

conferenceseries.com 846th Conference

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Scientific Tracks & Abstracts (Day 1)



Automobile 2016

Sessions:

Day 1 December 01, 2016

Automotive Design & Vehicle Electronics | Automotive Manufacturing | Automotive Safety | Electric and Hybrid Vehicles

Session Chair
Francisco Trinidad
Exide Technologies, Spain

Session Co-chair
Derya Haroglu
Erciyes University, Turkey

Session Introduction

Title: Realistic energy management strategy on parallel hybrid electric vehicles

Dohee Kim, Hyundai Motor Company, Korea

Title: Prioritizing sensor performance characteristics for automotive seat weight sensors in quality function deployment (QFD)

Derya Haroglu, North Carolina State University, USA

Title: Variable caster steering in vehicle dynamics

Dai Vo Quoc, RMIT University, Australia

Title: The criteria and methodology for evaluation the quality of Magnetic Impelled Arc But Welding joints in automotive industry

Marcin Korzeniowski, Wroclaw University of Science and Technology, Poland

Title: Evaluation of possibility of a family car conversion into electric basing on traction characteristics

Pawel Adamski, Technical University of Lodz, Poland

Title: Benchmarking VE and drawing VE

Yasunori Ota, Value Engineering Trainer, Japan

Title: Influence of operating factors on modal characteristics of a rolling truck tyre

Subhash Rakheja, Concordia University, Canada

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Realistic energy management strategy on parallel hybrid electric vehicles

Dohee Kim

Hyundai Motor Company, Korea

For the realistic energy management of hybrid powertrains an approach which provides efficient management of state of charge (SOC) and improvement of drivability by utilizing an adaptive torque control and an instantaneous minimization method known as equivalent consumption minimization strategy (ECMS) is presented. The main idea is to control the electric motor torque through SOC-based gain adaptation so as to obtain effective energy management within the prescribed SOC window while securing drivability by suppressing a sense of incompatibility caused by the power sources. To the best of authors' knowledge, this is the first result on the ECMS synthesis considering the improvement of drivability through direct torque control from a perspective of realistic implementation. To directly adapt the power sources which are a representative cause for interior noise, the adaptive torque control input is designed outside the ECMS framework. Within the prescribed SOC window an adaptive torque distribution makes the energy management effective while directly adjusting the source strength for improving interior noise, vibration and harshness (NVH). The proposed strategy has been applied to the prototype of Sonata Hybrid of Hyundai Motor Company (HMC) to practically assess driving performance. Test results show the performance about the SOC management and the noise attenuation comparing to adaptive ECMS methods.

Biography

Dohee Kim has received his PhD Degree in 2011 from the Department of Mechanical and Aerospace Engineering, University of Florida. He has published more than 20 papers for nonlinear controls and applications in reputed journals and conferences.

dohee.ghim@gmail.com

Notes:

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Prioritizing sensor performance characteristics for automotive seat weight sensors in quality function deployment (QFD)

Derya Haroglu^{1,2}, Nancy Powell¹ and Abdel Fattah M Seyam¹¹North Carolina State University, USA²Erciyes University, Turkey

Quality function deployment (QFD), a key tool to convert the customer needs into product features, is generally integrated into the new product development (NPD) process at the design stage. Prioritizing customer needs in a QFD process leads to using the resources (time, money and staffing) effectively by eliminating the unimportant customer needs. The overall goal of the research was to develop a textile-based optical fiber sensor for automotive seat occupancy. The findings of this paper were focused on the design of experiments in our previous publication. In this paper, a research study was conducted to better understand market demands in terms of sensor performance characteristics for automotive seat weight sensors, as a part of the QFD House of Quality (HOQ) analysis. A survey was sent to more than 20 companies operating in the field of automotive seat weight sensors and original equipment manufacturers (OEM) via e-mail. Only 5 companies participated in this study due to competitive concerns and confidentiality reasons. However, the companies responded to the survey were of quality relevant to the research and could be perceived as representative of the group of experts. All 5 companies participated in the survey agreed on the first 5 most important sensor characteristics: Reproducibility, accuracy, selectivity, aging and resolution; where the Analytic Hierarchy Process (AHP) was applied to prioritize the sensor characteristics.

