 Zilina, Slovakia

^bLublin University of Technology, ul. Nadbystrzycka 38 D, 20 – 618 Lublin, Poland

Abstract

The article describes modeling and simulation of the vehicle physical model. The vehicle model is simplified and it is made up of body and 4 tires. The model contains elementary information of the vehicle geometry - dimensions and center of gravity position. These information about the vehicle are sufficient for mathematical description of vehicle. The model is made of basic elements like engine, gearbox, differential and tires, which are represented by blocks. The model includes also other blocks, which are used to show measured outputs and control blocks, that make the vehicle mechatronic systems controllable according the driver model inputs. There are also studied the forces on tires and the engine speed of the vehicle model.

Keywords: Vehicle model; simulation; gearbox



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Concept of deep drawing mechatronic system working in extreme conditions

Michal Tropp^a, Maria Tomasikova^a,
Ronald Bastovansky^a, Leszek Krzywonos^b,
Frantisek Brumercik^a

^a*University of Zilina, Faculty of Mechanical Engineering, Univerzitna 1, 010 26 Zilina, Slovakia*

^b*Lublin University of Technology, ul. Nadbystrzycka 38 D, 20 – 618 Lublin, Poland*

Abstract

The subject of this article is an introduction of the concept of a device for deep drawing in extreme conditions. In this case, extreme conditions represents drawing process in vacuum by high temperatures required by molybdenum sheets forming. The first part of the paper is about the functional, structural, economical, technological, operational, safety, environmental, legal and design requirements. The second part of the article deals with description of possible variants of the mechanism structure. The paper describes also the results of the research work by evaluating the variants. The variants scores were rated by parameters, which are essential for properly work of the mechatronic system.

Keywords: Deep drawing; press; mechatronic system



Modal analysis of gearbox housing with applied load

Peter Weis^a, Lubos Kucera^a, Peter Pechac^b,
Martin Mocilan^b

^a*Univerzity of Zilina, Faculty of Mechanical Engineering, Department of Design and Mechanical Element, Univerzitna 1, Zilina 010 26, Slovakia*

^b*Univerzity of Zilina, Faculty of Mechanical Engineering, Department of Applied mechanics, Univerzitna 1, Zilina 010 26, Slovakia*

Abstract

The paper presents examination of the modal characteristic of gearbox housing with applied load. The first step involved solution of static analysis with load in form of bearing reactions. Subsequently modal analysis was performed to obtain natural frequencies and modal shapes. Bearing reactions were received from KISSsoft which is used for complex gearbox calculations. Finite element analyses were performed with ANSYS Workbench software. Twenty lowest natural frequencies were computed.

Keywords: Modal analysis; gearbox housing; natural frequencies; mode shapes



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic



Topic 4 ECONOMICS AND MANAGEMENT

Reviewers:

Abramovic Borna
Badura Stefan
Bartosova Viera
Binasova Vladimira
Blaho Peter
Bubenik Peter
Bukova Bibiana
Camaj Juraj
Cudanov Mladen
David Andrej
Dulina Luboslav
Dziendziora Joanna
Figurska Irena
Furmann Radovan
Gaso Martin
Gasova Martina
Gasparik Jozef
Gogola Marian
Gregor Milan
Grznar Patrik
Jachowicz Agnieszka
Jankal Radoslav
Kazda Antonin
Kendra Martin
Klinko Miloslav
Komsta Henryk
Konecny Vladimir
Krajcovic Martin
Krusinsky Peter

Lendel Viliam
Lizbetin Jan
Macus Peter
Madlenak Radovan
Madlenakova Lucia
Majercak Jozef
Majercakova Margita
Matuszek Jozef
Micieta Branislav
Michulek Tomas
Mozer Vladimir
Nedeliak Ivan
Nedeliakova Eva
Pancikova Lucia
Pavlicko Michal
Plinta Dariusz
Potkany Marek
Rakytka Miroslav
Ruttikay Ladislav
Satanova Anna
Smolarek Malgorzata
Soviar Jakub
Stefanik Andrej
Strenitzerova Mariana
Sulko Peter
Tokarcikova Emese
Varmus Michal
Virlanuta Florina Oana
Zitricky Vladislav



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The impact of the quality of transport services on passenger demand in the suburban bus transport

Robert Berezny^a, Vladimír Konečný^a

^aUniversity of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Road and Urban Transport, Univerzitná 1, 01026 Zilina, Slovakia

Abstract

The demand for transport services is determined by several factors at the same time, the impact of these factors is varied, and the impacts of individual factors of demand are different according to the groups of passengers making the demand for bus services. The article dealwith the design and the application of the methodology for measuring and evaluating the impact of the quality of transport services on the demand of passengers for suburban bus transport. The results may contribute to the stabilization of the demand for bus services, or they can serve as a basis for the improvement of transport services in the bus transport sector.

Keywords: demand; transport services; quality; passengers



Computer simulation and optimization of transport distances of order picking processes

Monika Buckova^a, Martin Krajcovic^a, Milan Edl^b

^a*University of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, University 8215/1, 010 26 Zilina, Slovakia*

^b*University of West Bohemia, Faculty of Mechanical Engineering, Department of Industrial Engineering and Management, Univerzity ul., c. orientacni 8, c.p. 2732, 306 14 Plzen, Czech republic*

Abstract

This article deals with optimizing of transport distances in orders picking processes. Article shows solution how to optimize orders picking in warehouse using dynamic simulation. In article basic steps of order picking planning process are described in order to minimize distances traveled by truck or human. The basis of this solution is execution of computer simulation and simulation experiments for faster finding of correct solution, which causes company cost reduction.

Keywords: Picking processes; Simulation; Experiments; Transport



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Knowledge transfer model and spin-off company set up in significant academic centres in Taiwan

Andrea Corejova^a, Maria Rostasova^b, Tatiana Corejova^b

^aUniversity of Zilina, University Science park, Univerzitna 8215/1, 010 26 Zilina, Slovakia

^bUniversity of Zilina, Faculty of Operation and Economics of Transport and Communications, Univerzitna 8215/1, 010 26 Zilina, Slovakia

Abstract

Innovation potential development with the support of new knowledge creation and presentation and its consequent transfer to business practice represents a part of knowledge society building. Experiences acquired abroad indicate that systematic support of invention application, technical solutions and knowledge acquired via research & development in business and social practice is necessary for maintaining sustainable development of a knowledge society. Building of platform for transfer of knowledge and technology support has just recently started in Slovakia. However, some of its activities have already been carried out mainly thanks to the EU structural funds. Sustainable economic growth must be based on latest knowledge. University's innovation potential is crucial. Specialised institutions focusing on knowledge and technology transfer have just started to emerge in Slovakia. Today, a very good example of technology transfer realization is the Broker Centre of Air Transport. This paper proposes a case study which was prepared in order to gain all the necessary information from the field of used technology and knowledge transfer model and spin-off companies in significant academic centres in Taiwan.

Keywords: university; spin-off; technology transfer; knowledge; Taiwan; Broker Centre of Air Transport



Multifactor analysis of online reputation of selected car brands

Peter Dorcak^a, Peter Markovic^a, Frantisek Pollak^b

^a*University of Economics in Bratislava, Faculty of Business Management, Dolnozemska
cesta 1, 852 35 Bratislava, Slovakia*

^b*University of of Presov in Presov, Faculty of Management, Konstantinova 16, 080 01
Presov, Slovakia*

Abstract

The paper discusses the issue of online reputation, more specifically the ways and methods of its measurements in selected entities operating in the automotive sector. A thorough multifactor analysis of reputation in the virtual world of the Internet was conducted on a specific sample of entities/ subjects – selected car brands operating on a central European market. Using a careful statistical testing relationships between factors were examined in order to identify and describe basic facts affecting online reputation of those entities in the hyper competitive market environment of the Internet. The findings identified by the analysis conducted on the selected part of the global market, can be effectively used in any market for the purpose of increasing competitiveness of selected entities from (not only) automotive industry.

Keywords: Reputation; Reputator; Internet; Automotive



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Optimization of the post logistics network and location of the local distribution center in selected area of the Lublin province

Paweł Drożdziel^a, Monika Wińska^a, Radovan
Madlenak^b, Paweł Szumski^c

^aLublin University of Technology, Nadbystrzycka 38 D, 20-618 Lublin, Poland

^bUniversity of Žilina, Univerzitná 1, 01026 Žilina, Slovakia

^cPolish Post, Waclawa Moritza 2, 20-900 Lublin, Poland

Abstract

These days customers expect the lowest price of postal services but still they look forward to its' wide availability, security and delivery of mail items on time. The most important in generating the total costs in these services is transport cost of postal items. Transport costs depend on many factors- purchase price of the vehicle, labor costs of the drivers, costs of maintenance and repairs, fuel costs etc. Hence, it is so important to find organizational solutions that can reduce the costs associated with the transportation of postal shipments, thereby reducing the total cost of postal services. An excellent way for doing it is to minimize the length of postal transportation routes, what means finding the shortest ways between post offices in selected area. This article presents the results of analysis and researches on existing postal network, which were based on the graph theory, in order to optimize actual network. Realized computer simulations were oriented to find a new location of the local distribution center. The relocation of local distribution center leads to minimize of the transport costs for delivery postal items "from point to point" of Polish Post SA network in the selected area of the Lublin province.

Keywords: optimization; postal network; local distribution centre



The Influence of Marketing Communication on Financial Situation of the Company – A Case from Automobile Industry

Lukas Falat^a, Martin Holubcik^b

^a*Department of Management Theories, Faculty of Management Science and Informatics,
University of Zilina, Univerzitna 8215/1, 010 01, Zilina, Slovakia*

^b*Department of Macro and Microeconomics, Faculty of Management Science and
Informatics,
University of Zilina, Univerzitna 8215/1, 010 01, Zilina, Slovakia*

Abstract

Marketing communication is a way how to provide selected information to customers, ideally with the fastest and in the most efficient form. Well set marketing communication of the company can presume the increment in the number of its customers which is often the significant factor of increase in sales. However, costs are linked with transforming marketing idea (using selected marketing communication channel and tool) into the final form which address customers. The goal of this paper is to use knowledge from the marketing communication of automobile company Tesla Motors, Inc. in order to gain information about efficient communication channels and tools which are currently used. We observe the relation of marketing strategy compared to financial situation, respectively financial characteristics. of selected communication channels and tools. Using real case of Tesla Motors authors suggest recommendations of efficient marketing communication in current environment as: a) effective from financial perspective b) beneficial in terms of building relationships with customer.

