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Electrifying Challenges for Road and Tyre Noise

**MIRA Technology Institute
18 September 2019**



Road and tyre noise present a significant challenge to vehicle manufacturers, particularly with the electrification of vehicles. This "Electrifying Challenges for Road and Tyre Noise" seminar offers an opportunity to discover and discuss recent novel experimental and analytical methods for understanding and controlling road noise transmission in vehicles, in addition to hearing case studies in the reduction of road noise both at the wheel and body of modern vehicles.

PROVISIONAL PROGRAMME

Engineering an Electric Vehicle for Road Noise - Mark Burnett, HORIBA MIRA

This presentation compares the road noise of an electric vehicle with that of an internal combustion engine vehicle. Experimental methods are used to split the road noise heard by the occupant into structural and airborne contributions from the front and rear axles. The aspects of a vehicle's design that influence road noise are discussed together with the relevance of the architectural differences commonly found on electric vehicles.

Lightweight noise isolation concepts for electric vehicles - Joe Oxenham, Autins

A range of concepts for decoupling solutions has been explored to reduce NVH component weight without degrading acoustic performance. These concepts are particularly relevant for electric vehicle environments where road and tyre noise is more prevalent within the vehicle interior without the masking effect of the combustion engine.

TPA-based road noise assessment method - Andrew McQueen, Siemens

This paper presents the initial validation of the component-based TPA methodology on a tire experimental case in static condition. The source component (the tire) is characterized by a set of blocked forces and combined with the transfer functions of the fully assembled system to allow for response prediction engineering analysis early in the vehicle development phase.

Doughnuts all sound the same so why don't tyres? - Alan Bennetts, Bay Systems

Data is presented that compares laboratory road wheel derived radiated noise, standard pass-by-noise test results and internal tyre cavity noise and vibration levels. The effect of damping foam, applied to the tyre liner, is shown to be identical to the difference between the best and worst tyre.

Combining Finite Elements (FEM), Statistical Energy Analysis (SEA) and Measured Data in a Hybrid Tool for Vibro-Acoustic Simulation - Prof Robin Langley, University of Cambridge and Prof Andy Moorhouse, University of Salford

The paper summarises the results from a government funded research project, EMBED, aimed at extending the capabilities of the hybrid method further by integrating measured data within the FEM/ SEA framework. The main concepts are presented and are illustrated by practical examples.

Virtual replacement of mounts in a vehicle simulator of a Bentley - Dr Andy Elliott, University of Salford and Graham Franks, BKSU.

The paper presents a method for simulating the effect of replacing an elastomeric component on the sound pressure in a vehicle cabin using a block force TPA method. This is validated through numerical models representing a vehicle suspension. The presentation will be accompanied by a practical demonstration of a vehicle simulator incorporating the mount replacement results.

Dynamic Response to Road Excitation and Noise Reduction - Dr Weiji Wang, University of Sussex

Tyred wheel dynamic response to road excitation during rolling has been simulated using finite element modelling in a graphical programming environment. The effectiveness has been demonstrated by the simulation result by increasing the damping in the tyre structure.

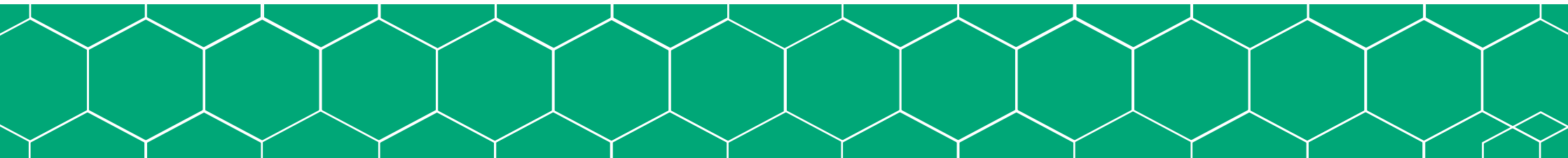
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The **Engineering Integrity Society** is an independent not-for-profit organisation which aims to inspire all engineers, both experienced and newly qualified, across a broad spectrum of technologies. The Society is committed to promoting events and publications, providing a forum for engineers to discuss present industrial needs, new technologies and to stimulate both company and personal development.

MIRA Technology Institute (MTI) is a 24,500 sq. ft. bespoke global centre for skills on the grounds of the MIRA Technology Park, funded through a £9.5m grant from the Leicester and Leicestershire Local Enterprise Partnership (LEEP) Local Growth Fund with contributions from its partners, and is backed by the Department for Business, Energy & Industrial Strategy (BEIS).

MTI delivers specialist skills and qualifications to industry leaders, engineers, technicians and other professionals working, or aspiring to work, in the automotive sector, helping them to develop essential skills that are key to fuelling their career ambitions and their employer's business success. With an ambition to constantly create learning opportunities in the cutting-edge technologies required to develop innovative and inspiring products, MTI's aim is to improve transport in all of its forms for future generations.

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