

**International Congress
Motor Vehicles & Motors 2012**

**SUSTAINABLE DEVELOPMENT
OF AUTOMOTIVE INDUSTRY**

Proceedings of Papers



October 3rd - 5th, 2012
Kragujevac, Serbia

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Publisher: Faculty of Engineering, University of Kragujevac
Serbia, 34000 Kragujevac, Sestre Janjić 6

For Publisher: Prof. Dr Miroslav Babić - Dean

Editors: Prof. Dr Radivoje Pešić
Prof. Dr Jovanka Lukić

Technical preparation: M.Sc. Dragan Taranović

Picture on the cover: Nemanja Lazarević

Print CD: Faculty of Engineering, University of Kragujevac
ISBN 978-86-86663-91-7

Year of publication: 2012

Number of copies printed: 200

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

629.3(082)(0.034.2)
621.43(082)(0.034.2)

INTERNATIONAL Congress Motor Vehicles & Motors (2012 ;
Kragujevac)

Sustainable Development of Automotive Industry [Elektronski izvor] :
proceedings of papers / International Congress Motor Vehicles & Motors
2012, October 3rd-5th, 2012., Kragujevac, Serbia ; [congress
organizers Faculty of Engineering ... [et al.] ; editors Radivoje Pešić,
Jovanka Lukić]. - Kragujevac : Faculty of Engineering, 2012
(Kragujevac : Faculty of Engineering). - 1 elektronski optički disk
(DVD) ; 12 cm

Sistemska zahtevi: Nisu navedeni. - Nasl. sa naslovnog ekrana. –
Tiraž 200. - Bibliografija uz svaki rad

ISBN 978-86-86663-91-7

1. Faculty of Engineering (Kragujevac)

а) Моторна возила - Зборници б) Моторни са
унутрашњим сагоревањем - Зборници
COBISS.SR-ID 193560076

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Publishing of this book is supported by:

Ministry of Education, Science and Technological Development of the Republic of Serbia

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Content

Predgovor	1
Foreword	2

INTRODUCTORY LECTURES

MVM2012-IL1	Giovanni Belingardi Jovan Obradović	RECENT DEVELOPMENT IN CAR BODY LIGHTWEIGHT DESIGN - A CONTRIBUTION TOWARD GREENER ENVIRONMENT	5
MVM2012-IL2	Dušan Gruden	DRIVE UNITS FOR FUTURE – QUO VADIS?	16
MVM2012-IL4	Patrizio Nuccio	ON FUTURE OF POWER PLANT FOR MOTOR VEHICLES	29
MVM2012-IL5	Maria Pia Cavatorta Lidia Ghibaudo Fabrizio Sessa Stefania Spada	PROCESS ERGONOMICS OF MOTOR VEHICLES	42
MVM2012-IL6	Bruno Dalla Chiara Ivano Pinna	ISSUES OF SUSTAINABLE TRANSPORT	53

SECTION A

MVM2012-009	Zlatomir Živanović Zoran Jovanović Zoran Masoničić Željko Šakota	THE APPLICATION OF DIFFERENT OPTIONS ALTERNATIVE FUELS BASED ON METHANE IN INTERNAL COMBUSTION ENGINES	67
MVM2012-013	Dragoljub Radonjić Radivoje Pešić Dragan Taranović Aleksandar Davinić	POSSIBILITIES FOR USE OF SIMULATION MODELS IN RESEARCH OF ANGULAR SPEED VARIATIONS OF IC ENGINE'S CRANK SHAFT	76
MVM2012-017	Aleksandar Djuric Snezana Jovanovic	CEPSTRUM ANALYSIS OF VIBRATION IN TRANSMISSION SYSTEM OF THE VEHICLE	87
MVM2012-019	Dejanu Marcel Dascălu Traian Popa Dinel Parlac Sebastian Salamu Gabriela	CALCULUS AND CONSTRUCTION OF A LASER PLUG	99
MVM2012-020	Dejanu Marcel Popa Dinel Dascălu Traian Tabacu Ion Pârlac Sebastian	EXPERIMENTAL BENCH FOR RECORDING IMAGES OF THE FLAME FRONT WHEN USING LASER PLUG IGNITION	107
MVM2012-022	Dobrivoje Ninković Dragan Taranović Saša Milojević Radivoje Pešić	MODELLING VALVE DYNAMICS AND FLOW IN RECIPROCATING COMPRESSORS – A SURVEY	113

