

Spring 2009

The latest news from DRIVENet & the Sustainable Vehicle Engineering Centre (SVEC)

In this issue:

- ★ Latest news
- ★ DRIVENet website re-designed and launched January 2009
- ★ Ryan Wood reports back from *Airbag 2008 – Sophisticated Car Occupant Safety Systems*, Karlsruhe, Germany
- ★ New publication available in March – World Auto Report by Max Pemberton
- ★ Contact details
- ★ News in brief section

Latest News

DRIVENet Forum, Tuesday, 7th April *'Powertrain and energy sources for future vehicles'*

This event will explore, through a series of presentations, the future of powertrains and energy sources for road vehicles.

Part of the day's highlights will be the opportunity to ride in a **Smart Electric Drive** and to view the Formula Student hybrid car.

Presentations will be given by expert speakers from Arup, BERR, BP, Mercedes Benz and Pemberton Associates, as well as leading members of the Sustainable Vehicle Engineering Centre (SVEC):

- Ideal energy sources and biofuels
- UK Government perspective
- Electrification of personal transport and electric vehicle technology
- Forecasting: the future of the automotive sector in numbers against the background of the current economic challenges.

We look forward to welcoming DRIVENet members and Forum participants to this exciting event.

To register your interest in attending contact roz.smith@brookes.ac.uk or visit the website.



Our team (l-r): Prof Allan Hutchinson, Head of SVEC; Jim Campbell, external consultant; Dr Patricia Winfield, DRIVENet coordinator; Ryan Wood, PhD Student; Ryan McCurdy, PhD student; Max Pemberton, external consultant; Dr Shaun Savage, Research Fellow.

Our Services

DRIVENet aims to provide its members and all interested parties with seminars, reports, consultancy and testing to improve:

Strategy: characterising the future landscape of the automotive industry;

Technology: the future technologies that will enable the production of more sustainable vehicles

Legislation: the present and future legislation that will impact the automotive industry both locally and globally

Products: that meet the needs of emerging markets.

More details can be found on the DRIVENet website www.drivenet.org.uk

Lord Montagu Sustainable Vehicle Engineering Centre

Following the success of DRIVENet, the Sustainable Vehicle Engineering Centre (SVEC) was launched in October 2008. The centre will deal with current and future challenge facing the whole life of the vehicle.

Lord Montagu of Beaulieu, who has long standing association with the motor industry, has agreed to be its patron.

SVEC's current research projects include:

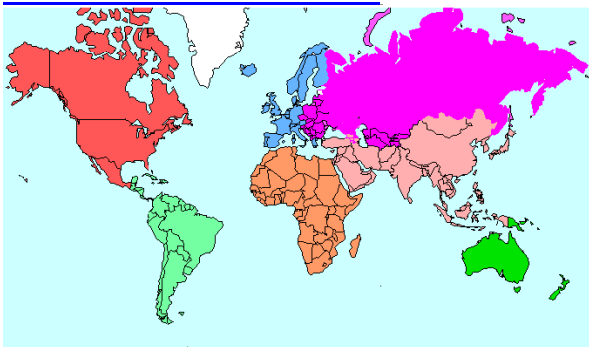
- ★ Disassembly of adhesive bonded joints for repair/end of life
- ★ Safe deployment and disposal of pyrotechnic devices like airbags
- ★ Use of alternative fuels and fuel additives
- ★ Improvements in engine efficiencies
- ★ Li-ion battery recycling

DRIVENet Publications

A new publication, 'World Auto Report – 2008' will be published in spring 2009.

Compiled by Max Pemberton, the report will analyse the growth and market changes and will present an authoritative and reliable picture of the automotive world.

The report will be free to DRIVENet gold members



The 'Whole Life Vehicle Waste Streams – A Global Perspective' publication is still available as a pdf file £50, or printed copy £60 including postage & packing. DRIVENet members receive a 25% discount.
ISBN 978 0 9556254 11

News in brief.....

