



9. International Quality Conference



CONFERENCE MANUAL

June 05th - 2015, Kragujevac
Faculty of Engineering, University of Kragujevac

9. International Quality Conference Conference manual

ISBN: 978 - 86 - 6335 - 015 - 1

Editors: *PhD Slavko Arsovski*, full professor
Faculty of Engineering, Kragujevac
PhD Miodrag Lazić, full professor
Faculty of Engineering, Kragujevac
PhD Miladin Stefanović, full professor
Faculty of Engineering, Kragujevac

Technical Editor: *PhD Aleksandar Aleksić*
Faculty of Engineering, Kragujevac

Publisher: **FACULTY OF ENGINEERING**
34000 KRAGUJEVAC
Sestre Janjić 6

CENTER FOR QUALITY
34000 KRAGUJEVAC
Sestre Janjić 6

For publishers: *PhD Miroslav Živković*, full professor
PhD Slavko Arsovski, full professor

No. of copies: 200

Printing: Faculty of Engineering, Kragujevac

Copyright © Faculty of Engineering, University of Kragujevac, 2015.

Copyright © Center for Quality, Kragujevac, 2015.

Publication of Conference manual and organization of
9. International Quality Conference is supported by:
**Department of Education, Science and Technological Development of Republic of
Serbia**

Izdavanje Zbornika radova, organizovanje i održavanje
9. International Quality Conference podržalo je:
Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije

9th International Quality conference ***Programme Committee***

1. PhD Slavko Arsovski, Faculty of Engineering, University of Kragujevac, Kragujevac, Serbia, president
2. PhD Zdravko Krivokapić, Faculty of Mechanical Engineering, University of Montenegro, Podgorica, Montenegro, vice president
3. PhD Zoran Punoševac, AQS, Kruševac, Serbia, vice president
4. PhD Miodrag Lazić, Faculty of Engineering, University of Kragujevac, Kragujevac, Serbia
5. PhD Tadeusz Sikora, The Department of Quality Management, Cracow University of Economics, Kraków, Poland
6. PhD Ezendu Ariwa, London Metropolitan Business School, London Metropolitan University, UK
7. PhD Tadeja Jere Jakulin, University of Primorska, Koper, Slovenia
8. PhD Mirko Soković, Faculty of Mechanical Engineering, University of Ljubljana, Ljubljana, Slovenia
9. PhD Milan Perović, Faculty of Mechanical Engineering, University of Montenegro, Podgorica, Montenegro
10. PhD Zora Arsovski, Faculty Of Economics, University of Kragujevac, Kragujevac, Serbia
11. PhD Goran Putnik, University of Minho, Braga, Portugal
12. PhD Martí Casadesús, AQU Catalunya, Barcelona, Spain
13. PhD Iñaki Heras, Universidad del País Vasco, San Sebastian, Spain
14. PhD Stanislav Karapetrović, University of Alberta, Edmonton, Canada
15. PhD Miroslav Badida, Faculty of Mechanical Engineering, Department of Environmental, Studies and Information Engineering, Technical University of Košice, Košice, Slovakia
16. PhD Janko Hodolič, Faculty of Technical Sciences, University of Novi Sad, Novi Sad, Serbia
17. PhD Miladin Stefanović, Faculty of Engineering, University of Kragujevac, Kragujevac, Serbia
18. PhD Aleksandar Vujović, Faculty of Mechanical Engineering, University of Montenegro, Podgorica, Montenegro
19. PhD Prasun Das, SQC & OR Division of the Indian Statistical Institute (ISI), Kolkata, India
20. PhD Ayşegül Akdoğan Eker, Yıldız Technical, University Mechanical Faculty, Beşiktaş/Istanbul, Turkey
21. PhD Bülent Eker, Namık Kemal University, Tekirdağ, Turkey
22. PhD Cornelia Ioan, Faculty of Agricultural Management, U.S.A.M.V.B., Timisoara, Romania
23. PhD Georgeta Rață, U.S.A.M.V.B. Timișoara, România
24. PhD Paul M. Andre, AQE Group, Chicago, Illinois, USA
25. PhD Nenad Injac, Quality Austria, Wien, Austria
26. PhD Krešimir Buntak, Tehničko veleučilište Varazdin, Croatia
27. PhD Petroman Ioan, Faculty of Agricultural Management, U.S.A.M.V.B., Timișoara, România

Dear friends,


By providing international platform, 9. International Quality Conference 2015 will gather experts from industry and academia in order to exchange ideas and present results of ongoing research in a range of topics.