Keywords: marketing; marketing communication, finance, income statement, transport, Tesla



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Stakeholders in the various field and relations between them

Patrik Ferenc^a, Michal Varmus^a, Josef Vodak^a

*^a Faculty of Management Science and Informatics, University of Zilina, Univerzitna 8215/1,
010 26 Zilina, Slovakia*

Abstract

Appearance of management is largely chaotic for many organizations. One of the accompanying events is to waste resources, whether human, technical or financial conditions, which they managed from various sources gain. These organizations should be able to effectively use these resources for the fulfilment of their mission, as the basic purpose for which they are incurred, but they unfortunately are not. These organizations do not know cooperate with many stakeholders, sometimes they do not know correctly identify and classify it. Despite that fact they are reliant on the cooperation and development of such relationships. The key to resolving this situation is to identify stakeholders and their relationships between them for further research.

Keywords: stakeholders; management; stakeholders engagement; industry;



Brazilian waste management: Belo Horizonte's case study of sustainable management

Evaldo de Melo Ferreira^a,
Raphael Tobias de Vasconcelos Barros^b, Jakub Soviar^c

^a*Federal University of Minas Gerais, Antônio Carlos avenue, 6627, Pampulha Campus, Engineering School, block 1, 4th floor, Postcode 31270901, Belo Horizonte, Brazil.*

^b*Federal University of Minas Gerais, Antônio Carlos avenue, 6627, Pampulha Campus, Engineering School, block 1, 4th floor, Postcode 31270901, Belo Horizonte, Brazil.*

^c*Faculty of Informatic and Management, University of Zilina, Univerzita 1, Postcode 01026, Zilina, Slovak Republic.*

Abstract

This study is part of a PhD research and aims to present one Brazilian case study of waste management, the process of waste management plan elaboration in Belo Horizonte city Brazil, and the sustainable actions that this city has, which is considered reference about waste management in Brazil. The process of waste management plan in this city started in 2014, and in 2016 is in the last stage. Three groups are important to this process. The first one is the technical group, constituted by urban oversight of Belo Horizonte, Brazil. The second is the steering committee, formed by representatives of the executive power organs. The last one is the consulting board, that includes political bodies for social participation, representatives of the public sector municipal and from the state, and the organized civil society as well, contemplating the popular segments, technical / academic, and from the companies too. Papers of Scopus and Science Direct were consulted as well to compare this Brazilian case with European cases.

Keywords: Public policies and management; public systems; management



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Interactive design of reconfigurable logistics systems

Radovan Furmann^a, Beata Furmannova^a,
Dorota Więcek^b

*^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Industrial
Engineering, Univerzitna 1, 010 26 Zilina, Slovak Republic*

*^bUniversity of Bielsko-Biala, Department of Industrial Engineering, Bielsko-Biala, 43 309,
Poland*

Abstract

Presented article reflects the demands of reconfigurable logistics systems design, within the Industry 4.0 initiatives meaning. When planning logistic systems, it is very important to interconnect the real data from the control systems of logistic resources with the monitoring system. Subsequently, interactive design takes into account actual requirements of the real systems. Methodology of interconnection of the real logistic elements with interactive projection planning system and process simulation will be described in the article. Mentioned projection planning system also uses genetic algorithms to support subsequent design of production layout with respect to the real requirements of logistics systems.

Keywords: Internal logistics; dynamic simulation; interactive projection system; genetic algorithm



Reducing of intralogistics costs of spare parts and material of implementation digitization in maintenance

Miroslav Fusko^a, Miroslav Rakyta^a, Frantisek Manlig^b

^a *University of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzita 8215/1, 010 26 Zilina, Slovakia*

^b *Technical University of Liberec, Faculty of Mechanical Engineering, Department of Manufacturing Systems and Automation Studentska 2, 461 17 Liberec, Czech republic*

Abstract

Reducing costs is one of the main ways to get a competitive advantage in the market. Today is 40% to 60% cost reduction programs unsuccessfully. So that is necessary to transform traditional approaches production systems to digital production systems. It also affects the intralogistics costs on spare parts and material.

Keywords: Intralogistics costs; spare parts; digitization; productivity; technical service; maintenance



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

E-Government as a quality improvement tool for citizens' services

Katarina Gasova^a, Katarina Stofkova^a

*^aUniversity of Zilina, Faculty of Operation and Economics of Transport and
Communication, Department of Communication, Slovakia*

Abstract

The information and communication technology innovations have influenced citizens' behaviour, their information needs and the way how people work and communicate. This progress affects social, cultural, commercial and public structures. The Internet, in particular, has intensified the digital transformation, because it brings the ability to access variety information, new ways of interaction and also supports the knowledge creation and sharing. Digitalisation and globalisation reduce the importance of geographical boundaries, because people and societies are connected at the international level. The contribution is focused on e-Government services, which are available for citizens of the Slovak republic through the central public administration portal. Authors analyse provided e-Government services, create ICTI Business Model and describe current project of e-Health.

Keywords: e-Government; ICTI Business Model; citizens



Advanced industrial tools of ergonomics based on Industry 4.0 concept

Martina Gasova^a, Martin Gaso^b, Andrej Stefanik^b

^a*CEIT, n.o., Univerzita 8413/6, Zilina 01008, Slovakia*

^b*University of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzita 8215/1, Zilina 01026, Slovakia*

Abstract

Over the years approach focusing in ergonomics has changed. We still talk about identification - analysis - elimination of the risks on the workplaces. But differences are at the possibilities of modern ergonomics, movement of science and technical possibilities. The options of using a mobile applications, Internet of Things, data gathering and their real time evaluation and their sharing. We present those solutions that combine traditional knowledge and modern technologies. The results are innovative and advanced ergonomic tools based on Industry 4.0 concept. Electronic tools are a new direction in ergonomics. With the support of mobile applications we see a way to create healthy conditions at work for production and also non-production workers, assembly and logistics. At the beginning of 20-th century, majority of us had no idea what the ergonomics is, how many risks occur during our job that they are connected with the health of employees and have not known that special methods and tools for their identification, analysis, evaluation and identification are developed. With the growing development of society we got to stadium when, luckily, majority of companies – employers even know the meaning of ergonomics or work risks, about risks at their workplaces and establish their evaluation and try to eliminate them. We have many methods and tools of modern ergonomics which enable us to realize analysis and optimization of employee's work to their benefit. Considering experience we can surely claim that we know the main problem of these days. It is requisite to realize ergonomic evaluation perfectly, extensively and mainly quickly. Slowness of some solutions discourages managers and directors and makes effective improving of work conditions impossible. The idea of mobile application developing which works as a screening tool came with demands from big companies that have dozens of workplaces and cannot identify work risks by themselves. CeitERgonomics Analysis Application, which is



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

described in article, is output of our own research and development. It is a mobile application developed in CEIT Company in collaboration with the University of Zilina and Slovak ergonomic association. It is a screening evaluation of space conditions and work positions of workers at potentially risky workplaces. It is developed at the base of legislation and technical norms, at our own platform, with the support of virtual and augmented reality. The main goal of evaluation by the CERAA usage is to find out if the workplace is risky from the ergonomic view. It is an innovative way of applied augmented reality tools during the ergonomic evaluation of chosen workplaces. Nowadays, the new submodules are being developed. They will identify risks at administrative workplaces, submodule which will evaluate working with loads and other that will evaluate repetitive operations. CERAA is used in several industrial companies in Slovakia and Czech Republic from the second half of 2016.

Keywords: Ergonomic; Industry 4.0 concept; electronic tools; virtual and augmented reality; CERAA



Life cycle and supply chain management for sustainable bins

Ingo Gestring

*HTW Dresden, University of Applied Sciences, Friedrich-List-Platz 1, 01069 Dresden,
Germany*

Abstract

Packaging is essential in logistics processes. All products consumed in a supply chain from fresh berries to large containership-parts are packed during their transportation and storing processes. Often plastics are used as a basic component for the bins. These synthetic materials are produced from crude oil. After their use plastic packaging is often burned to receive thermal energy. To measure and analyse the environmental impact a life cycle assessment can be carried out. In this paper the assessment is done for a Kanban bin made out of sunflower granulate. A typical supply chain situation is simulation. Different system boundaries are used. The production and the use/ maintenance phase are analysed with the help of a framework. The highest impact on the environment is during the use phase. The transportation and the recycling phase can be neglected in terms of the environmental impact. Using a sunflower-granulate the emissions during the production phase can be reduced. The impact is less strong considering a life cycle process.

Keywords: Life Cycle Management and Assessment; Kanban-Bins; Sustainability



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Smart Connected Logistics

Tomas Gregor^a, Martin Krajcovic^a, Dariusz Więcek^b

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzitna 8215/1, Zilina 010 26, Slovakia

^bUniversity of Bielsko-Biala, Faculty of Management and Transport, Department of Management, Willowa 2, Bielsko-Biala 43-309, Poland

Abstract

This paper presents research done at the University of Zilina, in cooperation with CEIT (Central European Institute of Technology). The topic of focus in this article is the Smart Connected Logistic System, which utilizes all the most advanced principles such as Mobile Robotic Systems (MRS), Mobile Automated Platforms, Multi-Agent Cloud based control and various IoT concepts. The paper clarifies the term of Smart Connected Product, exhibited in the context of Smart Logistics.