Biography

Derya Haroglu has completed her PhD in December 2014 from North Carolina State University. She is an Assistant Professor in the Department of Industrial Design Engineering at Erciyes University, Turkey.

dharoglu@erciyes.edu.tr

Notes:

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain**Variable caster steering in vehicle dynamics****Dai Vo Quoc**
RMIT University, Australia

When a vehicle is cornering, its wheels usually lean outwards from the center of rotation. This effect decreases lateral force and eventually limits tyre performance, especially when the tyre is working under a high side slip regime. This paper proposes a strategy for varying caster of the front steerable wheels to counter the effect. The homogeneous transformation is utilized to develop the kinematics of a road steering wheel which includes the dynamic camber during the cornering manoeuvre. A variable caster scheme is proposed based on the analysis of the dynamic camber. A roll vehicle model and a camber-included tyre force model are constructed; and MATLAB/Simulink is used to simulate the dynamic behavior of the vehicle with and without the variable caster. The results of step-steer, ramp-steer and swept-steer simulations show that the outwards leaning effect of the steering wheels is reduced significantly, leading to an improvement in lateral acceleration, and yaw rate capacities without compromising with other handling characteristics.

Biography

Dai Vo Quoc is currently working toward his PhD degree in Automotive Engineering at School of Engineering, RMIT University, Australia. His research interests include kinematics, dynamics of vehicle systems; dynamics, ride, handling and stability of vehicles. He has published and written 5 papers and book chapters.

dai.voquoc@rmit.edu.au
s3438339@student.rmit.edu.au**Notes:**

Automobile Engineering

December 01-02, 2016 Valencia, Spain

The criteria and methodology for evaluation of the quality of magnetic impelled arc butt welding joints in automotive industry

Korzeniowski M, Kustron P, Piwowaraczyk T and Sokolowski P
Wroclaw University of Science and Technology, Poland

Current trends in the automotive industry are forcing manufacturers of automotive components to improve the production process in terms of producing quality products at relatively low unit price. One way of achieving these assumptions is the radical change in manufacturing technology. Nowadays, manufacturers of drive shafts components noticeably follow the Magnetically Impelled Arc Butt (MIAB) welding technique, which has a number of advantages, especially important from an industrial point of view. The global automotive industry still has not solved the problem of quality assurance of MIAB welded joints, using random destructive testing of produced batch particular items. An alternative to the existing investigative methods are immersive systems of non-destructive testing based on modern ultrasound techniques. Information on engineering practice of destructive and non-destructive testing of Magnetically Impelled Arc Butt (MIAB) welded components were presented. Concept of the process was characterized and its advantages in comparison with alternative technologies were demonstrated. Status of documents, guidelines and instructions determining the correct performance of joints were described. Procedures of welds quality control were presented and were divided into two basic groups – in the process analysis and research of performed joints. Practical aspects were emphasized, taking as an application example the elements of drive transmission. Moreover, the concept of experiment set-up for ultrasonic nondestructive testing and preliminary research, based on using lateral wave were presented.

Biography

Korzeniowski M is an Assistant Professor at Wroclaw University of Science and Technology. His scientific activities and research work cover the basic techniques in the field of welding, in particular welding and robotic welding, welding process automation and quality control of welded joints, non-destructive methods, mainly application of ultrasonic techniques in automotive industry.

marcin.korzeniowski@pwr.edu.pl

Notes:

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Evaluation of possibility of a family car conversion into electric basing on traction characteristics

Pawel Adamski

Technical University of Lodz, Poland

Converting the cars being in use into electric cars without a major change in their construction seems to be very promising way of rapid adaptation of the automotive market to ongoing legislative restrictions. In this work, traction characteristics of Syrena 105 family car were elaborated for original S-31 engine and for asynchronous HPEVS AC-35 electric motor in order to compare the performance of the car with ICE and electric motor. It was concluded that there is a possibility of running the family car Syrena 105 with the electric motor through the original gearbox and original final drive, with satisfactory results. It was however noticed, that changing only the final drive ratio can enhance its performance outperforming the original vehicle specification.