This Conference has a motto "Road to excellence".

We invite you to participate in this important event.

*Sincerely yours,
President of Organization Committee*

Prof. dr Slavko Arsovski



9th IQC
**QUALITY
RESEARCH**

CONTENT:

SCIENTIFIC FOCUS 1: GLOBAL QUALITY1

1.	Sławomir Wawak PREVENTIVE ACTIONS VS. RISK MANAGEMENT IN ISO 9001:2015	3
2.	Matej Hohnjec, Mirko Soković SYSTEMATIC INNOVATION WITH TRIZ.....	11
3.	Bülent Eker A RESEARCH ON CLUSTERING OF AGRICULTURE AND AGRO-BASED INDUSTRIES.....	17
4.	Christos Tsiafis, Petar Todorovic, Xarilaos Karasiotos, Ioannis Tsiafis CASE STUDY: SHAFT ALIGNMENT AND TOLERANCES VERIFICATION FOR EXPERIMENTAL DEVICE USING COORDINATE MEASURING MACHINE.....	23
5.	Agnieszka Kister DESCRIPTIVE AND INDICATOR-BASED EVALUATION OF QUALITY MANAGEMENT SYSTEM IN MEDICAL CARE FACILITIES	27
6.	Anna Nagyova, Martin Palko, Hana Pacaiova ANALYSIS AND IDENTIFICATION OF NONCONFORMING PRODUCTS BY 5W2H METHOD	33
7.	Dominik Zimon THE IMPACT OF THE QUALITY MANAGEMENT SYSTEM FOR THE IMPROVEMENT OF WAREHOUSING PROCESSES	43
8.	Saso Antevski, Blagica Stojmanovska, Biljana Hadzi-Niceva, Mitre Arsovski THE USE OF KAPPA STATISTIC METHOD IN CERVICAL CYTOLOGY	49
9.	Viktor Kovalov, Vitaly Guzenko, Ivan Polupan RESEARCH OF THE CONSTRUCTION PARAMETRES IN ELEMENTS OF FASTENING OF TIP ON THE DURABILITY OF SPLIT CUP-TIP TOOL	57
10.	Ljubomir Lukić, Mirko Đapić, Predrag Popović, Aleksandra Petrović RISK MANAGEMENT IN POWER TRANSFORMATORS MANUFACTURING.....	61
11.	Elena Vladimirovna Ershova APPROACHES TO IMPLEMENTATION OF AN INTEGRATED MANAGEMENT SYSTEM IN THE PHARMACEUTICAL INDUSTRY. DOCUMENTATION GALENO-PHARMACEUTICAL COMPANY	65