Keywords: Smart Connected Logistics System; Mobile Robotic Systems ;Innovation Mapping and Planning; Smart Connected Product



Appraisal of driving forces in the reverse distribution channel in the Slovak Republic

Katarina Gubiniova^a, Gabriela Pajtinkova Bartakova^a,
Juliana Mruskovicova^b, Silvia Trelova^a

^a *Comenius University in Bratislava, Faculty of Management, Odbojarov 10, 820 05
Bratislava 25, Slovak Republic*

^b *University of Economics in Bratislava, Faculty of Commerce, Dolnozemska cesta 1, 852 35
Bratislava, Slovak Republic*

Abstract

The opinions emphasizing the need of so called reverse distribution and reverse logistics appeared in academic literature on marketing already in the 1970s. They dealt with a systematic move of waste generated in the distribution channel for the purpose of its transformation to usable materials. Changes in the material flows in distribution channels therefore represent both a challenge and an opportunity for managers in association with a change in the concept of rational marketing management. The motivation of customers is of special importance in such an approach, as they need to be sufficiently motivated in order to understand their role of “producers”, and, accordingly, to behave actively, as customers are the driving force in reverse distribution channels. The implementation methods associated with the reverse distribution concept include the activities of retailers, or other members of the distribution channel, for instance the take-back of recyclable materials. Therefore, the perception and assessment of preparedness of ultimate customers for their tasks in the processes of such a distribution in the Slovak Republic (on the grounds of a research with the participation of a representative sample size of 1,820 respondents) are dealt with in the paper. Based on a secondary data analysis, the preparedness of retail institutions for the reverse distribution concept is assessed. The outcome of the paper is a confrontation of the perspectives of two (most significant) entities involved in the reverse distribution channel.

Keywords: Distribution; reverse distribution; motivation of ultimate customers; retail institutions.



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Statistical Learning as a Tool for Optimizing the Level of Excise Tax of Mineral Oils in Slovakia

Beata Holkova^a, Lukas Falat^a

^aDepartment of Macro and Microeconomy, Faculty of Management Science and Informatics, University of Zilina, Univerzita 8215/1, 010 01 Zilina, Slovakia

Abstract

Excise taxes are one of the oldest taxes in the world. Countries have used these taxes to ensure profits of public finances. However, countries also have used these taxes as an indirect tool for removing negative externalities which cause damage the environment. One of the most significant excise taxes is the excise tax on mineral oils. This tax generates circa 10 per cent of all taxes coming to the public budget of the Slovak Republic. In Slovakia, the tax burden is the highest in our region. The state can influence the final price of gasoline products; however, it does not want to lose tax profits. It is due to the fact that these taxes generate remarkable profit in the Slovakian budget. We believe that there is a space for decreasing this tariff what would cause the decrement of gas and diesel prices. In this paper authors suggest a way how to use statistical methods based on linear regression and neural networks for modelling the decrement of excise tax tariff on gasoline with the same tax profits. We also suggest methodology of identification and modelling of these factors influencing the excise tax revenue.

Keywords: excise tax, mineral oils, gasoline, Slovakia, linear regression, neural network



The importance of e-mail marketing in e-commerce

Martin Hudak^a, Eva Kianickova^a, Radovan Madlenak^a

^a*University of Zilina, Univerzita 1, 010 26 Zilina, Slovakia*

Abstract

Online marketing is an integral part of e-commerce nowadays and includes many different ways of company's presentation, such as e-mail marketing, content marketing, social media, affiliate marketing and so on. The aim of the article is to highlight the importance of e-mail marketing due to the fact, it is considered as one of the most effective communication tools. The part of the article are also fundamental metrics used in e-mail marketing such as delivery rate, open rate and click through rate. In the end of the article are recommendations and suggestions for creating of successful e-mail. The eyetracking technology was also used to analyze the gaze of Internet users at mailbox.

Keywords: E-mail marketing; e-commerce; newsletter; eyetracking



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Networking of small and medium enterprises into clusters in the Slovak Republic

Denisa Janasova^a, Veronika Bobanova^a,
Stanislava Strelcova^a

^aFaculty of Security Engineering, University of Zilina, Univerzitna 8215/1, 010 26 Zilina, Slovak republic

Abstract

According to survey of risks, market risks are the most endangering risks threatening small and medium sized enterprises in the Slovak Republic for years. Appropriate way to reducing these risks is networking enterprises in clusters. Creating clusters favourably affects the stability and competitiveness of the participating enterprises. Due to the fact, that cooperation is still underdeveloped in the Slovak Republic the main aim of this paper is to point out the growing importance and benefits of clusters for small and medium sized enterprises. The paper analyzes current state, structure and application (usage) of clusters in the Slovak Republic.

Keywords: Clusters; SMEs; transport; networking; cooperation



Support planning and optimization of intelligent logistics systems

Matej Kovalsky^a, Branislav Micieta^a

^aUniversity of Zilina, Faculty of mechanical engineering, Department of Industrial Engineering, Univerzitna 1, Zilina, 010 26, Slovakia

Abstract

The present article deals with logistics planning, focusing on the use of static and dynamic analysis in the planning of automated logistics unit in the automotive industry. Article describes the basic steps of the planning process from the description of a collection of basic input data, perform static analysis to verification by dynamic simulation. Except Article describes the basic steps in planning the logistics of tractors includes the difference of static calculations necessary logistical capacity tractors and results of dynamic simulation. In conclusion, based on the results summarize the advantages and disadvantages of these two instruments for the planning of internal logistics.

Keywords: Internal logistics planning; computer simulation; Plant Simulation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Forklift workers strain of spine at industrial logistics in depending on human work posture

Miroslava Kramarova^a, Luboslav Dulina^a, Ivana Cechova^a

^a University of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzitna 8215/1, Zilina 010 08, Slovakia

Abstract

The article provides information about the dangerous logistic activities in a company, where a worker is exposed to an excessive load to the musculoskeletal system. It describes the dependence between the operator's load parameter during his control of a forklift and his subjective reaction to this load parameter in the form of strain. Evaluation of the operator's strain is based on the force that is exerted on the intervertebral segment L4 / L5 and the muscles in the spine. It also provides information about values of the operator's awkward postures, differing from the neutral working posture during a specific work activity that's hazardous. Subsequently, the article defines the optimal range of parameters for an operator, during his control of a forklift, within which he doesn't get into non-physiological work postures associated with discomfort.

Keywords: Ergonomics; non-physiological postures of forklifts operators; spinal load; spinal muscle tension



Simulation of human effect to the Adaptive Logistics System used in public facilities

Ladislav Krkoska^a, Milan Gregor^a, Jozef Matuszek^b

aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Zilina, 010 26, Slovakia

bUniversity of Bielsko-Biala, Department of Industrial Engineering, Bielsko-Biala, 43 309, Poland

Abstract

It is important to deal with Automated Guided Vehicles (AGVs) usually used in healthcare facilities. In such cases, an AGV has to cope with uncertainties arising from the unaware public. AGVs are often forced to slow down or stop. We developed a simulation tool in Simio© software called „SHEALS“, used for simulation and analysis of the human factor to the total performance our Adaptive Logistics System (ALS). We used the agent-oriented design to create Multi-Agent System (MAS). It allows decision making and interactions between humans and AGVs. Simulation tool is able to combine many parameters, such as safety distance, reaction time, equipment of AGVs, etc. Simulated scenarios can be presented in the form of visual illustration and statistical data.

Keywords: Automated Guided Vehicles; Public Facilities; Simio; Multi-Agent System



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Efficiency of using financial resources and their impact on security in a local context

Jozef Kubas^a, Viktor Soltes^a, Jan Misik^a,
Zuzana Stofkova^b

^aUniversity of Zilina, Faculty of Security Engineering, Univerzitna 1, Zilina 010 26,
Slovakia

^bUniversity of Zilina, Faculty of Operation and Economics of Transport and
Communications, Univerzitna 1, Zilina 010 26, Slovakia

Abstract

Each city or municipality expends a certain amount of financial resources for creation of the most secure environment possible. Several methods exist for assessing the efficiency of using these resources. One of the methods for comparing efficiency is Data Envelope Analysis, or the DEA method. Using this method we determine to what measure the selected largest cities in the Slovak Republic utilize resources for security. An important task is to select suitable data, which will be the inputs and outputs for the given method. The amount of financial resources from a security program per resident and the amount of financing from the budget per resident were selected among the inputs. The number of residents per one violation was selected as the output. In the contribution the most current closed period in the final accounts of the cities are compared.

Keywords: Security; DEA methods; Municipal police; Finance



The proposal of coordination the rail and bus passenger transport on the relation Zilina – Ruzomberok

Stefan Kudlac^a, Jozef Majercak^a, Cezary Mańkowski^b

^aUniversity of Zilina, Univerzitná 1, Zilina 010 26, Slovakia

^bUniversity of Gdańsk, ul. Jana Bażyńskiego 8, Gdańsk 80-309, Poland

Abstract

The current trend in passenger traffic is a sharp increase of individual passenger transport, resulting in substantial adverse environmental impacts such as congestion and traffic accidents. These negative impacts can be reduced by using an efficient system of public transport. Research realized at the Department of railway transport at the University of Zilina has showed high proportion of simultaneous connections between transport modes on the relation Zilina – Ruzomberok. This state is inefficient and significantly increases the economic costs of public passenger transport.

The result of research is the proposal of optimization for passenger transport lines on the relation Zilina – Ruzomberok, including the elimination of simultaneous connections. There are a major financial savings after this elimination that can be used to improve level of public passenger transport and creating integrated transport systems.

Another result of the research is the proposal of flow chart that use the predetermined criteria to assess the relevance of concurrent connections. The flow chart can be suitably adjusted according to various specified criteria and also expanded to more types of transport systems.

Keywords: Analysis, coordination, transport, quality, service



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Organizing Innovation Activities in company

Viliam Lendel^a, Dominika Moravcikova^a, Martin Latka^a

^a*University of Zilina, Univerzitna 8215/1, 010 26 Zilina, Slovakia*

Abstract

In the dynamically changing world where new technologies are rapidly developing it is necessary for the company to be able to respond promptly to changes in the market environment. Very important factor currently is innovation, differentiation from the competition. Well-defined processes, working with innovative ideas and realization of innovation is crucial for the company competitive advantage. It is also necessary that the innovation processes are represented in the information system.

The aim of this article is based on a detailed analysis of the literature sources and the research develop to design the Model of Organize Innovation Activities in Company.

