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About

Remi Olatunbosun is a leading expert in the areas of vehicle structural dynamics testing, tyre dynamics, Noise, Vibration and Harshness (NVH) in vehicles and vehicle dynamics simulation. The vehicle structural dynamics performance standards which he established in the late 1970s are routinely applied in industry for assessing the vibro-acoustic performance of vehicle structures.

He has done extensive work on tyre dynamics covering dynamic testing, empirical modelling of tyre characteristics and FE simulation of tyre dynamics. He has also published extensively in the area of vehicle ride and handling dynamics.

Remi has published over 70 research papers in scientific journals, conferences and edited works. He has worked extensively on funded research with UK Automotive OEMs such as Rolls Royce, Ford, Jaguar, LandRover and MG-Rover as well as Tier 1 suppliers such as Dunlop Tyres, TRW, Michelin Tyres, Goodyear Tyres etc.

Qualifications

- PhD in Mechanical Engineering, University of Birmingham 1976
- MSc in Mechanical Engineering, University of Manchester 1974
- BSc (Hons) in Mechanical Engineering, University of Manchester 1972
- Fellow Institution of Mechanical Engineers
- Member Society of Automotive Engineers
- Member Nigerian Society of Engineers

Biography

Remi Olatunbosun graduated from the University of Manchester with a BSc in Mechanical Engineering in 1972. He stayed on at Manchester to complete an MSc before moving on to the University of Birmingham to join the Automotive Research Group in 1974. He was awarded a PhD in 1976 for his work on the dynamic performance of vehicle body structures.

Before joining the University of Birmingham in 1988, Remi Olatunbosun had taught Mechanical Engineering at the University of Lagos, Nigeria (1976-1988). He had also worked for the British Leyland Cars from 1978 to 1979 as a research and development engineer with responsibility for Noise Vibration and Harshness (NVH) performance on the LC10 project.

He joined the University of Birmingham as a Research Fellow in the Automotive Engineering Centre with responsibility for managing research and consultancy projects with the automotive industry and helped to establish the centre's reputation with NVH development work done on the Jaguar XJ40.

He was appointed to a lectureship position in the Department of Mechanical Engineering in 1994 and is currently a senior lecturer and Head of the Vehicle Dynamics Laboratory.

Remi Olatunbosun teaches Automotive Engineering to undergraduate and postgraduate students and through his research on tyre dynamics, vehicle ride and handling and vehicle structural dynamics analysis, he has worked extensively on funded research with UK Automotive OEMs such as Rolls Royce, Ford, Jaguar, LandRover and MG-Rover as well as Tier 1 suppliers such as Dunlop Tyres, TRW, Michelin Tyres, Goodyear Tyres etc.

Teaching

Teaching Programmes

- BEng/MEng, Mechanical Engineering
- BEng/MEng, Mechanical Engineering (Automotive)

Postgraduate supervision

- Simulation of aircraft tyre dynamic characteristics and development of a tyre design system
- A study of tyre structural behaviour and development of an intelligent tyre
- Artificial Road Load Data Generation tool for vehicle durability assessment using artificial intelligence techniques
- A study of the thermo-mechanical properties of disk brakes and generation of brake noise

PhD opportunities

Research

RESEARCH THEMES

Tyre Dynamics, Vehicle ride and handling dynamics, Vehicle durability assessment, Brake noise

RESEARCH ACTIVITY

Tyre Dynamics

Work in this area has spanned over 25 years starting with the commissioning of an electro-hydraulic driven tri-axial tyre test facility in conjunction with digital control and analysis software capable of carrying out automatic testing cycles of tyres. At this time, analytical lumped parameter system models were developed to enable both linear and non-linear modal parameters of vehicle tyres to be determined. Subsequently emphasis changed to the use of analytical techniques, simulation and virtual testing.

This has resulted in the development of Finite Element models of vehicle tyres for the simulation of tyre behaviour and performance. These models can be used in product design verification as they are able to represent the detail design of a tyre. Therefore, the effects of any changes to the design can be simulated by the models.

For example a 2-D model was developed for the mandatory tyre burst test while 3-D models were developed for simulating the tyre forces generated during cornering manoeuvres. These models have been developed in collaboration with the tyre industry through direct grants as well as a TCS grant (in collaboration with Dunlop Aircraft Tyre Ltd).

These series of validated tyre FE models, supported by laboratory testing, form the basis for the development of a tyre design system which is currently on-going with DATL and Airbus, supported by AWM under the Aerospace Technology Exploitation Programme (ATEP). In addition, work is ongoing to integrate sensors into a tyre to study its structural deformation under the action of tyre forces with a view to producing an intelligent tyre with ability to predict tyre/road interface forces for vehicle chassis control systems.

Vehicle Durability Assessment

Initial research in this area involved the development of vehicle durability cycles using remote parameter control, a programme which was funded by a direct grant from MG-Rover over the period 2001 to 2005. This has been followed up with a collaborative study with Jaguar Land Rover (JLR) on the application of artificial intelligence in vehicle development, specifically the development of a Reliability Improvement Expert System (RIES) which can be applied in the early stages of vehicle development to predict the reliability performance of a new vehicle and therefore identify the critical areas into which resources need to be concentrated to improve reliability performance.