MVM2012-023	Dobrivoje Ninković Dragan Taranović Saša Milojević Radivoje Pešić	A REVIEW OF MODELS FOR PREDICTING INSTANTANEOUS HEAT EXCHANGE BETWEEN THE GAS AND CYLINDER IN RECIPROCATING COMPRESSORS	126
MVM2012-024	Predrag Mrđa Nenad Miljić Marko Kitanović Slobodan Popović Miroljub Tomić	MODEL BASED APPROACH IN YAMAHA R6 FORMULA STUDENT ENGINE CONTROL PARAMETERS OPTIMISATION	137
MVM2012-026	Marko Kitanović Slobodan J. Popović Nenad Miljić Miroljub Tomić Predrag Mrđa	A SIMULATION STUDY OF THE EFFECTS OF TURBO-EXPANSION CONCEPT IMPLEMENTATION ON COMBUSTION AND GAS-EXCHANGE PROCESSES OF A 1,4 L SPARK-IGNITION ENGINE	147
MVM2012-030	Nenad Miljić Miroljub Tomić Slobodan J. Popović Marko Kitanović Predrag Mrđa	COMPARATIVE STUDY ON COMBUSTION FEATURES EXTRACTION METHODS IN IC ENGINES USING NEURAL NETWORKS MODELS	159
MVM2012-032	Slobodan Popović Miroljub Tomić Nenad Miljić Marko Kitanović Predrag Mrđa	THE INFLUENCE OF DYNAMIC ENGINE MODEL PARAMETERS ON CRANKSHAFT INSTANTANEOUS ANGULAR SPEED – SENSITIVITY AND ERROR ANALYSIS	173
MVM2012-033	Jovan Dorić Nenad Raspopović Ivan Klinar	IMPROVEMENT OF TEST STAND FOR INTERNAL COMBUSTION ENGINE	186
MVM2012-034	Raspopović Nenad Dorić Jovan Adamović Dragan Antonić Života Klinar Ivan	ONE METHOD FOR MEASUREMENT OF BENZENE, TOLUENE, ETHYLBENZENE AND XYLENE (BTX) IN SPARK IGNITION ENGINE	192
MVM2012-039	Petrović Saša Perić Sreten Mitrović Melanija Lozanović-Šajić Jasmina	STATISTICAL ENGINE CRANKSHAFT ROTATION ANALYSIS	200
MVM2012-040	Gligorijević Radinko Jevtic Jeremija Borak Djuro	BIOFUELS AND BIOMASS	212
MVM2012-043	Breda Kegl Stanislav Pehan Marko Kegl	EMISSION CHARACTERISTICS OF A DIESEL ENGINE USING BIODIESEL PRODUCED FROM RAPESEED OIL	216
MVM2012-044	Željko Šakota Zlatomir Živanović Đorđe Diligenski Zoran Jovanović	INVESTIGATION OF THE POTENTIAL FUEL SAVINGS COMING FROM THE USE OF HYDRAULIC REGENERATIVE SYSTEMS IN UTILITY VEHICLES	221
MVM2012-045	Lozica Ivanović Danica Josifović Boris Rakić Blaža Stojanović Andreja Ilić	THE INFLUENCE OF VARIATION IN POSITION OF OUTPUT SHAFT TO LOAD ON THE CARDAN JOINT CROSS SHAFT	227