Keywords: innovation; innovation activities; organizing innovation activities



Sustainability in performance measurement and management systems for supply chains

Thomas Liebethuth^a

^a*OTH Regensburg, Seybothstraße 2, 93053 Regensburg, Germany*

Abstract

Aspects of sustainability – understood as the ability to manage economic, social and environmental performance at the same time – are becoming more important in Supply Chain Management. This is a challenge as sustainability adds less quantifiable aspects to Supply Chain Management than classic process aspects. On the other side measuring sustainability is crucial for the implementation of modern Supply Chains Management and to manage sustainably in the daily business. This contribution discusses the integration of sustainability in performance measurement and management systems (PMMS) for Supply Chain Management. Therefore in the paper firstly an overview of definitions and developments in performance measurement and management systems and a structure for PMMS are given. Secondly guidelines for good and modern PMMS are discussed. Thirdly existing approaches for Supply Chain Management PMMS (e. g. KPIs, TCO, value driver trees and balanced scorecards and maturity assessments) are presented and the suitability for Supply Chain Management as well as the possibility to integrate aspects of sustainability are examined. Lastly the fulfilment of the requirements and the ability to cope with the challenges of the approaches is discussed.

Keywords: Supply Chain Management; Performance Measurement Systems; Performance Management Systems; Key Performance Indicators; Total Cost of Ownership; Balanced Scorecard; Maturity Assessment; Sustainability



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The trend of cost of universal services provided by national postal operator and correlation between price of letter mail and amount of sent letter mails in Slovakia

Maria Matuskova^a, Matej Pechota^a, Lucia Madlenakova^a

^aUniversity of Žilina, Univerzitná 1, Žilina 010 01, Slovakia

Abstract

National postal operator seeks to provide the universal postal service. Consequently, obstacles may be created. While providing the universal postal service, the operator has the costs, which tend to be growing. In this article, we are going to calculate this trend and try to predict the next outcome. According to the costs, we should pay attention to the price of letter mail, which is connected to the costs. In this article, we are going to calculate correlation between price of the letter mail and the amount of sent letter mails. The article focuses on the importance of the postal services. Importantly, we should focus on the universal postal service, because nowadays, there is a different situation on the postal market. This article will use statistics data from Slovakia postal market, while calculating the results.

Keywords: Universal service; Correlation coefficient; Post; Trend analysis



Planning and performance evaluation of the manufacturing organizations

Iveta Medvecká^a, Vladimira Binasová^a, Libor Kubinec^a

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzitna 1, Zilina 010 26, Slovakia

Abstract

This paper deals with the planning and performance evaluation of the manufacturing and transport organizations. Nowadays, the financial analysis is the most important tool of financial management and its purpose is to carry out an assessment of financial management. The result of the solution is an effective and comprehensive early warning system that measures and takes into account the performance of the enterprise and satisfies the conditions for the rapid application in small and medium-sized enterprises. At the same time, it creates conditions for fast and thorough assessment of business performance generated with respect to the value creation of the organization. Finally, the validity of the proposed system is implemented.

Keywords: Business performance; financial and economic analysis; planning, transport



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Implementation of Automated Guided Vehicle system in healthcare facility

Marko Pedan^a, Milan Gregor^a, Dariusz Plinta^b

^aUniversity of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzitna 1, Zilina 010 26, Slovak Republic

^bThe University of Bielsko-Biala, Faculty of Mechanical Engineering and Computer Science, Department of Production Engineering, Willowa 2, Bielsko-Biala 43 309, Poland

Abstract

The article deals with the use of automated guided vehicle (AGV) system in the hospital. This paper provides the requirements and technical specifications of AGV cart designed for healthcare facility. The second part describes the application and benefits of AGV implementation in selected health care facility gained from computer simulation that is used as a verification tool. This part also contains the economic evaluation of this implementation and summary of further investments related to this technology.

Keywords: AGV; healthcare; improvement; simulation; efficiency



Calculation of emissions from transport services and their use for the internalisation of external costs in road transport

Frantisek Petro^a, Vladimir Konecny^a

^aUniversity of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Road and Urban Transport, Univerzitna 1, 010 26 Zilina, Slovakia

Abstract

Impact of transport operations on the environment is an important criterion of quality services. Requirements for environmental acceptability has recently escalated, manufacturing and trading companies require the carriers to declare the impact of their activities on the environment. Area of concern are the emission factors used for calculating emissions and their unification. For this reason it was accepted norm STN EN 16258, which deals with the methodology of calculation and declaration of energy consumption and greenhouse gas emissions from transport services. Existing emission calculators do not allow the calculation of the external costs of transport services in the area of transport services impacts on the environment. Article deals with the design and application of the calculator of external costs of transport services as an extension, respectively another important function, emission calculator for field of transport services.

Keywords: environment; emissions; emission calculator; external costs; internalisation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Specificities identification of value management of companies providing transport services

Tatiana Potkanova^a, Maria Durisova^a

^aDepartment of Macro and Microeconomics, Faculty of Management Science and Informatics, University of Zilina, Univerzitna 8215/1, 010 01, Zilina, Slovakia

Abstract

Value management belongs to relatively new fields of general management. Companies increasingly place emphasis on activities oriented on competitiveness improvement also through providing value. In application in company conditions, value management belongs to fields of management which subjects to some specificities in dependence on orientation of companies' sector of activity. In companies providing services there exist differences of generally applicable elements or tools of value management application. Transport services providers belong to companies in which it is even necessary to adjust generally applicable components of value management. Such need is caused in particular by difference of stakeholders since the customer isn't at the same time the final consumer. Importance of provided values for these two specific stakeholders is evident in particular from benefit for transport companies' point of view. Output of article which is part of research works is to create model oriented on value management for companies providing transport services.

Keywords: Value; value management; stakeholders; value analysis; finance



Suggested credit score of municipalities as a tool for more efficient city management

Tatiana Potkanova^a, Lukas Falat^a

^aDepartment of Macro and Microeconomy, Faculty of Management Science and Informatics, University of Zilina, Univerzita 8215/1, 010 01, Zilina, Slovakia

Abstract

In this paper we suggest a way how to make the management of city more efficient. Forecasting the financial situation of the organization is an important part of the company practice. The economy of cities and municipalities works on the same principle however relations balance-sheet data are not so explicit. Minimal attention is attributed to many correlations as the sense of forecasting balance-sheet data of municipalities is not considered to be an interesting part of the financial-economic analysis. The methodology of forecasting of the future financial state using our suggested credit score expressed through trading income per habitant absents. Credit score is one of ways how to determine the total financial situation of the organization. The goal of the paper is to propose methodology for taking into account relations and correlations of the basic financial and economic data in order to determine financial condition and solvency of municipalities. The determination of this credit score would be useful for citizens of the city, the government of the city as well as for banking institutions. The use of these relations would be a simple manual how to get the situation about financial economy of the cities. Finally, the implementation and use of these characteristics could be useful in making the city management more efficient. By doing this, municipalities and cities would have financial resources, either from surplus or provided low bank credits, to finance important areas such as public transport and infrastructure.

Keywords: Credit score; municipality; city; transport; financial indicators; trading income per habitant



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Cost reporting of the transport company and its use in decision-making

Marek Potkany^a, Lucia Krajcirova^b

^aTechnical University in Zvolen, T.G. Masaryka 24, 960 53 Zvolen, Slovakia

^bTechnical University in Zvolen, T.G. Masaryka 24, 960 53 Zvolen, Slovakia

Abstract

This paper deals with the problematic of cost reporting at the condition of transport company and its importance in decision making tasks. So important part of cost reporting is the classification of cost into variable items, specific fixed and enterprise fixed costs with the aim to use them for determining the break-even point analysis. The point of the proposed methodology is optimization of routes for the transportation of logs in order to maximize the coefficient of rides utilization and contribution margin to 1 km distance.

Keywords: Cost; reporting; transport company; contribution margin



Cooperation management on construction business market in the Slovak republic – an Insight from a Company

Jakub Soviar^a, Martin Holubcik^a, Josef Vodak^a

^a*Department of management theories, Faculty of management science and informatics,
University of Zilina, Univerzita 8215/1, 010 26 Zilina, Slovak republic*

Abstract

Continuous research in the area of cooperation, its theory and practice, gradually moves us closer towards the applicability of cooperation management in specific environments. In the Slovak Republic one such environment is the construction business market, which is characterized by various cooperation networks. Statistics of the construction business indicate slow economic growth, which is in fact lower compared to the time period before 2007. The main challenge is to stay competitive in the environment where supply of construction services is considerably higher than the demand for such services. Companies that are competitive and have a strong cooperation basis are characterized by frequent activity, long-term interactions, high performance, and adherence to the supply & construction terms. In the discussion part of this article we focus in detail on a model of cooperation management for this specific environment. The main part of the model is a managing unit, which coordinates cooperation activities of the collaborating and competitive companies. Successful cooperation is one of the elementary activities of cooperation management suitable for strategic management of a group of companies. Competitive environment at this construction market can be generalized and the results of this study can be used for applying cooperation management in other industries and collaborative settings.

Keywords: cooperation management; Slovak Republic construction business market; company case study; synergy; cooperation networks



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The impact of using the digital environment in transport

Natalia Stalmasekova^a, Tatiana Genzorova^a,
Tatiana Corejova^a, Lucia Gasperova^a

^aUniversity of Zilina, Univerzita 8215/1, Zilina 010 26

Abstract

An arrival of the Internet caused not just the revolution in ordinary life but it significantly influenced the business environment. The times when the seller and the buyer had to physically meet are gone and trading was transferred to online world. The wide availability of the Internet gives us the ability to trade anywhere and it has brought great opportunities in the field of transport and travel. Simple man no longer has to rely on public transport but often can choose the departure and the arrival to selected destination by himself. The opportunity to have a ride with someone, who has the same journey, brings many benefits, but also drawbacks. The aim of this paper is to describe the operation of the digital world and models that work in it. It will include identifying current trends of using other means of transport against the traditional kind of transport.

Keywords: Digital business model; e- business, transport; Uber; Taxi



State-of-the-art approaches to material transportation, handling and warehousing

Ivana Sulirova^a, Ludmila Zavodska^a, Miroslav Rakyta^a,
Vera Pelantova^b

^a *University of Zilina, Faculty of Mechanical Engineering, Department of Industrial engineering, Univerzitna 1, 010 26 Zilina, Slovak republic*

^b *Technical University of Liberec, Faculty of Mechatronics, Informatics and Interdisciplinary Studies, Institute of Mechatronics and Computer Engineering, Studentska 2, 461 17Liberec, Czech republic*

Abstract

Providing a desired level of customer service in the business is an important part of logistics management. The role of logistics is to provide transport right material in the right quantities and the right quality to the right place. The problem arises when harmonization logistics requirements. This article focuses on solving the problem of increasing the level of customer service through effective material transport, handling and storage. The first part focuses and compares different types of warehouses and the order picker's inventory management technologies. The second part is devoted to logistics and supply. Warehouse management and transport of the material is connected with tractive control system that reacts flexibly to changes in customer requirements. Authors in solving based on the results of realized survey of the current situation in enterprises in the described areas.