The structure of the system also allows lessons learned from previous vehicle programmes to be stored in a manner that makes it easy to access when required so that loss of knowledge is eliminated and Knowledge Transfer is enhanced. Further work on developing an artificial road load data generation tool for vehicle durability assessment has been proposed.

Using artificial intelligence techniques, road load data for new vehicle prototypes will be generated by adaptation of available load history based on changes to vehicle design and configuration even from the early CAD/CAE stages of the vehicle development. It will also provide realistic road load data to drive component and vehicle test rigs as soon as new vehicle prototypes are available thus shortening vehicle development time considerably.

Vehicle Structural Dynamics

The vehicle structural dynamics performance standards which were established by Dr Olatunbosun in the late 1970s are still routinely applied in industry for assessing the vibro-acoustic performance of vehicle structures. Recent work has been targeted at updating the standards and extending the diagnostic application of the standards in the design of better vehicle structures from a vibro-acoustic point of view. A recent study involved the optimisation of the vibro-acoustic package of a low noise light weight vehicle structure by the application of spray-on visco-elastic treatment.

Disc Brakes

A study of the vibrational characteristics of disk brakes has just been initiated with a view to understanding the mechanism of brake noise generation in collaboration with Jaguar/LandRover. The study will include the coupling of the brake system with the dynamics of the vehicle chassis through the flexibility of the tyres, a radical concept in the study of brake instability.

Other activities

- Editorial Board, International Journal of Engineering Simulation
- Editorial Board, International Journal of Vehicle Structures and Systems
- Editorial Board, Scientia Iranica
- External Examiner, MSc Programme in Military Vehicles, Cranfield University (2006-2010)
- Visiting Professor, Dept of Systems Engineering, University of Lagos (2007-2008)
- Scientific Liaison Officer, NSERC Canada (2007-2010)

Publications

- Olatunbosun, O.A, Gauchia, A, Boada, M.J.L and Diaz, V (2011), Dynamic Performance Analysis of a Light Van Body-in-White Structure, **Proceedings of I Mech E, vol 225 (2) Part D, *Journal of Automobile Engineering***, pp167-177 ISSN: 0954-4070 (Print) 2041-2991 (Online)
- Yang, X., Olatunbosun, O.A., Bolarinwa, E.O., (2010), Materials Testing for Finite Element Tire Model. ***SAE Int. J. Mater. Manuf.*** 3(1): 211-220 2010. ISSN: 1946-3979 (Print), 1946-3987 (Online)
- Gauchía, A, Díaz, V, Boada, M.J.L, Boada, B.L. and Olatunbosun, O.A, (2010) Bus Structure Behaviour under Driving Manoeuvring and Evaluation of the Effect of an Active Roll System. (2010), ***Int. J. Vehicle Structures & Systems*, 2(1)**, 14-19, ISSN: 0975-3060 (Print), 0975-3540 (Online).
- Olatunbosun, O.A., Yang, X., Behroozi, M., and Garcia-Pozuelo, D., (2010), Development of an AI-based model to determine vehicle tire design configuration. Paper F2010-C-213, FISITA 2010 World Congress, Budapest, 30th May to 4th June 2010.
- Yang, X, Olatunbosun O.A., & Bolarinwa, E.O. (2009), Generation of tyre cross-sectional geometry for FE tyre model using image processing techniques. ***International Journal of Engineering Simulation*** vol 10 No 1, pp3-10, ISSN 1468-1137.
- Yang X., Olatunbosun, O.A., (2009) 'Optimization of Reinforcement Turn-up Effect on Tire Durability and Operating Characteristics for Racing Tire Design using Finite Element Analysis'. The Tire Society 28th Annual Meeting & Conference, Akron Ohio, September 15-16, 2009., Akron Ohio, September 15-16, 2009.

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- Lolas, S., Olatunbosun, O.A, (2008), Prediction of Vehicle Reliability Performance using Artificial Neural Networks, ***Expert Systems with Applications*** 34 (2008) pp2360-2369. ISSN 0957-4174.
- Nguyen, V.K & Olatunbosun, O.A. (2007), A proposed method for fatigue crack detection and Monitoring using the breathing crack phenomenon and Wavelet analysis. ***Journal of Mechanics of Materials & Structures***, Vol 2, No 3, 2007. pp399-420.
- Nguyen, V.K & Olatunbosun, O.A (2007) 'A method for remote monitoring of structural health based on the nonlinear phenomenon in dynamic response of damaged structures'. Proceedings, World Congress on Engineering (WCE 2007) London, 2007, Paper ICME_40. 6pp.
- Lolas, S, Olatunbosun, O A, Steward, D, Buckingham, J. (2007) 'Fuzzy Logic Knowledge Base Construction for a Reliability Improvement Expert System'. Proceedings, World Congress on Engineering (WCE 2007) London, 2007, Paper ICCIIS_62. 6pp.

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