MVM2012-052	Elif Eker Imdat Taymaz	THE EFFECT OF OPERATION AND DESIGN PARAMETERS ON THE PERFORMANCE OF PEMFC	237
MVM2012-056	Catalin V. Zaharia Adrian C-tin. Clenci	RESEARCHES ON THE IMPACT OF HYPERMILING TECHNIQUES AND FUEL SAVING DEVICES IN ORDER TO REDUCE POLLUTION IN URBAN AREAS	245
MVM2012-057	Adrian Clenci Adrian Biziiac Pierre Podevin Rodica Niculescu	VARIABLE INTAKE VALVE LIFT ON A PORT FUEL INJECTED ENGINE AND ITS EFFECTS ON IDLE OPERATION	253
MVM2012-062	Snežana Petković Pero Dugić Omer Kovač Jadranka Vujica	EFFECTS OF BIODIESEL ON ENGINE OIL PROPERTIES	263
MVM2012-066	Saša Milojević Dušan Gordić Radivoje Pešić	NATURAL GAS AS A SAFE TECHNOLOGY FOR CLEAN URBAN VEHICLES	269
MVM2012-068	Slobodan Mišanović	EXPLOITATION AND ENVIRONMENTALLY ASPECTS OF HYBRID BUSES IN EUROPEAN CITIES	280
MVM2012-071	Radivoje Pešić Snežana Petković Emil Hnatko Stevan Veinović	INTERDISCIPLINARY CONTENTS OF THE PROJECT "THE MINIMUM FUEL CONSUMPTION CAR"	289
MVM2012-072	Aleksandar Davinić Radivoje Pešić Dragan Taranović Miroslav Ravlić	OTTO/DIESEL COMBINED ENGINE -REALIZATION AND CHARACTERISTICS-	298

SECTION B

MVM2012-001	Milan Milovanović Miroslav Demić Saša Jovanović	THE ANALYSIS OF SUBFRAME INFLUENCE ON CAR BODY BEHAVIOUR	309
MVM2012-004	Jovan Obradovic Emre Ertugus Giovanni Belingardi	RELEVANCE OF TUBULAR RING STRUCTURES FOR BODY-IN-WHITE LATERAL CRASH PERFORMANCE AND OCCUPANT SAFETY EVALUATION	317
MVM2012-011	Milan Blagojević Miroslav Živković	3D DEFORMATION MEASUREMENT OF CAR BODY PARTS BASED ON POINT CLOUD GENERATED BY OPTICAL MEASURING TECHNIQUES	326
MVM2012-012	Milan Blagojević Miroslav Živković Marko Topalović	REGISTRATION AND SURFACE INSPECTION OF AUTOMOTIVE PRESSED PARTS BASED ON POINT CLOUD GENERATED BY OPTICAL MEASURING TECHNIQUES	334
MVM2012-014	Nenad Kostic Zorica Djordjevic Mirko Blagojevic Sasa Jovanovic	STATIC ANALYSIS OF HYBRID METAL - COMPOSITE SHAFTS	340

MVM2012-027	Stanislav Pehan Breda Kegl	EFFICIENT RECUMBENT TRIKE DESIGN	346
MVM2012-041	Dragan Milosavljević Gordana Bogdanović Ljiljana Veljović Aleksandar Radaković Mirjana Lazić	COMPOSITE MATERIALS IN AUTOMOTIVE ENGINEERING – MECHANICAL BEHAVIOR OF ANISOTROPIC MEDIA	352
MVM2012-042	Dragan Milosavljević Ljiljana Veljović Gordana Bogdanović Aleksandar Radaković Mirjana Lazić	NONLINEAR DYNAMICS OF HEAVY GYRO ROTORS	359
MVM2012-046	Ionel Vieru Viorel Nicolae Danut-Gabriel Marinescu Adrian Rosescu Gheorghe Petrache	STRESS AND DEFORMATION ANALYSIS FOR THE LOWER KNUCKLE BRACKET OF FRONT SHOCK ABSORBERS	368
MVM2012-050	Andreja Ilić Lozica Ivanović Danica Josifović Vukić Lazić	DESIGN OF THE MOTOR VEHICLES FROM THE ASPECT OF HIGH STRENGTH STEELS APPLICATIONS	372
MVM2012-051	Lazar Savin Milan Tomić Mirko Simikić Laszlo Mago	TESTING OF SEAT BELT ANCHORAGE OF TRACTOR YTO 40s	380
MVM2012-067	Vladan Madić	AUTOMOTIVE SUPPLIER SYSTEM	385

SECTION C

MVM2012-002	Rajko Radonjić Aleksandra Janković Branislav Aleksandrović Dragoljub Radonjić	MODELING OF DRIVER BEHAVIOUR	401
MVM2012-005	Branka Grozdanić Djuro Borak Velimir Petrović Zlata Bracanović Slobodan Janković	A CONTRIBUTION STUDY OF SUSPENSION SYSTEM FROM THE POINT OF VEHICLE'S COMFORT	411
MVM2012-025	Boris Stojić Nenad Poznanović Aleksandar Poznić	STUDY OF TRACTOR TIRE VERTICAL DYNAMICS WHEN ROLLING OVER SHORT- WAVELENGTH ROAD UNDULATIONS AND IMPACT OBSTACLES	417
MVM2012-029	Mile S. Šiljak	SAFETY AND TRAFFIC IN REAL AERODYNAMIC EFFECT LATERAL ATTRACTION OF MOTOR VEHICLES	426
MVM2012-031	Pikula Boran Trobradović Mirsad	CONTRIBUTION TO THE DEFINITION OF THE MOST IMPORTANT PARAMETERS FOR TIRE MODELS	432

MVM2012-035	Sreten Simović Aleksandra Janković Milanko Damjanović	AN ANALYSIS OF VEHICLE SEMISHAFT LOADING WHEN THE WHEEL PASSES OVER SUCCESSIVE ROAD IRREGULARITIES	440
MVM2012-055	Aleksandar Poznić Boris Stojić Ferenc Časnji	MAGNETORHEOLOGICAL FLUID BRAKE APPLICATION POTENTIAL FOR LIGHT VEHICLES	448
MVM2012-060	Branimir Milosavljević Radivoje Pešić Jovanka Lukić Saša Babić	MODERN AERODYNAMIC TECHNOLOGY ON MOTOR ROAD VEHICLES	459
MVM2012-061	Branimir Milosavljević Radivoje Pešić Jovanka Lukić Saša Babić	AERODYNAMIC RESISTANCE IMPACT ON MOTOR VEHICLE FUEL ECONOMY	464
MVM2012-069	Jasna Glišović Miroslav Demić Jovanka Lukić Danijela Miloradović	DYNAMOMETER FOR TESTING HIGH-FREQUENCY NOISE OF DISC BRAKES	472

SECTION D

MVM2012-015	Dragan Ružić Ferenc Časnji Nenad Poznanović	THE HUMAN MODEL FOR THE SIMULATION OF THERMAL CONDITIONS IN VEHICLE CABIN	487
MVM2012-058	Saša Babić Radivoje Pešić Jovanka Lukić Branimir Milosavljević	NOISE EMISSION WITH ASPECT OF VEHICLES FLEET STRUCTURE – THE CASE OF SERBIA	499
MVM2012-063	Valentina Golubović- Bugarski Snežana Petković	MEASUREMENT OF STATIONARY NOISE OF VEHICLES IN USE	506
MVM2012-064	Miroslav Demić Jovanka Lukić Danijela Miloradović Jasna Glišović	INFLUENCE OF DETERIORATION OF VIBRATION PARAMETERS ON MOTOR VEHICLE'S VIBRATION COMFORT	514

SECTION E

MVM2012-006	Zoran Papić Svetozar Kostić Vuk Bogdanović Milan Simeunović	THE EMPIRICAL MODEL FOR DETERMINING THE LANE CHANGE DISTANCE DURING AN OVERTAKING MANEUVER	523
MVM2012-007	Aleksandar Kostikj Milan Kjosevski Ljupcho Kocarev	DETERMINATION OF REACTION TIME AND INTERVEHICLE SPACING AS IMPORTANT HUMAN BASED MICROSCOPIC TRAFFIC PARAMETERS IN URBAN ENVIRONMENT	531
MVM2012-008	Zlata Bracanović Đuro Borak Branka Grozdanić Velimir Petrović	LUMINOUS EFFICIENCY OF AGRICULTURAL TRACTORS	538

MVM2012-021	Perić Sreten Grkić Aleksandar Krsmanović Milan	MONITORING OF FOUR-STROKE ENGINES BY OIL ANALYSIS AND PROACTIVE MAINTENANCE	543
MVM2012-028	Dragoljub Radonjić Aleksandra Janković Rajko Radonjić	INFLUENCE OF INCREASE OF MODERN VEHICLES MAXIMAL SPEED AND ACCELERATION ON TRAFIC SAFETY	552
MVM2012-037	Saša Brakočević Radoje Vujadinović	EXAMPLE OF IMPROVING ENERGY EFFICIENCY OF VEHICLE FLEET USING LOW BUDGETARY MEASURES	562
MVM2012-059	Branimir Milosavljević Radivoje Pešić Jovanka Lukić Saša Babić	ESTIMATION OF EXHAUST EMISSIONS FROM TRANSPORT BY TIER METHODS ON KRALJEVO CITY	568

MVM2012-060
Branimir Milosavljević¹
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MODERN AERODYNAMIC TECHNOLOGY ON MOTOR ROAD VEHICLES

ABSTRACT: When designing vehicle bodies it is essential to reduce the air resistance in order to improve fuel economy and performance while driving. Interest in the new technologies, to reduce air resistance, has become more and more significant due to the fact that the drag force increases with the square of speed, while engaged power requirements need cube speed of vehicles. This paper provides an overview of modern aerodynamic instruments (vortex generators and directed air streamlines) which can be mass-used in passenger and freight transport in particular and affect achievement of the automotive designer's goals.

KEY WORDS: Aerodynamic, vortex generators, directed air streamlines, road motor vehicles

INTRODUCTION

With the development of new composite materials, vehicles are becoming lighter and forces which act through the tires on the ground do not create a big rolling resistance but some form of lifting forces [1]. Besides the reduction of the air resistance, aerodynamic details and vehicle design can create force that will operate through the car wheels on the road and create better traction. Vehicles are better controlled during slippery and wet road driving and aquaplaning possibility is eliminated [2]. The question is how different vehicle additives can affect car aerodynamics. A compromise must be established between low air resistance and negative lifting force. Optimal balance between these forces depends not only on specific vehicle design but also on added body parts. The example of detail optimization is shown in Figure 1 with minor modifications of the front vehicle body (A), hood (B), front pillars (C) and last columns forms (D and E) and with the total drag coefficient reduction (C_x) of 21%. Recent studies of the aerodynamic drag reduction present innovative technologies such as vortex generators and directed air streamlines. Both deserve explanations because of fuel consumption savings and better vehicle handling.

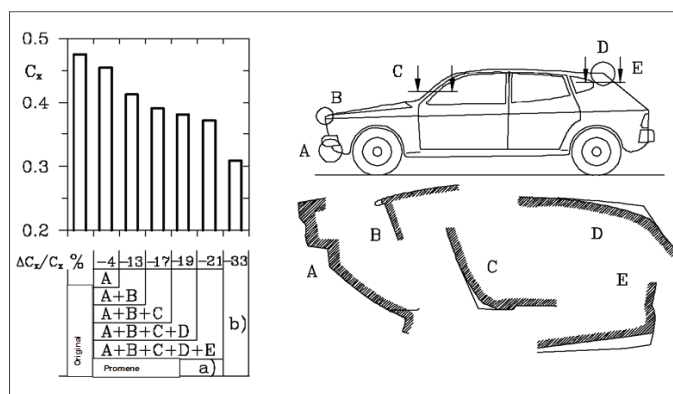


Figure 1 Optimization of car details [3]

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