Keywords: Customer service; kanban; milk run; warehouse with narrow aisles



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Review of parking policies in the case of medium-sized Polish cities

Agnieszka Szumilas^a, Paweł Pach^b

^aFaculty of Architecture, Wrocław University of Technology, Prusa Str. 53-55, Wrocław 50-377, Poland Country: Poland

^bFaculty of Architecture, Wrocław University of Technology, Prusa Str. 53-55, Wrocław 50-377, Poland Country: Poland

Abstract

The problem of parking addressed in this paper is a part of current communication problems faced by European Cities. The rapidly growing number of cars and a range of urban problems related to vehicular communication are in the area of interest for increasing number of regional decision-making institutions [6]. The problem of parking, which is an important spatial issue is becoming increasingly difficult to resolve. One of the tools by which the city can control the problem of parking both in the center and on the outskirts is the introduction of parking policy – a strategy that determines what solutions should be adopted to reduce the number of cars. Especially in medium-sized cities dealing with parking problem is a fairly new issue and it mostly includes resolutions that introduce paid parking zones and pedestrian zones or outsources expertise in the field of communication. The study examined documents, resolutions, parking policies and all other available materials concerning parking in 379 cities located in 16 regions. Cities of more than 10 000 inhabitants were analyzed. The aim of this study is an overview and analysis of parking policies implemented by Polish cities. The texts of studies, master plans, resolutions and notices that create a strategy for parking in various cities were analyzed as a part of this study.

Keywords: parking policy, transportation system, urban planning, motorization rate, car parks, Park& Ride



Connection of dynamic quality modeling and Total Service Management in railway transport operation

Vladimira Stefancova^a, Eva Nedeliakova^a,
Carlos Lopez-Escolano^b

^aUniversity of Zilina, Univerzitna 8215/1, 01026 Zilina, Slovakia

^bUniversity of Zaragoza, Instituto Universitario de Investigacion en Ciencias Ambientales
de Aragon, Department of Geography and Territorial Planning, Spain

Abstract

Improving the quality of transport services should be based on the procedure leading to the formation of future better services and define processes to ensure quality so that they comply with the requirements of the customers. The technology of transport and carriage process is one of the elements of the transport system, the quality of which can be influenced actively through the use of new advanced technology. This paper is focused on the new approach in designing the preparation of processes and services in accordance with customer's needs. New software solution was created for the achievement of the complexity of the preparation, effective implementation and timely indication of any diversions from quality in railway transport. The principles of the dynamic quality modeling and total service management were used as an important support for new software in railway transport operation.

Keywords: Dynamic models; Total Service Management; process-oriented management; quality



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The directions of on-going air carriers' hybridization: Towards peerless business models?

Anna Tomova^a, Matus Materna^a

^aDepartment of Air Transport, University of Zilina, Univerzitna 1, 010 26 Zilina, the Slovak Republic

Abstract

We define the directions of air carriers' business models hybridization according to key attributes which are generally accepted by economic research. Using the conclusions of current hybridization literature as well as illustrative examples, we characterize hybridization as a complex, robust and multi-sided process going across all business models' attributes. Just peerless business models of airlines investigated by a new methodological framework are seen by us as a very perspective research concept to identify competitive advantages of rivals at global market with air services.

Keywords: airlines; business model; hybridization; low-cost



Examining changes in GDP on the demand for road freight transport

Peter Varjan^a, Dominika Rovnanikova^a, Jozef Gnap^a,

^a*University of Zilina in Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Road and Urban Transport, Univerzitna 1, 010 26, Zilina, Slovakia*

Abstract

The paper deals with the analysis of long-term development of GDP, while it is per 1 capita in Slovakia and neighboring countries. This development will be further compared with the economies of developed countries. This paper also parse the vehicle fleet of road transport and examines the burden on the road network. This is based on statistical data from the Slovak Road Administration and information from the toll system since 2009. The paper also examine the load of roads in the factory Kia Motors Slovakia by road freight transport. The output of paper are recommendations for the development of transport infrastructure, road and rail transport in terms of sustainable development.

Keywords: GDP; freight transport; transport capacity



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The Business Excellence assessment

Lukas Vartiak^a, Miriam Jankalova^a

^aUniversity of Zilina, Faculty of Operation and Economics of Transport and Communications, Univerzitna 8215/1, 010 26 Zilina, Slovakia

Abstract

Every company, regardless of its business orientation, strives for success. For many of them, success is equal to profit. Naturally, profit serves as a basic motivation for the formation of companies. On the other hand, it is however necessary to take into account the way of making a profit. This implies the need to achieve success which is most appropriately expressed by the term Business Excellence. The aim of the paper is to create a quick checklist for assessing the company's state of Business Excellence. Such tool is to be created by intersecting the Oliver Wight Class A Checklist for Business Excellence (OWC) and the core themes of excellence described by Les Porter and Steve Tanner. The main finding is that related items from OWC were identified and linked with every core theme of excellence. As a result, a quick checklist for assessing the company's state of Business Excellence, containing of 45 items, was created.

Keywords: Business Excellence; Assessment; Checklist; Success



Computer simulation as a tool for the optimization of logistics using automated guided vehicles

Vladimir Vavrik^a, Milan Gregor^a, Patrik Grznar^a

^a*University of Zilina, Faculty of Mechanical Engineering, Department of Industrial Engineering, Univerzitna 1, 010 26 Zilina, Slovak Republic*

Abstract

The article describes results of the research project and at the same time, it introduces the method of the determination of number of automated guided vehicles and choosing of optimal internal company logistics track. New technologies are fundamentally changing the internal logistics and internal logistics is therefore gradually becoming adaptive, and that requires changes in the whole concept of future solutions. One example is automated logistics system of planned operation of manufacturing semi-products intra-process of components production in the automotive industry. The simulation results of the logistics system were variants for increasing the use of the operation areas, optimized material supply and created layout that would be able to flexibly response to the future company requirements.

Keywords: Computer simulation; automated guided vehicle; automated logistics system; plant Simulation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The proposal for the allocation of capacity for international railway transport

Vladislav Zitrický^a, Lenka Černá^a, Borna Abramović^b

^aDepartment of Railway Transport, Faculty of Operation and Economics of Transport and Communications,

University of Zilina, Zilina 010 01, Slovakia Republic

^bFaculty of Traffic and Transport Sciences, University of Zagreb, Zagreb 10 000, Croatia

Abstract

The geographic position of the Slovak Republic and transport flows of goods create assumptions for the development of rail freight transport. Market share of railway transport in the Slovak Republic is about 20% of the overall transport volume. This share is largely formed by the international transport. International railway transport has in the Slovak Republic the significant share of the rail transport performance and therefore it is necessary to find out solutions that improve and strengthen its position. One possibility of development of international railway transport is to set up the conditions for faster transit of trains at cross border stations. The process of border crossing between different rail networks is extensively problematic, not only from the perspective of transfer of transport responsibility for the wagon loads, but also from allocation of the infrastructure capacity for international trains. The opening of rail freight market allows entering of new rail operators to the rail network. To optimise the use of the network and ensure its reliability it is useful to introduce additional procedures to strengthen cooperation on allocation of international train paths for freight trains between infrastructure managers. The paper contains the methodology of the allocation of rail capacity for international railway transport in conditions of Slovak railways. Based on the process transport analysis of cross border stations, common procedure of communication between rail operators and infrastructure manager is designed. Proposed coordination of allocation of the train paths reflects the conditions of common European Union transport market and it provides possibility to increase the competitiveness of railway transport on the transport market.

Keywords: rail capacity; train path; train diagram



Influence of information-communication system to reputation management of a company

Diana Zrakova^a, Milan Kubina^a, Gabriel Koman^a

^a Faculty of Management Science and Informatics, University of Zilina, Univerzita 8215/1,
010 26 Zilina, Slovakia

Abstract

In the present time are managing and decision making highly influenced by information-communication technologies, which are by usage of the specific information systems securing necessary, early and relevant information as inextricable outputs to decision-making activities within individual managing processes. A constant improvement of information-communication technologies and systems are bringing many opportunities in the field of gathering information and monitoring a company, as well as the relation of public to a company and its products. This paper is closely aimed to importance of the influence of information-communication systems to a management of reputation of a company. The management of reputation is very important for a company. It is process for monitoring activities, processes, products, as well as services of company, opinions about it and further endeavour to improve areas with negative feedback. Because is the management of reputation important for a company, its appropriate to aim on its management.

Keywords: reputation; management; on-line reputation; process of reputation management; information-communication systems, stakeholders



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Topic 5 INFORMATICS AND SAFETY

Reviewers:

Bukova Bibiana	Lovecek Tomas
Celko Jan	Martinka Jozef
Danihelka Pavel	Milinkovic Sanjin
Dobos Lubomir	Mozer Vladimir
Dvorak Zdenek	Olejniak Remigiusz
Guldan Vladimir	Orgon Milos
Hadacek Libor	Pokorny Jiri
Hargas Libor	Pollak Stefan
Holla Katarina	Rehak David
Hrbcek Jozef	Ristvej Jozef
Hromada Martin	Senovsky Michail
Janota Ales	Simak Vojtech
Kamencay Patrik	Spalek Juraj
Kandrac Jan	Stankovic Radomir
Klinko Miloslav	Stroch Petr
Klucka Jozef	Sulgan Marian
Koniar Dusan	Svetlik Jozef
Kostolny Jozef	Tavac Viliam
Krivda Vladislav	Thomitzek Adam
Kucera Petr	Tomek Miroslav
Kvarcak Milos	Vandlickova Miroslava
Kvet Michal	Wisztova Elena
Leitner Bohus	Zabovsky Michal
Lizbetin Jan	Zdansky Juraj



Modelling of transition of system with standby redundancy into failed state

Jozef Balak^a, Peter Zdansky^a

^a*Department of Control and Information Systems, Faculty of Electrical Engineering,
University of Žilina, Univerzitna 8215/1, 010 26 Žilina, Slovakia*

Abstract

An extension of a system by redundancy is a method of system modification which can be used for failure detection, failure masking or recovery after a failure. Dependability system features (availability) and safety system features (safety integrity) can be improved in a desired manner by an application of redundancy. The resulting influence of redundancy on the system depends on used forms of redundancy and its application methods. The paper deals with a calculation of a failed state probability of the system with standby redundancy and it points out the importance of choosing of a suitable method for an analysis of a monitored system feature.

Keywords: reliability; redundancy; standby redundancy; failed state probability; failure rate; FTA; CTMC



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Fire spread models and Tunnel Traffic & Operation Simulator

Peter Danisovic^a, Eva Jancarikova^a, Juraj Sramek^a,
Milos Zuziak^b

^a*University of Zilina, Faculty of Civil Engineering, Univerzitna 8215/1, 01026 Zilina,
Slovakia*

^b*Transport Research Institute, JSC., Velky Diel 3323, 01008 Zilina, Slovakia*

Abstract

The computer simulation of fire spread based on modelling of complex processes related to fire by Computer Fluid Dynamics CFD theory should be a significant contribution to increase of safety of road tunnels. This paper is about instant project aimed at creating simulation models of formation and spread of fires in the road tunnel. The simulations will be compared with real in-situ measurements of fire scenarios suggested by customer organization in two road tunnels. Within the project, Tunnel Traffic and Operation Simulator, as unique facility at University of Zilina will be extended by visualizations of smoke stratification in the virtual tunnel tube.

Keywords: tunnel, safety, fire spread, simulation, incident



The parameters of the optimal method of water transport to forest fires

Milan Dermek^a

*^aUniversity of Zilina, Faculty of Security Engineering, Department of Fire Engineering, Ul.
1. maja 32, 01026 Zilina, Slovakia*

Abstract

The basic requirement for fast localization and following extinguishing of a forest fire is securing enough supply of water through suitable transport of water. The basic methods are water shuttle operation through tanker trucks and long-distance transport of water by hose lines and portable pumps. Nowadays beside of this classic methods, different combined methods of transport are used and a modern method with a high-capacity pump. In the article I deal with each method of transport of water to forest fires and I am comparing them according to possibility of their deployment. The decisive parameters for deployment of single methods of transport are mentioned and based on the created models of transport of water, the optimal method is suggested for given conditions of environment.

Keywords: forest fire; firefighting tactics;pumping water relay; shuttle water relay



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Deployment of pond system to firefighting in extreme terrain conditions

Milan Dermek^a, Bohuslava Kozicova

*^aUniversity of Zilina, Faculty of Security Engineering, Department of Fire Engineering, Ul.
1. maja 32, 01026 Zilina, Slovakia*

Abstract

The article deals with the possibilities of overcoming forest fires in extreme terrain conditions. It is devoted an issue of using pond system for the water transport to the seat of fire during firefighting under what conditions it is advantageous to deploy this mode of water transport, how to proceed when it is required and its deployment. Transport of water in exposed terrain is governed by the basic hydraulic regularities that determine the ways of deployment pond system.

Keywords: forest fire; firefighting tactics; pond system; firefighting equipment; inaccessible terrain.



Current trends in source code analysis, plagiarism detection and issues of analysis big datasets

Michal Duracik^a, Emil Krsak^a, Patrik Hrkut^a

^aUniversity of Zilina, Faculty of Management Science and Informatics, Univerzitna 8215/1,
010 26 Zilina Slovakia

Abstract

In this work, we analyze the state of the art in source code analysis area with a focus on plagiarism detection and provide a proposal for a future work in this area. Detection of plagiarism combines the detection of clones and methods for determining similarity. Nowadays, there are several approaches that can be divided into three levels. The first one is text based and uses plain text as an input. The second level is token based. The top level is model based and uses models to represent source code. These advanced algorithms (token and model based) can't work with large datasets.

We believe the future belongs to the algorithms that will be able to handle large amount of source code. These algorithms should use one of model-based representations. They can be used for formation of large-scale anti-plagiarism systems. They can be used also in the area of source code optimization. Complex information systems often have common parts, and identifying the parts would help us with more effective development of the systems in the future.

Keywords: source code analysis; plagiarism; current trends; transport; optimizations



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Sustainability of large urban transport structures in terms of traffic and environment

Vladimir Faltus^a, Pavel Pribyl^b, Ondrej Pribyl^c,
Lukas Hrdina^b

^a*Czech Technical University in Prague, Department of Transport Telematics, Konviktska 20, 110 00 Prague 1, Czech Republic*

^b*Czech Technical University in Prague, Department of Transportation Systems, Horska 3, 128 03 Prague 2, Czech Republic*

^c*Czech Technical University in Prague, Department of Applied Mathematics, Na Florenci 25, 110 00 Prague 1, Czech Republic*

Abstract

The paper attempts to explain the impacts of large transport structures on the traffic quality and urban environment, in terms of the sustainability of these structures in the long term decades. Such effects can be expressed e.g. via travel time and speed, the length of congestions and time delays, number of stoppings, fuel consumption, location and amount of pollutants produced. The rating is based on the application of mathematical models working with data measured throughout the city, using strategic detectors and floating cars, or test drives. One of the models is the estimation of fuel overconsumption due to reduced travel speed e.g. in congestions, as well as a model determining the delay costs due to traffic situation. Models and measurement data enable to compare the situation before the construction and after implementation of the structures. The method is demonstrated in the case of the Blanka tunnel complex on City Ring Road, which was opened in September 2015. The Blanka tunnel complex is the longest road tunnel in the Czech Republic and the longest city tunnel in Europe, the most expensive transportation project in the history of Prague, whose global impact on the city has not yet been competently quantified.

Keywords: Sustainability; Data measurement and processing; Road tunnel; Strategic detectors; Floating cars; Level of service; Fuel consumption.



Simulation tool for fire and rescue services

Adelaida Fanfarova^a, Ladislav Maris^b

^a*Department of Fire Engineering, Faculty of Security Engineering, University of Zilina,
Univerzitna 8215/1, 010 26, Zilina, Slovakia*

^b*Department of Security and Safety Research, Faculty of Security Engineering, University of
Zilina, Univerzitna 8215/1, 010 26, Zilina, Slovakia*

Abstract

The authors of the contribution present the possibility of using modern simulation tools based on computer software - applications for the needs of emergency responders, especially for fire fighters. They point out different features of simulation technologies and recommend their implementation in the process of lifelong preparation, training and education of the members of Fire and Rescue Services as the new trend for the comprehensive improvement of preparedness and safety of fire fighters and rescuers. The contribution also presents basic research supported by institutional grant project of the University of Zilina. In agreement with research results, the authors propose a new simulation model design. This model can be used for designing and programming serious games and software for education of fire fighters. It is the first time the simulation model has been designed with active cooperation and support of the Fire and Rescue Services in Slovakia.

Keywords: simulation tool; fire and rescue services; serious games; software; model



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

ADR safety system in efficiency conditioning

Pawel Gromek^a

^a The Main School of Fire Service, Slowackiego 52/54 Street, 01629 Warsaw, Poland

Abstract

The paper presents theoretical approach for ensuring ADR safety. Whole spectrum of object constituting aspects is described in the light of the system methodology, with parallel identification of the system elements, relations between the elements as well as common aims and operational directions. Consequently, author's interpretation of ADR safety system is highlighted. Its implementation into relevant Polish determinants allows to analyze them in strictly practical dimensions and notice that main entities (institutions, services, entrepreneurs etc.) participating in ensuring ADR safety are connected by unique relations stated by law, trade and practical requirements. Such kind of research perspective is valuable especially from efficiency point of view. Accordingly to the Polish school of praxeology, the safety system can be analyzed by efficiency mechanisms, covering many different realms of safety-related operations (e.g. effectiveness, economy, rationality). In the paper a network methodology for identification of the crucial system efficiency determinants is used. Thus, practical development issues of ADR safety system are presented.

Keywords: ADR; transport safety; safety system; system efficiency



Financing the disaster resilient city in the Slovak Republic

Jan Havko^a, Veronika Mitasova^a, Tomas Pavlenko^a,
Michal Titko^a, Jana Kovacova^a

*^aFaculty of Security Engineering, University of Zilina, Univerzita 8215/1, 010 26 Zilina,
Slovak Republic*

Abstract

This paper presents a framework for scaling climate change adaptation in cities in the Slovak Republic. The framework specifically focuses on the requirements of financial resources mobilizing for climate change adaptation and other urban risk reduction. An article is elaborated through the resilient city concept, an ability of urban areas and their individual assets to perform a basics service for stakeholders under a wide range of condition. The purpose of the article is to identify and analyze funding resources for disaster resilient city in the European Union.

Keywords: disaster resilient city; crisis management; financing resilient city



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Vulnerability of the city infrastructure as a part of the resilient city concept

Jan Havko^a, Michal Titko^a, Jana Kovacova^a

^a Faculty of Security Engineering, University of Zilina, Univerzitna 8215/1, 010 26 Zilina,
Slovakia

Abstract

The sustainability development and operation of the city is basically dependent on its serviceable infrastructure. The understanding of different infrastructures resilience and vulnerabilities is important for the city security. In this work we focus on the notion of transportation infrastructure vulnerability. Some infrastructure types or some specific infrastructure elements can be more or less vulnerable than the others. Following mentioned facts the paper focuses on assessment of the city infrastructure vulnerability to the effects of disasters as a part of the resilient city concept. The proposed assessment is intended to be applied to the critical infrastructure.

Keywords: vulnerability; resilience; resilient city concept; transportation infrastructure



Parallel genetic algorithm for capacitated p-median problem

Milos Herda^a

*^aUniversity of Zilina, Faculty of Management Science and Informatics, Univerzitna 1, 010
26 Zilina, Slovak Republic*

Abstract

This paper presents an implementation of a specific genetic algorithm on a high performance computing cluster. The algorithm is designed to approximately solve the capacitated p-median problem. Since the p-median problem has been proven to be NP-hard, exact algorithms are not efficient in solving it in reasonable time. Therefore it is helpful to use metaheuristics like genetic algorithm. In an endeavor to obtain the best solution, even for large instances, we look for best ways how to use all computing power that is in our disposal. The obvious method to achieve that is to design parallel algorithm and let it run on a high performance computing cluster.

Keywords: Capacitated p-median problem; Genetic algorithm; Parellel computing; HPC cluster; Heuristic



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Risk assessment model verification in hazardous industrial processes

Katarina Holla^a, Veronika Mitasova^a, Tomas Pavlenko^a

^a *University of Zilina in Zilina, Faculty of Security Engineering, Ul.1.maja 32, 010 26, Zilina*

Abstract

This paper presents results of a scientific project investigating the possibilities for applying a risk assessment model structure in a chosen "SEVESO" establishment process. This model was mainly created from the block diagram structures where methods and techniques in different kinds of steps were applied. And therefore it was verified that this model is suitable and applicable for these kinds of industrial processes.

Keywords: industrial accidents prevention; risk assessment; complex model; hazardous substances



Uncertainties associated with tunnel design fire scenarios

Matej Kadlic^a, Vladimír Mozer^a

^a*University of Zilina, Faculty of Security Engineering, Ul. 1. Maja 32, 01 026 Zilina,
Slovakia*

Abstract

Computer fire modelling and design fire scenarios are traditionally used in the tunnel design process to challenge tunnel systems, e.g. smoke ventilation, evacuation routes and strategy, and the exposure of structural members. In general, any such fire scenario should be reasonably severe, however, not unrealistically, which may lead to unnecessary over-designing and cost increase. This approach is commonly referred to as the worst-case design fire approach. The objective of the paper is to analyze the impact of uncertainties associated with input data and design fire selection on the representativeness of the design fire scenario. Firstly, the design fire scenario specifications are mapped and uncertainties relating to input data identified and quantified. Subsequently, a risk-based design fire selection approach is introduced taking into account the objective of the analysis: life safety or property protection. The paper is concluded with recommendations regarding the significance of selected input parameters, given analysis objectives, and the possibilities of their uncertainty treatment.

Keywords: Tunnel fire; uncertainty; CFD modeling, FDS + Evac; heat release rate (HRR); smoke movement; ventilation



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

The tunnel ventilation system in MATLAB in cooperation with TuSim

Peter Kello^a, Jozef Hrbcek^a, Juraj Spalek^a

*^aDepartment of Control and Information Systems, Faculty of Electrical Engineering,
University of Zilina, Univerzitna 8215/1, Zilina 010 26, Slovakia*

Abstract

The paper deals with an influence of the ventilation system to the tunnel tube parts according to the traffic intensity. Simulations have been made by the PLC based tunnel simulator TuSim and the tools MATLAB and Simulink. The connection between MATLAB and TuSim has been made by free OPC server. The aim of this paper is to demonstrate dependence between base tunnel inputs like traffic intensity, lighting, atmospheric condition, air and car velocity and output pollutions. The obtained model is used to predict the output pollution values to the future.

Keywords: Tunnel simulation; simulation; ventilation; MATLAB; OPC server



Creating safety in transport – traffic risk approach

Joanna Koziol^a, Pawel Gromek^a

^a *The Main School of Fire Service, Slowackiego 52/54 Street, 01620 Warsaw, Poland*

Abstract

The paper presents essence of traffic risk. Determinants of this derivative of frequency and consequences are enumerated and described. The main attention is focused on kind of consequences, type of vehicle, injury seriousness as well as kind of accident participant. Basing on classical risk approach, traffic risk assessment methodology is created. It plays a crucial role in formulating risk strategies, implemented from most popular, international risk management standards – PRINCE2® and PMI®. Recommendations for traffic safety improvement base on a unique comparison of risk assessment results and general risk strategies, and they are implemented into real data that characterizes the biggest city in Poland – Warsaw.

Keywords: risk; safety; transport; traffic safety; traffic risk; risk management



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Temporal index location in multiple tablespace type definitions

Michal Kvet^a, Karol Matiasko^a

*^aUniversity of Zilina, Faculty of Management Science and Informatics, Univerzitna 8215/1,
010 26 Slovakia*

Abstract

Temporal database has been defined using object level granularity in the recent past. Our developed system uses fine-grained granularity - column or column group. In this paper, we propose developed approach, but mostly highlight the performance with regards tablespace type for data location. Tablespace as intermediate layer between database instance and data files themselves is mainly characterized by the location, size and structure. Block size database parameter is fixed and cannot be changed after database creation at all. In this paper, we use multiple size and structure of the block in the tablespace and compare the performance based on temporal access queries. Such concepts and solutions can be used in any information system dealing with time limited validity objects as well as sensor data processing.

Keywords: temporal database; column level temporal approach; tablespace; index; balancing



Smart city, Safety and Security

Maros Lacinak^a, Jozef Ristvej^a

^a*Faculty of Security Engineering, University of Zilina,
Univerzitna 8215/1, 010 26 Zilina, Slovakia*

Abstract

Nowadays, cities across the world are one after another trying to become so called Smart Cities. In this paper we propose several ideas on how to define the concept of Smart City, including our own. However, our main focus will be on the question of the safety and security in such cities in the future. Our study of the Smart City program shows the lack of importance which is being given to this topic. Because of that, we are inspired to introduce our definition of a Safe City. Along with the topics of safety and security, we also provide the reader with an insight into the importance and use of the modelling and simulations in a Safe City.

Keywords: Smart City; Safe City; Safety Features; Simulations



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Safety of personal vehicles on mountain passes during the winter period

Daniel Lorencik^a, Anna Maciakova^b

^a*Department of Cybernetics and Artificial Intelligence, Technical University of Kosice,
Letna 9, 042 00 Kosice*

^b*BETAMONT s.r.o., J. Jesenskeho 1054/44, 960 03 Zvolen*

Abstract

Not only overloaded trucks are potential risk while driving mountain passes during the winter time, but also incorrectly loaded resp. overloaded personal vehicles. Each personal vehicle has defined maximum load for technical condition guarantee and its handling. The maximum allowable weight of trucks shall be given by national standards according to vehicle category. However, personal vehicles are all classified into one category “vehicles till 3,5 tons”. By recognizing of the vehicle make and model and its accurate weighing in motion, we would know to check compliance with permitted weight limits per axle for a particular vehicle model. We would detect vehicles in traffic stream, which may have a problem with maneuverability under the winter conditions and thus endangers yourself as well as other road users. Traffic control system should get flag severity of the risk associated with vehicle pass through the mountain pass under the adverse weather condition. The paper deals with monitoring methods of personal vehicles for purpose of vehicle make and model recognition, determine the accurate weight and weather condition. Authors also propose scenarios for the traffic control system regards the received data processing, a comparison with the implemented technical database (technical parameters of vehicle model), risk assessments and implementation of measures – action of the traffic control system (warning, appropriate message, online escort, etc.). Wintertime in mountain terrain is critical for transport. Traffic system should be able to detect any potential risk in time and eliminate it in terms of maintaining the safest possible traffic operation and traffic fluidity.

Keywords: vehicle make and model recognition; weight in motion; overloaded personal vehicles; incorrectly loaded personal vehicles; wintertime on mountain passes



Risk of emergency supply to the evacuated population of basic foodstuffs

Julia Mihokova Jakubcekova^a, Radka Privarova^a

^aUniversity of Žilina, Univerzitná 8215/1, 010 26 Žilina, Slovakia

Abstract

The publication deals with selected issues related to planning and ensuring the evacuation of the population from the area threatened by the consequences of the crisis phenomenon. It deals with the idea of emergency supply evacuated the population in terms of transport security and its possibility at the choice of a suitable method of transport of food for evacuees people. The main idea is to create the optimal model of the supply of the population with basic foodstuffs. For optimum supply it is necessary to specify the possible.

Keywords: transport; evacuation; infrastructure; risk; emergency supplies



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

GIS modeling for motorways of the sea

Moreno Navarro J.G^a, Ismail Hilal^b

^aDepartment of Geography, University of Seville. 41004 Spain

^bDepartment of Geology, Abdelmalek Essaadi University. Tetouan, Morocco.

Abstract

The development of a GIS for the analysis of the Motorways of the Sea requires special consideration in mapping, taking into account the scale of the work and the projection used, as it consists of networks spanning several hundreds or even thousands of miles. Also taking into account the fundamentals of the ecological and logistic efficiency justifying its genesis, parameterization can become complex. For this reason, we propose a model where all parameters are assigned to the arcs of a single multimodal network layer, obviating the point geometry of the nodes. In this paper, we disclose the techniques for the development of this network, its parameterization, and application to the European network of the Motorways of the Sea with the aim of obtaining route optimization results according to various criteria.

Keywords: Motorways of the sea; GIS modeling; Intermodal Transport.



Visual localization and identification of vehicles inside a parking house

Dusan Nemeč^a, Marian Hrubos^a, Michal Gregor^a,
Emilia Bubenikova^a

^a*University of Zilina, Faculty of Electrical engineering, Department of Control and
Information Systems, Univerzitna 8215/1, 01026 Zilina, Slovakia*

Abstract

The paper discusses a method for simultaneous localization and identification of vehicles by active visual ID tags - small LED arrays. Lights from ID tags are captured by the standard camera which allows low cost of the overall solution, high flexibility of changing ID if needed and resistance against changes in ambient light. The proposed localization algorithm is capable of detecting not only position but also direction of the vehicle. Algorithm has been implemented in the OpenCV framework and tested on multiple E-puck mobile robotic platforms. Output of the algorithm can be used for real-time navigation of the vehicle inside parking house, applicable for both indoor and outdoor environments.

Keywords: vehicle localization; identification; visual detection; parking



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Case study: capacity characteristics comparison of single-lane roundabout and turbo-roundabouts

Pitlova Eva^a, Kocianova Andrea^a

*^aDepartment of Highway Engineering, Faculty of Civil Engineering, University of
Žilina, Univerzitná 8215/1, Žilina, 010 26, Slovakia*

Abstract

Turbo-roundabouts are new type of roundabouts that recently become more popular for their significant advantages. Due to their specific geometry of spiral leading circulatory lanes and raised lane dividers provide a high level of traffic safety while a relatively large capacity maintain. To compare with conventional double-lane roundabouts, turbo-roundabouts ensure above all a reduced number of conflict points moreover without waving and lower driving speed through the intersection. Challenge of this paper is to transfer existing single-lane roundabout into configuration models of basic and egg turbo-roundabouts and compare their capacity characteristics. Case study is placed in Žilina, the city on the north of Slovakia, where the single lane roundabout has a great congestion problem not just during peak hours. Configurations of the roundabout are evaluated and compared from their performance parameters using microsimulations and theoretical models. For calibration procedure of microsimulation, complex data obtained from survey of existing roundabout were used and derived as input variables for two new configurations. This example is to demonstrate the capacity increase of turbo-roundabouts comparing with single-lane roundabout and the comparison of microsimulation model and theoretical models to determine capacity of turbo-roundabouts.

Keywords: turbo roundabout; capacity; waiting time; microsimulation



Application of four probability distributions for wind speed modeling

Ivana Pobocikova^a, Zuzana Sedliackova^a,
Maria Michalkova^a

^aDepartment of Applied Mathematics, Faculty of Mechanical Engineering, University of Zilina, Univerzitna 1, 010 26 Zilina, Slovakia

Abstract

When modeling the wind speed in some location the probability distributions are proving to be a useful tool. In this study we consider four different probability distributions: the 2-parameter Weibull, the 3-parameter Weibull, the 2-parameter Gamma and the 2-parameter Lognormal. All of them are applied on the wind speed data recorded at the airport in Dolny Hricov. Parameters of the density distributions are estimated by the maximum likelihood method. In order to select the best fitting distribution there are used the χ^2 -test, the Kolmogorov-Smirnov test, the Akaike information criterion, the Bayesian information criterion, the coefficient of determination and the root mean square error. Based on the results the 3-parameter Weibull performs as the best and the 2-parameter Weibull distribution performs as the second best.

Keywords: Wind speed; Weibull distribution; Gamma distribution; Lognormal distribution; goodness of fit test; Akaike information criteria; Bayesian information criteria; coefficient of determination; root mean square error



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Selecting a replacement source of water for emergency supplies in case of Emergency

Radka Privarova^a, Julia Mihokova Jakubcekova^a

^aUniversity of Žilina, Univerzitná 8215/1, 010 26 Žilina, Slovakia

Abstract

The article deals with gradual steps to address emergency situations, which are necessary for security of the basic living needs of the population to ensure a sufficient quantity of drinking water. Key features in dealing with emergency supplies, is to obtain information on the number of the population has been threatened incident and find out that drinking water is satisfactory at the moment for supply.

Keywords: transport; evacuation; risk; emergency supplies; drinking water



System for deterministic risk assessment in road tunnels

Ondrej Pribyl^a, Pavel Pribyl^a, Tomas Horak^a

^a*Czech Technical University in Prague, Faculty of Transportation Sciences, Konviktska 20,
Praha 1, 110 00, Czech Republic*

Abstract

In this paper, a pragmatic and goal oriented system for risk analysis in road tunnels is described. It is particularly focusing on mortality risks in case of a road tunnel accident. It is a deterministic approach combining three major components: a) vehicle distribution in a tunnel; b) smoke propagation in case of a fire; and c) people evacuation (escape) component. The major improvement of this approach is in capturing the knowledge often provided only by experts into a robust and pragmatic system available to all decision makers. This is achieved through a large number of scenarios combining different configurations of road tunnels (e.g. different number of lanes, different speed limits) and the travel demand (e.g. different structure of the flow, different volumes of traffic) which were prepared and evaluated through microscopic traffic simulation. The resulting scenarios with the information about the number of vehicles in different tunnel sections were obtained. The results describe most of the existing tunnels and situations and can be used universally. Similarly, the people evacuation component can be evaluated in a general form. The results can be manually updated to suit any particular road tunnel which can differ for example by the availability or quality of warning and information systems. The remaining task is to create a physical model of the real tunnel and to model the smoke and fire propagation. All these components were combined into the CAPITA software that was developed as a part of the research project HADES (supported by the Technology Agency of the Czech Republic). The CAPITA software is presented in the last chapter of this paper. The scenarios available off-line are in fact a knowledge base available to experts as well as decision makers and lead to a higher level of comprehension of the developments in case of fire and significantly speed up preparation of a risk analysis.

Keywords: road tunnel; risk analysis; deterministic model; CAPITA



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Wi-Fi fingerprint radio map creation by using interpolation

Jan Racko^a, Juraj Machaj^a, Peter Brida^a

^a*University of Zilina, Univerzita 8215/1, 010 26 Zilina, Slovakia*

Abstract

The most common answer to question what can be used for location estimation is GPS. It is not an incorrect answer, but not within buildings. Multipath propagation and attenuation by trespassing through walls makes GPS an unprecise system for indoor positioning. Therefore many different techniques have been developed. One of options is to use wireless fingerprinting. Advantage of the mentioned method is that it doesn't need additional equipment and can be built based on existing Wi-Fi infrastructure. On the other hand, drawback of the fingerprinting is process of a radio map creation, which is very time consuming. Whole space where we want to use fingerprinting must be divided into smaller areas represented by fingerprints, which consists of RSS (Received Signal Strength) measured for each area separately. In our work we focused on interpolation methods reducing time needed for radio map creation. We will measure RSS in some positions and the rest of fingerprints will be calculated by two interpolation methods, namely linear interpolation or Delaunay algorithm. Thanks to this, time needed for radio map creation is reduced and it is easier to implement fingerprinting localization method. Paper also deals with comparison of reference points in radio map created by both interpolation methods with real measurements.

Keywords: Intepolation; Fingerprinting; Delaunay Algorithm; Linear Interpolation



Correlation of core areas determining the resilience of critical infrastructure

Simona Slivkova^a, David Rehak^a, Veronika Nesporova^a,
Michaela Dopaterova^a

*^aVSB-Technical University of Ostrava, Faculty of Safety Engineering, Lumirova 13/630, 700
30 Ostrava-Vyskovice, Czech Republic*

Abstract

The article discusses the architecture of the resilience of critical infrastructure. In the introductory section we present the most important documents related to the issue of critical infrastructure resilience. Subsequently, the basic areas determining the resilience of critical infrastructure subsystems are specified and defined. They include preparedness, absorption, responsiveness, recoverability and adaptability. Each area is specified by an interpretation and graphic representation of the function in a time context. The article concludes with defining the correlativity of these areas.

Keywords: Critical Infrastructure; Resilience; Preparedness; Absorption; Responsiveness; Recoverability; Adaptability



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Simulation of possible assault vectors in an attack using a real-life waterworks object as a use case

Anton Siser^a, Tomas Lovecek^b, Ladislav Maris^b

*^aFaculty of Security Engineering/Department of Security Management, University of Zilina,
010 01 Zilina, Slovakia*

*^bFaculty of Security Engineering/Department of Security Research, University of Zilina, 010
01 Zilina, Slovakia*

Abstract

The aim of this article is to showcase the ability to simulate various attack scenarios on a protected element within a waterworks object which is a part of a critical infrastructure. The benefit of working out a use case in this article will be ascertaining the accuracy of the data acquired through processes and verification of the software-evaluated level of protection. Positive output will be in form of a tool which can be used in security and preventative activities of security managers but also in the education process.

Keywords: case study; security; critical infrastructure; attack; water supply system; protection



Comparison of background subtraction methods on near Infra-Red spectrum video sequences

Tibor Trnovszky^a, Peter Sykora^a, Robert Hudec^a

^a*University of Zilina, Faculty of Electrical Engineering, Dp. of multimedia and information-communication technologies,
Univerzitna 1, Zilia 010 26, Slovakia*

Abstract

Background subtraction methods are used to detect foregrounds objects in video sequences. However, a lot of parameters of video sequence could complicate this process. Like noise, moving trees, rain, wind etc. Most popular methods are based on Gaussian mixture models (GMM). Four methods based on GMM were used: GMG, KNN, MOG, MOG2. Comparison is realized by using twenty video sequences captured in near infrared spectrum. Each video sequence has one or more moving wild mammals. On twenty randomly selected frames the moving objects are manually segmented for each video. Manual segmentation is done by group of people. Then, results from background subtraction methods are compared opposite to human segmentation by using brute force matcher and were improved by using Radon transformation. From results is obvious the KNN has the biggest similarity opposite to human segmentation. The method with the best correlation opposite to human segmentation will be used in near future for animal detection purpose.

Keywords: Background; Substraction; Infrared; Video; Comparison; GMG; KNN; MOG



TRANSCOM 2017, 31 May – 2 June 2017
High Tatras, Grand Hotel Bellevue, Slovak Republic

Simulation of an on-off controller for systems of second order with the use of LabVIEW

Tomas Urica^a, Anna Simonova^a

^aDepartment of mechatronics and electronics, Univerzita 1, Zilina 010 26, Slovakia

Abstract

This paper deals with the usage of a toolkit Control Design & Simulation in development software LabVIEW for simulation of a two-position controller. This automatic control can be used to regulate regulation processes with high rise time such as temperature processes. Many of these processes can be categorized as second order systems. Main topic of this paper is the description of on-off controllers, their abilities and shortcomings and the way of use of such controllers to regulate processes of a second order. The publication then describes the development software LabVIEW, mainly useful toolbox Control Design & Simulation. This module was then used to design, simulate and optimize two-position controller.

Keywords: On-off controller; Two-position control; LabVIEW; Control Design & Simulation module



The use of crisis management information systems in rescue operations of Fire Rescue Service of the Czech Republic

Katerina Vichova^a, Martin Hromada^a, David Rehak^b

^a*Tomas Bata University in Zlin, Faculty of Applied Informatics, Department of Security Engineering, Nad Stranemi 4511, 760 05 Zlin, Czech Republic*

^b*VSB - Technical University of Ostrava, Faculty of Safety Engineering, Department of Civil Protection, Lumirova 13, 700 30 Ostrava - Vyskovice, Czech Republic*

Abstract

The article deals with the use of crisis management information systems in rescue and disposal operations of Fire Rescue Service of the Czech Republic. The first part of the article defines the selected information systems. Furthermore, the systems are closely specified and their main use in rescue and disposal operations of Fire Rescue Service of the Czech Republic is described.

The second part of the article deals with the heuristic and comparative analysis of theselected information system. All findingsare evaluated in the final part.

Keywords: Information Systems; Crisis Management; Rescue Operation; FRS