12. Mirko Blagojević, Ivan Pantić, Miloš Matejić MODAL ANALYSIS OF CYCLOIDAL SPEED REDUCER	73
13. Ayşegül Akdoğan Eker, Bülent Eker CLUSTERING TECHNIQUES FOR MATERIAL SELECTIONS	77
14. Danijela Tadić, Slavko Arsovski, Stefan Đorđević WORK SAFETY ASSESSMENT IN OIL RECYCLING WORKPLACE.....	81
15. Dajana Živković, Danijela Tadić, Slavko Arsovki EVALUATION OF INFLUENCE RECYCLING DEVICE ON ENVIRONMENT IN PROJECTING PROCESS PHASE BY PROMETHEE METHOD.....	85
16. Predrag Pravdić, Rada Kučinar STRATEGY ACTIONS IN BSC AND HOSHIN PLANNING.....	91
17. Aysel İçöz, Bülent Eker A QUALITY ENHANCING PRACTICE IN THE PACKAGING OF CHICKEN MEAT.....	99
18. Danijela Nikolić, Milorad Bojić, Jasna Radulović, Vesna Ranković, Jasmina Skerlić ENERGY OPTIMIZATION OF SERBIAN BUILDINGS WITH PV PANELS AND GAS HEATING SYSTEM.....	105
19. Dragan D. Milanović, Aleksandar Nestorov, Mirjana Misita, Marija Milanović, Petar Kefer APPLICATION OF QUALITY TOOLS FOR THE PURPOSE OF PROCESS IMPROVEMENT IN THE PHARMACEUTICAL INDUSTRY	111
20. Nebojsa Jovičić, Nikola Makojević, Goran Bošković, Dragomir Dimitrijević, Saša Jovanović PERFORMANCE ANALYSIS OF SOLID WASTE MANAGEMENT COMPANIES IN THE REPUBLIC OF SERBIA	119
21. Aleksa Đurić, Natalija Bogdanović, Vukašin Petrović, Mila Mihajilović, Gordana Bogdanović, Vanja Šušteršič, Lazar Petrović, Anđelija Bogdanović NEW CONCEPTS FOR CITIES THAT PRODUCE - FOOD FOR BILLIONS (TECHNOLOGICAL, ECONOMIC, SOCIAL, AND LEGAL ASPECTS OF VERTICAL FARMING)	127
22. Dragan Cvetković, Milorad Bojić, Dragan Taranović, Jasmina Skerilić, Miloš Matejić, Nenad Kostić THE IMPACT OF THE CONTROLLER POSITION ON THE ENERGY CONSUMPTION AT THE FLOOR-CEILING HEATING	135
23. Dragan Rajković, Petar Stojilković, Biljana Stepanović THE PRACTICAL ADVANTAGES OF OHSAS STANDARD IN SMALL AND MEDIUM-SIZED ENTERPRISES	141

24.	Nebojša Jurišević, Vanja Šušteršič, Dušan Gordić, Nikola Rakić OVERVIEW OF AIR QUALITY LEGISLATION AND MONITORING OF MEASUREMENT ZONE SERBIA	145
25.	Nikolaos A. Fountas, Nikolaos M. Vaxevanidis, Constantinos I. Stergiou, Redha Benhadj-Djilali QUALITY RESEARCH ON THE PERFORMANCE OF A VIRUS-EVOLUTIONARY GENETIC ALGORITHM FOR OPTIMIZED SCULPTURED SURFACE CNC MACHINING, THROUGH STANDARD BENCHMARKS	153
26.	Snežana Vrekić PRINCIPLES OF DESCRIPTIVE GEOMETRY AS BASIS FOR CORRECT 3D MODELING	161
27.	Zvonko Nježić, Đorđe Okanović, Šandor Kormanjoš, Predrag Damnjanović, Ratko Rogan UTILIZATION ANIMAL WASTE FROM MEAT INDUSTRY FOR ENVIRONMENT PROTECTION	165
28.	Sasa Jovanovic, Nebojsa Jovicic, Goran Boskovic, Zorica Djordjevic, Slobodan Savic INFLUENCE OF MORPHOLOGICAL COMPOSITION OF WASTE TO ENVIRONMENTAL PERFORMANCE OF MUNICIPAL SOLID WASTE MANAGEMENT TECHNOLOGIES	171
29.	Dobrivoje Čatić, Jasna Glišović, Nada Ratković, Marko Delić, Stefan Ilić ACCELERATED TESTING AND TRUNCATED TESTS PLANNING FOR RELIABILITY ASSESSMENT	177
30.	Zineta Čemerlić, Himzo Popović USE OF A MODIFIED HAZOP METHODOLOGY FOR CHECK OF ENVIRONMENTAL RISKS	183
31.	Jasna Glišović, Jovanka Lukić, Vanja Šušteršič, Dobrivoje Čatić DEVELOPMENT OF TRACTORS AND TRAILERS IN ACCORDANCE WITH THE REQUIREMENTS OF LEGAL REGULATIONS	193
32.	Aleksandar Đorđević, Snežana Nestić, Miladin Stefanović, Danijela Tadić Slavko Arsovski, Suzana Doljanica, Milan Mišić NEW SERVICE DEVELOPMENT METRIC IN MEDIUM ORGANIZATIONS	203
33.	Marko Janković, Bogdan Nedić, Milan Erić, Bratislav Trifunović COMPUTER TOOLS OF CNC PLASMA CUTTING	211
34.	Stefan Ilić, Marko Delić, Jasna Glišović, Dobrivoje Čatić PERFORMANCE LOSS ANALYSIS OF A GRID-CONNECTED PHOTOVOLTAIC SYSTEM IN CENTRAL INVERTER CONFIGURATION USING FTA METHODOLOGY	219
35.	Miloš Matejić, Milorad Bojić, Nenad Petrović, Nenad Marjanović, Mirko Blagojević COMPARATIVE ANALYSIS OF ALTERNATIVE SOLAR: COLLECTORS FOR LOW-RISE HOUSING UNITS	225