Biography

Pawel Adamski has completed his graduation from Arts et Métiers Paristech and Technical University of Lodz in the field of Mechanical Engineering. He is the Commercial Director of PEVT s.c., an innovative company dedicated to e-mobility. He is now working on electric drives for vehicles along with his PhD studies at Technical University of Lodz.

p.w.adamski@gmail.com

Notes:

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Benchmarking VE and drawing VE

Yasunori Ota

Value Engineering Trainer, Japan

This presentation introduces two specific approaches regarding the VE method- Benchmarking VE and Drawing VE. I have been concerned about how to come up with good ideas effectively. I have used various methods by trial and error in idea generation sessions. By doing so, I noticed that two methods proved to be effective; one was Benchmarking VE. It is used at the early development stage in order to coordinate the relationship between function and parts. Further, by applying this method to your competitors function and parts, you are able to ascertain the strengths and weaknesses of your company and you can think of good ideas from comparison contents. The other is Drawing VE. It can be used before, during and after production. Specifically, it reexamines the role of the instructions in the drawing (materials, dimensional tolerance, function of thickness, thickness of the board and post-processing). And you can think cost reduction idea from reexamines the role of the instructions in the drawing. Based on this, the method allows you to develop new solutions. I hope to share these methods with other VE practitioners around the world in order to contribute to the promotion of VE.

Biography

Yasunori Ota is a Value Engineering Trainer and has been in VE practice since 10 years. In relation to cost planning in particular, he took initiative in increasing profitability by coordinating target value in the procurement, design and production technology departments, providing a list of items for cost reduction and managing their progress.

chakachaka329@gmail.com

Notes:

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Influence of operating factors on modal characteristics of a rolling truck tyre

Subhash Rakheja, Shahram Shokouhfar and A K W Ahmed
Concordia University, Canada

A structural 3D tyre model is developed for estimating modal characteristics of a rolling truck tyre using LS-DYNA finite element analysis platform. The model takes into account the complex construction of a pneumatic tyre such as the multi-layered composite designs of carcass and belts as well as hyper-elastic rubber materials forming the tread and bead fillers. The validity of the structural tyre model was thoroughly examined via comparisons with reported experimental data in view of vertical and lateral forces, and aligning moment characteristics. The verified tyre model is subsequently employed to study its modal characteristics in terms of variations in vibration modes and frequencies of the pre-loaded pneumatic tyre structure considering ranges of loading conditions such as inflation pressure, normal load and rolling speed. The influences of these loading conditions are incorporated in the eigenvalue calculations via applying the large-deformation finite element theory, where a new term, known as the geometric stiffness matrix, is introduced to the material stiffness matrix of the system. This new term accounts for nonlinear geometric effects due to rotations of stresses arising from the loading conditions. A number of prior explicit dynamic simulations are thus necessitated in order to determine the stress state throughout the tyre model at circumstances when the modal characteristics are desired. This is achieved using LS-DYNA via the intermittent eigenvalue extractions during an explicit dynamic simulation at three distinct instants including: (i) Following tyre inflation in response to the internal pressure under given loading condition; (ii) following steady-state tyre deflection due to applied normal load; and (iii) following a given steady rolling speed. These permitted the analyses of variations in modal frequencies and deflection modes under applied inflation pressure, loading and rolling speed. The validity of the simulation results are established through demonstrating correlations of predicted natural modes and frequencies with the reported data for similar tyres. Furthermore, a computationally efficient algorithm is formulated and applied to facilitate model reformulations for parametric studies. The results showed significant contributions of all the operating factors considered, namely, inflation pressure, vertical load and rolling speed. Several pairs of conjugate mode frequencies were further detected for the inflated tyre due to symmetry. For the deflected tyre, however, each pair diverged to two distinct frequencies with one lower and other higher than the corresponding frequency of the tyre under inflation alone.

Biography

Subhash Rakheja is a professor of mechanical engineering at the CONCAVE Research Center, Concordia University, Montreal, Canada. He is a research chair in vehicular ergo-dynamics in Concordia University. Dr. Rakheja is a fellow of the CSME and of the ASME. He is the editor of the International Journal of Industrial Ergonomics and associate editor of the SAE Journal of Commercial Vehicles and International Journal of Heavy Vehicle Systems. He continues to serve in the Canadian Advisory Council on International Standards.

subhash.rakheja@concordia.ca

Notes:

conferenceseries.com 846th Conference

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Scientific Tracks & Abstracts (Day 2)



Automobile 2016

Sessions:

Day 2 December 02, 2016

IC Engine & Automotive Transmission | Fuel Economy | Alternate Energy Sources | Automation in Driving | Pollution by Automobiles | Automotive Industry

Session Chair

Kadir Aydin

Çukurova University, Turkey

Session Chair

Hakan Kaleli

Yıldız Technical University, Turkey

Session Introduction

Title: Effect of cooling gallery on the piston temperature in a gasoline direction injection engine

Sangwook Han, Korea Automotive Technology Institute, Korea

Title: Structural transfer path analysis using normal frequency response functions

Akin Oktav, Bogazici University, Turkey

Title: Financial aspects of Czech automobile industry development

Jana Vychytilova, Tomas Bata University in Zlin, Czech Republic

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Effect of cooling gallery on the piston temperature in a gasoline direct injection engine

Sangwook Han¹, Hyunchul Kim¹, Gyucheol Im² and Younsul Yoo²¹Korea Automotive Technology Institute, Korea²Dongsuh Federal Mogul, Korea

Significant efforts have been devoted to developing gasoline direct injection (GDI) engine technologies to meet the stringent emission legislation. From the combustion point of view, combustion pressure is getting higher with higher injection pressure and boosting pressure, which enhances the combustion process and thus reduces the emissions. This issue requires reinforcement of the piston as well as improvement of cooling performance in the piston. The objective of this study was to investigate the effect of cooling gallery on the piston temperature in a GDI engine. Prior to the engine experiment, parametric study on the oil jet was performed in the test bench. In addition, oil targeting was optimized for the insurance of sufficient oil flow rate in the cooling gallery. This was realized by optical piston and modified cylinder block. Two types of pistons, which are with and without cooling gallery, were developed by Dongsuh Federal-Mogul in Korea. Furthermore, the research engine was modified to install the oil jet in the cylinder block and inject the oil into the cooling gallery in the piston. The developed pistons were applied and evaluated in a GDI engine. The piston temperature was measured by tempplug which is screw-type steel and is sensitive to temperature. It was confirmed that the cooling gallery played an important role in determining the piston temperature. The piston with the cooling gallery resulted in significantly lower temperature. It is believed that the optimization for the location and shape of cooling gallery should be needed for better cooling performance.

Biography

Sangwook Han has completed his PhD from Korea Advanced Institute of Science and Technology. He is a Senior Researcher in the Clean Engine System R&D Center of Korea Automotive Technology Institute, Korea. His research interests are in the engine combustion, vehicle thermal management system and automobile parts development for the improvement of fuel economy.

swhan@katech.re.kr

Notes:

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Structural transfer path analysis using normal frequency response functions

Akin Oktav, Cetin Yilmaz and Gunay Anlas
Bogazici University, Turkey

Structural transfer path analysis describes the total interior sound pressure level as a vector sum of individual contributions from the powertrain force inputs entering the unibody over the engine and exhaust mounts. In this work, a hybrid transfer path analysis method that utilizes computational and experimental studies is proposed. Computational transfer path analysis is important to achieve modification studies, but the frequency response functions obtained do not contain the damping information. On the other hand, complex frequency response functions measured during the experimentation have the damping information embedded in. However, it is possible to separate damping from the frequency response functions measured. These damping free functions are called as normal frequency response functions. Correlation is made between the undamped computational model of the structure and normal frequency response functions derived from experimental transfer path analysis study. The proposed method essentially makes use of the viscous damping identified in the experimental step. Viscous damping data are computed separately and imposed on the final computational model. In this talk, important advantages of the method and a reference application will be presented. Results of the application demonstrate that the method proposed works well with real problems.

Biography

Akin Oktav received his PhD degree in Mechanical Engineering from Bogazici University. Currently, he is working as a Specialist in the Vibration and Acoustics Laboratory of Bogazici University. His research interests include structural model updating, vehicle noise variability, identification of damping and modification for vehicle acoustic problems.

akin.oktav@boun.edu.tr

Notes:

Automobile Engineering

December 01-02, 2016 Valencia, Spain

Financial aspects of Czech automobile industry development

Jana Vychytilova and Drahomira Pavelkova
Tomas Bata University in Zlin, Czech Republic