Dr Patricia Winfield and Dr Shaun Savage have been awarded a grant from Oxford Brookes University to investigate 'The recycling challenge of lithium ion batteries'.

Issues to be examined include the recycling drivers, recycling technology and disposal routes.

Dr Shaun Savage has represented SVEC at the following seminars and conferences:

- Automotive World Briefing "Annual Global Automotive Symposium: Meeting the Challenges of the Credit Crunch 2008"
- The IOM³ "Sustainable Development Group" Seminar
- The SMMT "Low Carbon Vehicles and the future of the internal combustion engine"
- DEFRA / TRL Stakeholder workshop "Mapping the lifecycle environmental impacts, interventions and trade offs for cars"

Contact Shaun for more information about these seminars and conferences.

During January Ryan Wood and other members of the SVEC group visited Autogreen in Daventry to discuss vehicle airbag disposal - best practices and accurate data collection. Joined by Paul Hillier and Mike Dodds they also considered general trends in vehicle disassembly and government legislation pertinent to ELV, battery recovery and ELV scenarios for the next generation of hybrid vehicles.



Prof Allan Hutchinson attended the UKTI Advanced Engineering 09 UK-India Low Carbon Vehicle Workshop at the RBS Williams F1 Conference Centre in Oxfordshire, in early February. He gave a presentation on "Lightweight Materials and Structures" to stimulate discussion. The theme of his presentation was concepts and conflicts with light-weighting of future vehicles. The event ran over two days and was attended by over 100 delegates.

Symposium news

AIRBAG 2008 KONGRESSZENTRUM, KARLSRUHE, GERMANY **SOPHISTICATED CAR OCCUPANT SAFETY SYSTEMS** December 2008

**RYAN WOOD, SVEC,
OXFORD BROOKES UNIVERSITY**

Airbag 2008, the 9th International Symposium and Exhibition on Sophisticated Car Occupant Safety Systems which is held bi-annually at the Karlsruhe Congress Centre, Germany, brought together 700 delegates from vehicle and component manufactures, governmental departments and the research community. Among those attending were representatives from BMW, VW, Bosch and Euro NCAP.



Figure 1. Karlsruhe Congress Centre, Karlsruhe, Germany

The presentations began with a paper from Elmar Frickenstein of BMW entitled '**Upcoming Milestones in Automotive Safety.**' This paper reviewed the history of safety systems with particular focus on BMW products. The speaker indicated that the development of passive safety devices such as airbags and pretensioners is slowing and expected to reach a peak in the near future. Although conception of new devices is slowing, refinement and redesign of existing technologies is expected to dominate the passive safety sector.

The greatest development will occur in the active safety and post crash areas with developments including pedestrian and

pole/tree detection, ESC development and advanced telematics.



Figure 2. BMW Night-vision Camera Detection System

Michael Ryan of Lungershausen and Smith, an international legal firm specialising in auto industry litigation, presented a paper focused upon '**Product Liability Law.**' This presentation emphasised how Europe, and the UK especially, were adopting US style litigation along with punitive damages and 'E' or 'Civil Discovery' which requires the release of all documents by a company including computer and communication records. Mr Ryan demonstrated the huge effects of punitive damages with a case vs. GM that required payment of punitive damages to the tune of \$4,907,000,000 (\$4.9 billion). Product liability is an especially pertinent issue for the occupant safety sector and is likely to cause a tightening of already stringent testing.

'**Challenges of China NCAP**' was presented by Zhao Hang of China Automotive Technology and Research Centre (CATARC). The lecture provided an insight into the development of China New Car Assessment Programme

¹ <http://bmwblog.com/wp-content/uploads/nightvision.jpg>

(NCAP), started in 2006. The presentation demonstrated the differences in situation affecting testing parameters; China sees a slower average vehicle speed, poorer road conditions and over occupied rear seats that all have a bearing upon testing, results and therefore vehicle design. It was conceded that the programme is in its infancy and had some outstanding issues at present which could be assisted by European input.



Figure 3. TRW Exhibition Stand

Michael van Ratingen of Euro NCAP presented '**The changing outlook of Euro NCAP**'. This paper demonstrated the changes affecting new vehicle safety ratings. The new rating system will encompass:

1. Adult Occupant
2. Child Occupant
3. Pedestrian Protection
4. Safety Assist (ESC: yes/no)

Each test section will be weighted to ensure a safety and protection balance. It will now be impossible for a vehicle to attain a five star Euro NCAP rating by 2010 if it is not fitted with Electronic Stability Control (ESC).

A number of issues were raised by delegates regarding the applicability of a YES/NO rating to varying complexity systems such as ESC and the lack of a test concerning rear seat adult occupant safety; these were duly noted by Mr van Ratingen.

²<http://www.ict.fraunhofer.de/EN/VuM/Airbag/index.jsp>

Heiko Kratz of Takata presented '**Shockwave Characterisation, Parameter Studies and Visualization for a Cold Gas Curtain Inflator**'. An informative paper based upon an in-depth analysis of a curtain airbag inflator analysed the shockwave used to open the outlet disc mechanism. To understand the shockwave and how it opens the outlet in under 1.2 ms, Computational Fluid Dynamics (CFD), schlieren photography and speed measurements were taken and analysed.

The presentation by Jochen Neutz of Fraunhofer ICT, although not automotive-based, demonstrated an alternative use for pyrotechnic gas generators. A new composition generator was described and utilised for sheet metal forming. The new generator provided minimal slag and was applied for deep drawing, tested on steel, stainless steel and aluminium of a varying thickness. During testing, generators have been used to punch multiple holes in a component with a flash-free cutting edge. It was suggested that these generators could be used for small and medium scale production where alternative traditional tooling and equipment costs would be high.

2009 will see the start of significant changes to the Euro NCAP rating system, established in 1997, which will undoubtedly affect the way in which occupant safety is approached by vehicle and component manufacturers. With all manufacturers striving for the NCAP 5 star accolade, ESC will become the norm and active safety will further develop throughout the sector. Further emphasis will be placed upon pedestrian and child occupant safety, and therefore overall vehicle occupant and pedestrian safety is set to improve markedly.

The 'Pyrobrake' system currently under development by Volkswagen demonstrates forthcoming innovative developments in the field of automotive safety and the continued uptake of pyrotechnic devices within vehicle safety systems. The system utilises an additional

pyrotechnically-operated piston within the Anti-lock Braking System (ABS) to initiate emergency braking in around 80 milliseconds. The system is designed to operate in an emergency situation to reduce vehicle speed prior to impact.

Vehicle safety continues to develop at a startling pace with consumers, manufacturers and regulators all striving towards a common goal of vehicles safer for both occupants and pedestrians alike. With developments such as the 'Pyrobrake' and BMWs night vision camera system it seems that with vehicle safety anything can be possible.

The Airbag 2000+ series of conferences and exhibitions is set to return again in 2010 and will once again be attended by the SVEC and DRIVENet team.

Details of the Airbag 2008 conference programme and an order form for proceedings can be found at <http://www.ict.fraunhofer.de/EN/VuM/Airbag/index.jsp>

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WLV '09

A major international conference – Whole Life Vehicle - will take place over two days towards the end of November 2009.

The DRIVENet team is currently making preparations towards this event that will include formal papers, an exhibition and partnering workshops.

The technical themes will include forecasting and trends, legislation, design, materials, new vehicle technologies, electric and hybrid vehicles, safety, fuels and additives, re-manufacturing and recycling, repair and maintenance.

Offers of papers and other contributions are welcomed at any time by the DRIVENet team.

Website re-launched

Take a look at the new DRIVENet website www.drivenet.org.uk . The site will be updated with news of forthcoming events and publications.

You will find the details about the new membership benefits, consultancy and research services available.