36.	Nenad Kostić, Nenad Petrović, Milorad Bojić, Nenad Marjanović, Dragan Cvetković INFLUENCE OF OPTIMAL HEATING SYSTEM CHOICE ON ENERGY SAVING AND DECREASE OF NEGATIVE ENVIRONMENT IMPACT	231
37.	Nikola Komatina, Danijela Tadić, Slavko Arsovski EVALUATION OF INFLUENCE RECYCLING DEVICE ON ENVIRONMENT IN PRODUCTION PROCESS PHASE BY TOPSIS METHOD.....	239
38.	Stefan Aksentijević, Danijela Tadić, Slavko Arsovski EVALUATION OF INFLUENCE RECYCLING DEVICE ON ENVIRONMENT IN PROTOTYPE MANUFACTURING PROCESS PHASE BY ELECTRE METHOD	245
39.	Zoran Karastojković, T. Stožinić, Z. Janjušević, R. Žunjanin, N. Bajić, M. Stamenković IMPROVING THE SURFACE QUALITY OF STAINLESS STEEL X18CR10NI BY DEPOSITION OF CHEMICAL NICKEL COATING.....	253
40.	Marko Deliće, Stefan Ilić, Jasna Glišović, Dobrivoje Čatić DYNAMIC FAULT TREE ANALYSIS OF LAWNMOWER.....	257
41.	Uroš Pantić, Danijela Tadić, Slavko Arsovski EVALUATION AND SELECTION OF OIL RECYCLING TECHNOLOGIES	263
42.	Novak Nikolić, Nebojša Lukić, Dragan Taranović RESULTS OF THE EXPERIMENTAL VERIFICATION OF THE MATHEMATICAL MODEL OF THE THERMAL BEHAVIOUR OF A DOUBLE EXPOSURE FLAT-PLATE SOLAR COLLECTOR.....	267
43.	Danijela Marjanović, Živče Šarkoćević, Bojan Stojčetić, Danijela Ivkov, Andrijana Anđelković EFFECTS OF APPLICATION RFID TECHNOLOGY IN RETAIL.....	273
44.	Predrag Pravdić, Rada Kučinar BALANCED SCORECARD APPROACH OF MONITORING IMPROVEMENTS OF BALANCE INDICATORS REGARDING BUSINESS SUCCESS IN HYDRO POWER PLANTS ON THE TREBISNJICA	281
45.	Nikola Kovačević, Milan Erić, Nataša Aleksić THE USE OF AUTOMATIC GUIDED VEHICLES IN ORDER TO INCREASE THE QUALITY OF THE PROCESS OF STORAGE OF GOODS	293
46.	Predrag Pravdić, Rada Kučinar CONCEPTUAL FRAMEWORK OF BSC IN STRATEGIC PLANNING.....	299

47.	Kristina Vicko, Michal Potran, Branko Strbac, Djordje Vukelic DIMENSIONAL ACCURACY OF MONOPHASIC IMPRESSION TECHNIQUE- INFLUENCE OF SETTING TIME ON ACCURACY OF WORKING CASTS	307
48.	Dragan Lazarević, Milan Mišić, Živče Šarkoćević, Zlatibor Lekić Bojan Stojčetočić COMPUTER-AIDED INSPECTION PLANNING SYSTEMS FOR OMI AND CMMS	311
49.	Dragan Lazarević, Milan Mišić, Živče Šarkoćević, Zlatibor Lekić, Bojan Stojčetočić SPECIFICATION OF GEOMETRIC TOLERANCES, REVIEW THE RECENT DEVELOPMENT	317

SCIENTIFIC FOCUS 2: GLOBAL QUALITY325

50.	Nina Aniskina INTEGRATED MODEL OF FUNCTIONING OF THE NATIONAL QUALIFICATIONS SYSTEM	327
51.	Alexandra Simon, Merce Bernardo EXPLORING THE IMPACT OF INTEGRATED MANAGEMENT SYSTEMS AUDITS ON BUSINESS PERFORMANCE	335
52.	Pawel Nowicki SELECTED BRANCH QUALITY MANAGEMENT SYSTEMS BASED ON ISO 9001 STANDARD – THE REVIEW	339
53.	Shirshendu Roy, Sujoy Samaddar TO REDUCE DEFECT IN SOFTWARE DEVELOPMENT: A SIX SIGMA APPROACH	345
54.	Bernard Binczycki THE PROBLEM OF MOTIVATION TO WORK IN THE PUBLIC SECTOR ORGANIZATIONS	353
55.	Piotr Kafel INTEGRATION OF NORMALIZED MANAGEMENT SYSTEMS WITH AQAP STANDARDS	361
56.	Piotr Rogala WHY DO INTERNAL AUDITS FAIL? THE INTERNAL AUDITORS' PERSPECTIVE	367
57.	Alexei Scerbakov, Nikolai Scerbakov A METHOD FOR QUANTITATIVE EVALUATION OF UNIVERSITY LECTURING	375
58.	Cornelia Petroman, D. Paicu, I. Petroman, Rodica Bolocan, Diana Marin, C. Bejan MANAGEMENT OF INTERVENTION AND REHABILITATION IN CASE OF TECHNOLOGICAL HAZARD	379

59. Dragana Beba, Christian Schundau, Armin Reller, Andreas Rathgeber COSTS OF LOW- QUALITY.....	383
60. Kinshuk Batabyal, Sudip Chattopadhyay, Sujoy Samaddar, Shirshendu Roy DEVELOPMENT OF FRAMEWORK BASED EFFORT ESTIMATION BENCHMARK.....	387
61. Krešimir Buntak, Ivana Droždek, Vesna Sesar THE REVIEW OF TOOLS FOR HUMAN RESOURCES MANAGEMENT IN QUALITY MANAGEMENT SYSTEM.....	393
62. Valentin Pugach, Elena Syrtsova, Olga Tokmakova THE PROBLEM OF IMPLEMENTING ONLINE MODEL OF EDUCATION QUALITY ASSESSMENT EQUASP IN PRACTICE OF RUSSIAN UNIVERSITIES.....	401
63. Nenad Marković, Darko Petković, Slaviša Moljević, Bogdan Marić, Ranka Gojković POSSIBILITIES OF IMPLEMENTATION OF THE BALANCED SCORECARD METHOD IN HIGHER EDUCATION	407
64. Ljiljana Berezljjev, Miroslav Bjegović, Bećir Kalač, Miodrag Vuković, Ljiljana Miletić QUALITY MANAGEMENT SYSTEM IN THE CRISIS.....	419
65. Danijela Tadić, Marija Zahar Đorđević, Hrvoje Puškarić, Aleksandar Aleksić A NEW FUZZY DELPHI METHOD FOR EVALUATION OF BUSINESS GOALS	423
66. Jelena Jovanović, Rade Grujičić, Zdravko Krivokapić, Radoslav Tomović, Aleksandar Vujović APPLICATION OF AHP DECISION-MAKING METHOD IN THE METHODOLOGICAL DESIGNING PROCESS	431
67. Mirjana Misita, Dragan Lj. Milanović, Dragan D. Milanović, Marija Milanović IMPROVEMENT OF PRODUCTION PLANNING PROCESS BY APPLYING THE THEORY OF CAUSATION	439
68. Miloš Jelić, Ivan Krstić STANDARDS AND TECHNICAL REGULATIONS – SERBIAN QUALITY INFRASTRUCTURE CHALLENGES	447
69. Angela Fajsi, Slobodan Morača, Miodrag Hadžistević, Miloš Jovanović VALUE NETWORK AS A MODEL IN ACHIEVING QUALITY IN COMPLEX BUSINESS NETWORKS	453
70. Ružica Jelisić, Zlatko Maksimović, Srđan Mijatović QUALITY MANAGEMENT IN THE INSTITUTION OF PRIMARY HEALTH CARE IN REPUBLIC OF SRPSKA	457
71. Srđan Mijatović, Zlatko Maksimović, Ružica Jelisić QUALITY MANAGEMENT AT HEALTH CENTRE BIJE LJINA	463

72.	Miloš Petronijević, Aleksandar Đorđević, Ana Janković, Milan Mišić PROTECTION AT WORK AS APPROXIMATE PROCES MANAGEMENT	467
73.	Svetomir Simonović BOTH QUALITY AND EFFICIENCY THROUGH PRODUCT DESIGN.....	473
74.	Milan Stamenković, Marina Milanović THE RELATIONSHIP BETWEEN SERVICE QUALITY IN STUDENTS' RESTAURANT AND CUSTOMER LOYALTY	477
75.	Zorana Tanasić, Maja Vuković, Goran Janjić, Mirko Soković, Borut Kosec SIMULATION AS A TOOL IN LEAN ENVIRONMENT	483
76.	Ana Langović Miličević, Tatjana Cvetkovski, Dejan Mihailović STRATEGY OF HUMAN RESOURCE MANAGEMENT IN MULTINATIONAL CORPORATIONS	489
77.	Zlatko Langović, Ana Langović Miličević, Brankica Pažun IMPORTANCE OF "CLOUD COMPUTING" IN STRATEGIC MANAGEMENT OF BUSINESS SYSTEMS IN CONDITIONS OF GLOBALIZATION	495
78.	Zoran Nešić, Nebojša Denić, Miroslav Radojičić, Jasmina Vesić Vasović IMPACT OF QUALITY INFORMATION IN RELATION TO THE BUSINESS DECISION MAKING PROCESS	503
79.	Snežana Đorđević, Jasmina Vesić Vasović, Miroslav Radojičić, Zoran Nešić, Đorđe Mihailović IMPROVEMENT OF THE DIRECTORS' WORK EFFICIENCY IN THE FUNCTION OF IMPROVING THE ORGANIZATION OF SCHOOL OPERATING.....	509
80.	Zoran Nešić, Nebojša Denić, Jasmina Vesić Vasović, Miroslav Radojičić ONE APPROACH TO THE DEVELOPMENT OF SOFTWARE FOR IMPROVING THE USE OF FIXED ASSETS.....	517
81.	Zoran Nešić, Nebojša Denić, Miroslav Radojičić SOME ASPECTS OF INFORMATION QUALITY INFLUENCE ON THE EFFICIENCY OF THE BUSINESS DOING OF ENTERPRISES	523
82.	Vesna Radonjić Đogatović, Branka Mikavica, Valentina Radojičić, Aleksandra Kostić-Ljubisavljević QUALITY OF SERVICE REGULATION ISSUES IN FUTURE INTERNET	529
83.	Dejan Mihailović, Ana Langović Miličević, Tatjana Cvetkovski STRATEGIC HUMAN RESOURCE MANAGEMENT AND COMPETITIVE ADVANTAGE.....	535
84.	Marina Radović, Vesna Ranković, Milorad Bojić, Jasna Radulović LAYER DIGITAL RECURRENT NETWORK FOR FORECASTING OF LONG-TERM NATURAL GAS CONSUMPTION IN EU COUNTRIES.....	543

85. Miroslav Milojević, Lozica Ivanović, Bogdan Dimitrijević DESIGN AND ANALYSIS OF FORMULA STUDENT FRAME	547
86. Neda Nikolić, Srećko Ćurčić, Aleksandra Gajović QUALITY OF LIFE, EDUCATION AND ECOLOGICAL EDUCATION	553
87. Ljiljana Berezljjev, Miroslav Bjegović, Bećir Kalač, Miodrag Vuković, Ljiljana Miletić EVOLUTION AND ENTROPY IN MANAGEMENT QUALITY- MUTUAL DETERMINATION	561
88. Jelena Kostadinović Jovanović THE NEW VIEW ON QUALITY MENAGEMENT IN TOURISM AND HOSPITALITY	565
89. Elena Syrtsova, Olga Tokmakova QUALITY ASSESSMENT OF E-LEARNING: VYATKA STATE UNIVERSITY EXPERIENCE	571
90. Jelena Kostadinović Jovanović SPECIFIC OF QUALITY MANAGEMENT IN THE SERVICE SECTOR	579
91. Aleksandar Marić, Dragana Pešić THE ANALYSIS OF EDUCATIONAL PROCESS PARAMETERS	585
92. Alexander Bolshakov, Larisa Perova DEVELOPMENT OF BUSINESS PROCESS MANAGEMENT FORMATION OF COMPETENCES STUDENTS OF THE UNIVERSITY	591
93. Tomasz Brzozowski THE POTENTIAL OF MANAGEMENT SYSTEMS TO IMPROVE ORGANIZATION TOWARDS SUSTAINABLE DEVELOPMENT	597
94. Ercan Buluş, Bülent Eker, Halil Nusret Buluş INVESTIGATION OF BITCOIN CRYPTO CURRENCY METHOD WAS DEVELOPED FOR SHOPPING OVER THE INTERNET	603
95. Jasmina Skerlić, Milorad Bojić, Danijela Nikolić, Jasna Radulović, Dragan Cvetković ENVIRONMENTAL GAINS OF DHW SYSTEM THROUGH OPTIMUM SLOPE SOLAR COLLECTOR	607
96. Zlatko Langović, Ana Langovic Milicevic, Brankica Pažun IMPACT OF PROCESSOR TECHNOLOGY ON BUSINESS SYSTEM	613
97. Brankica Pažun, Zlatko Langović, Ana Langovic Milicevic INTEGRATION OF TECHNOLOGIES OPENDAYLIGHT, OPENSTACK, NFV/SDN IN BUSINESS ENVIRONMENT	617

98. Lesya Melnichenko, Dmitriy Alimov CHAMPIONSHIP MECHANISM FOR MONITORING THE QUALITY OF VOCATIONAL EDUCATION IN WORLD SKILLS INTERNATIONAL SYSTEM	621
99. Bogdan Dimitrijević, Bogdan Nedić THE USE OF MODULAR (FLEXIBLE) FIXTURING ELEMENTS FOR THE PURPOSE OF MANUFACTURING FORMULA STUDENT CHASSIS	627
100. Goran Putnik, Vaibhav Shah, Vesna Spasojević-Brkić, Cátia Alves, Hélio Castro A PROPOSAL FOR INSTALLATION ARCHITECTURE FOR VIDEO CAMERAS AND SCREENS IN AN INTEGRATED VISION SYSTEM FOR CRANE CABINS	633
101. Goran Putnik, Cátia Alves, Carlos Carvalho, Sérgio Sousa, Leonilde Varela, Vaibhav Shah, Hélio Castro SOCIAL NETWORK-BASED EDUCATION AND LEARNING FACTORY AS EMERGENT FORMS OF EDUCATION AND TRAINING: AN APPLICATION FOR QUALITY MANAGEMENT	641
102. Zoran Milojević, Žarko Milojević A DECISION MAKING MODEL USING A WEB- BASED AHP: THE STUDY PROGRAMME DILEMMA	647
103. Bojan Stojčetočić, Živče Šarkoćević, Dragan Lazarević, Danijela Marjanović APPLICATION OF THE PARETO ANALYSIS IN PROJECT MANAGEMENT	655
104. Srećko Ćurčić, Milan Pavlović, Danijela Tadić, Aleksandar Tomović, Svetlana Stojanović TECHNOLOGIES OF ELECTRONIC WASTE RECYCLING.....	659
105. Goran Putnik, Vaibhav Shah, Carlos Carvalho, Cátia Alves, Hélio Castro SMART OBJECTS FOR QMS IN ADVANCED PRODUCTION SYSTEMS – A PLATFORM FOR EFFICIENT APPLICATION DEVELOPMENT	669
106. Goran Putnik, Carlos Carvalho, Cátia Alves EDUCATION 3.0 AND SOCIAL NETWORK-BASED EDUCATION: AN IMPLEMENTATION FRAMEWORK AND EXPERIMENT AT THE UNIVERSITY OF MINHO FOR EDUCATION AND TRAINING IN QUALITY MANAGEMENT	675
107. Joseph Ricciardelli, Jelena Pantic, Ivan Macuzic FROM SELF DEVELOPMENT TO COACHING OTHERS	681

LATE ARRIVALSL

108. Pawel Skowron COMPARATIVE ANALYSIS OF ACCIDENTS IN THE WORK IN COUNTRIES OF THE EUROPEAN UNION	L1
---	----

109. Ольга Калачикова	
МОДЕЛИРОВАНИЕ КОМПЕТЕНЦИЙ ПРЕПОДАВАТЕЛЯ	
КАК УСЛОВИЕ ПОВЫШЕНИЯ КАЧЕСТВА	
ОБРАЗОВАНИЯ В УНИВЕРСИТЕТЕ	L3
110. Halil Nusret Buluş, Ercan Buluş, Bülent Eker	
SIGN LANGUAGE DETECTION	L5
111. Csaba Gyenge	
NEW TECHNOLOGY AND MATHEMATICAL	
ALGORITHMS FOR CNC GRINDING OF	
SPECIAL CYLINDRICAL GEARS FOR WIND TURBINES	L7
112. Zoran Milojević, Žarko Milojević	
A REAL-LIFE DECISION MODEL	
BASED ON AHP: PRODUCTION OF	
PARTS FOR COMPLEX BALLISTIC SYSTEMS.....	L9
113. Tatsiana Krukouskaya, Sergey Melnov	
MINERAL ELEMENT LEVELS IN SCALP	
HAIR FROM CHILDREN IN MOGILEV, BELARUS:	
LINK TO ENVIRONMENTAL AND DIETARY FACTORS	L11
114. Aleksandar Tomović, Miroslav Vulić	
RECYCLING OF AUTO GLASS FROM ASPECT OF	
TECHNOLOGICAL IMPACTS ON SOME	
PARTS OF RECYCLING PROCESS.....	L13

Jasna Glišović¹⁾
Jovanka Lukić¹⁾
Vanja Šušteršić¹⁾
Dobrivoje Čatić¹⁾

1) University of Kragujevac
Faculty of Engineering, Serbia
{jaca, lukicj, vanjas,
caticd}@kg.ac.rs

DEVELOPMENT OF TRACTORS AND TRAILERS IN ACCORDANCE WITH THE REQUIREMENTS OF LEGAL REGULATIONS

Abstract: Operation tasks of tractors and trailers in agriculture have changed considerably over the last decade. Today on the roads of Europe and the United States are tractors whose speed exceeds 50 km/h, even when fully loaded, which raises important issue of the effective stopping i.e. the quality of the braking system. Tractor trailers must correspond to the tractors with respect to size and weight, but must be capable of moving at speeds of towing vehicle. Their braking must be synchronized with the tractor and must not affect the deterioration of the operation quality of tractor-trailer combination. Also important is their good maintenance to avoid problems with the braking of the towing vehicle. In order to address these issues, revised braking requirements will apply to all agricultural tractors and their trailers (both new and existing) from 1 January 2016. They will also apply to equipment such as slurry tankers, fertiliser or manure spreaders, grain chaser bins and so on.

Keywords: tractors, trailers, brake system, legal, requirements

1. INTRODUCTION

The basic technology of agricultural machines has changed little over the last century. Though modern combine harvesters and planters may do a better job than their predecessors, the combine of today cuts, threshes, and separates grain in essentially the same way earlier versions had done. However, technology is changing the way that humans operate the machines, as computer monitoring systems, GPS locators, and self-steer programs allow the most advanced tractors and implements to be more precise and less wasteful in the use of fuel, seed, or fertilizer. In the foreseeable future, some agricultural machines may be made capable of driving themselves, using GPS maps and electronic sensors.

There is a tendency worldwide to improve tractor's transporting performance by increasing tractor speed. Faster, bigger, more powerful and more manoeuvrable machines are capable of developing ever higher speeds. Only the future will show whether the achievement of 50 km/h speeds signals an upper limit. Nevertheless, the increase of the agricultural

vehicles' speed requires efficient braking system that should enable agricultural vehicles to keep the pace with the other fast vehicles participant in road traffic, taking into account traffic safety. Braking technology for the mega-machines of today and tomorrow needs to be equally efficient, low-maintenance, convenient and economical. Highly effective, oil-cooled multi servo disk brakes guarantee a solid, reliable braking performance.

The standards associated with tractors are much more complicated than one outside of the standard's profession might expect. Tractor standards include three basic types of standards: safety, performance and interoperability. There are seven different major Standard Development Organizations (SDOs) for the agricultural tractor industry: the Organization for Economic Co-operation and Development (OECD), International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), Society of Automotive Engineers (SAE) International, American Society of Agricultural and Biological Engineers (ASABE), Association of Equipment Manufacturers – Equipment Manufacturers Institute (AEM-