The automobile industry significantly contributes to the overall economic performance of the Czech Republic and in the recent years with growing total assets, a number of employees and sales, especially from export, the share of the automobile industry in manufacturing industry further increases. Manufacture of motor vehicles (except motorcycles), trailers and semi-trailers represent the core automotive industry, i.e. vehicle and parts makers in the Czech Republic. It refers particularly to manufacture of motor vehicles; manufacture of bodies for motor vehicles, manufacture of trailers and semi-trailers, and manufacture of parts and accessories for motor vehicles. The survey refers about the Czech automotive industry financial aspects results supported inter alia by financial statements and ratios analyses, and provides an overall assessment of the financial situation and insights into this business. Related important issues as if the Czech automotive industry has been severely hit by the crisis since mid-2008 investigating the car sales, or if the Czech government has been supported the automobile industry by scrapping schemes are considered. Finally, assessment of the current economic importance of the Czech car market, of its size share in the overall size of OECD economies in terms of value added, employment and export and specific features of the Czech automobile industry are presented.

Biography

Jana Vychytilova has completed her PhD in Finance from Tomas Bata University and was a Post-doc in the Centre of Applied Economics at Tomas Bata University. She is currently the Assistant Professor at Faculty of Management and Economics, Tomas Bata University and a Faculty Advisor for CFA Institute Research Challenge. She is author or co-author of 1 monograph, 1 article in J_{SC}, 1 article in J_{ERIH+}, 1 article in J_{REC}, 5 contributions of type D, leader of IGA project and GaCR project participant.

vychytilova@fame.utb.cz

Notes:

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain**Parking is no more a back seat watcher****Subramanian Venkataraman**

VMW Parking & Container Handling Systems (P) Ltd, India

Parking was not given any status earlier as it was not considered as a challenge as the number of cars was not more and there were enough open spaces. But during last two decades, the growth of automobile population is astronomical. A typical statistics from India would be a global indicator. Ratio of cars to population has jumped up from 40/1000 to 400/1000 in cities. Now the time has come to give the parking its due weight when designing a car as all cars big or small need parking for 80% of the day. The important aspects are access to handling equipments without interference, stability during transition and safety during parking and extra fittings like antenna and rear view mirrors and their impact on parking. The paper deals with present parking solutions and their limitations in the current scenario and what would be the best fit solution for tomorrow's demands and the suggestions put forth before designers for making parking a pleasant experience.

Biography

Subramanian Venkataraman has passed Diploma in Automobile Engineering and got Associate Membership in the Institution of Engineers (India). Over 40 years, he is involved in engineering projects including service in Government undertaking and in heavy engineering executing projects for big and medium industries. He is the first to conceive multi-level car parking in 1984 in India and developed further to get patent for automated multi-level car parking in India, US, Japan and Singapore. His application reached grant stage in EPO. He presented paper on new generation container handling and published article in World Port Development and presently serving as Director for VMW Parking & Container Handling Systems (P) Ltd which is working on end to end automation for container terminals.

carparksvr@yahoo.com**Notes:**

2nd International Conference and Exhibition on

Automobile Engineering

December 01-02, 2016 Valencia, Spain**A comparative exergoeconomic analysis of two biomass post-firing and co-firing combined power plants****Saeid Soltani**

Sejong University, South Korea

Biomass energy is a promising potential replacement for fossil fuels in future, because it is relatively abundant, clean and carbon dioxide neutral. Biomass can be converted using thermo-chemical and bio-chemical processes into solid, liquid and gas bio-fuels, which can then be used for generating heat and/or electricity. In the present lecture, the application of gasification for electricity production is investigated via energy, exergy and exergoeconomic analyses for two configurations: (1) Externally fired biomass combined cycle and (2) combined cycle with co-firing of biomass and natural gas. The second configuration is found to be more economic (on a large scale) as its relative cost difference and exergoeconomic factor are less than those for the first configuration. The results also indicate that the energy and exergy efficiencies of combined cycle with co-firing could be about 2% and 4% higher than those of the externally fired combined cycle, respectively.

Biography

Saeid Soltani is a PhD student at the University of Sejong South Korea. He received his 1st PhD in 2013 at the Faculty of Mechanical Engineering University of Tabriz. He is the author or co-author of 22 publications. His fields of interest are renewable energy, exergy analysis, exergoeconomic analysis and advanced exergy analysis.

soltani929@gmail.com

Notes: