

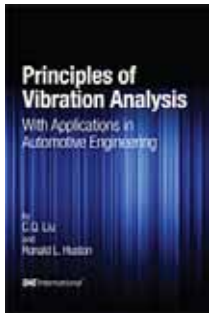
# >AUTOENGINEER

ISSUE 43 SEPTEMBER 2011



- > Ford repositions LPG
- > AutoCRC supporting innovation and productivity
- > Australian International Motor Show goes "green"

# SAE-A Publications Order Service



## **Principles of Vibration Analysis with Applications in Automotive Engineering** by Ronald L. Huston, C. Q. Liu

Published January 2011

Order No. R-395 > List \$141.00 > SAE-A member \$126.90 > SAE joint member \$112.80

Written for practicing engineers, designers, researchers, and students, this book summarises basic vibration theory and established methods for analysing vibrations. It goes beyond most other texts on this subject, as it integrates the advances of modern modal analysis, experimental testing, and numerical analysis with fundamental theory. No other book brings all of these topics together under one cover. The authors have compiled these topics, compared them, and provided experience with practical application. This must-have book is a comprehensive resource that the practitioner will reference time and again.



## **Semi-Active Suspension Control Design for Vehicles** By Sergio Matteo Savaresi, Charles Poussot-Vassal, Luc Dugard, Oliver Sename, Cristiano Spelta

Published August 2010

Order No. B-888 > List \$141.00 > SAE-A member and joint member \$126.90

Semi-active suspension systems promise weight efficiencies, cost savings, and higher safety and comfort compared to other types of electronically controlled suspensions currently in use. With the growing emphasis on fuel economy, reduced CO2 emissions, and cost reductions for all vehicles, these semi-active systems are set to become a growing part of vehicle design, but coverage of them in standard automotive engineering texts is currently limited.

This book is comprehensive overview of semi-active suspension systems, with an emphasis on performance analysis and control design. Several different approaches using different control theories are presented and evaluated in the book, with methodology provided to analyse and evaluate suspension performances while identifying optimal performance bounds.

Intended as an application-oriented reference for automotive engineers, a tutorial resource for students in automotive systems and a control design-oriented text for researchers, this book presents an authoritative account of this critical vehicle dynamics topic based on the extensive academic and industrial research of this expert author team.

Topics include Technologies and Models, Methodology for Analysis, Optimal Strategy, Classical Control, and Mixed SH-ADD Semi-Active Control.



## **Japan and the Global Automotive Industry** By Koichi Shimokawa

Published June 2010

Order No. B-892 > List \$135.00 > SAE-A member and joint member \$108.00

The Japanese automotive industry enjoyed spectacular success in the 1980s. This was largely due to the so-called "Lean Production System" – the combination of efficient production and effective supplier and product development systems.

In the 1990s, the industry fell on hard times because of the Japanese asset price bubble and extreme currency appreciation. In this book industry specialist Koichi Shimokawa draws on his thirty years of research and fieldwork with Japanese and American firms, to show how the Japanese automotive industry has managed to recover from this difficult period. Using data and source material previously unavailable to the English-speaking world, he shows how firms like Toyota were able to change to compete in increasingly globalised markets.

In addition, the book addresses the two major challenges to the current industry model: the rise of China, and the environmental and energy supply situation.

> Prices include GST > Add \$16.50 postage to order. > A credit card fee on total order amount of 2% for MasterCard/Visa and 3% for Amex will apply. > Enquiries to Rose De Amicis on Tue/Wed/Fri

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*On the cover: Toyota Australia will produce seventh generation Camry models at its Melbourne plant, including a unique Australian version - the Camry Atara. (See News in Brief page 4.)*

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## Nexteer invests in next generation technologies

> Victorian automotive supplier Nexteer Australia will invest more than \$120 million dollars in new technology and capital equipment to manufacture an innovative electric steering system, which will create 250 direct jobs.

The funds include \$63 million in Commonwealth assistance over three years from the Government's Green Car Innovation Fund and additional funding from the Victorian Government, with the balance contributed by Nexteer.

Federal Innovation Minister Senator Kim Carr said the project represented a major investment by a large global company in Australia's automotive supply chain and brought new manufacturing capability here for the long term. Victorian Minister for Manufacturing, Exports and Trade Richard Dalla-Riva said the investment was a strong vote of confidence in Victorian manufacturing.



*Pictured at the Nexteer investment announcement were (from left) Victorian Minister for Manufacturing, Exports and Trade, Richard Dalla-Riva, Nexteer Australia Managing Director Greg Malone and Federal Member for Calwell, Maria Vamvakinou.*

Nexteer technologies involve electric power steering systems, and lightweight steering column and drive line components – significantly reducing greenhouse gas emissions and fuel consumption. This technology will be supported by a new Melbourne Manufacturing Technical Centre.

## Saab seeks court protection from creditors

> Swedish Automobile, the troubled producer of Saab vehicles, is seeking protection from creditors in a Swedish district court. Saab is seeking court approval for voluntary reorganisation to secure short term stability while it waits for 70 million Euros bridging funding from Chinese investors Pang Da Automobile Trade Co. and Youngman. In the meantime, two white collar unions have filed a court petition to have the business placed in bankruptcy as they pursue back pay.

## 2011 Events Calendar

> This events calendar, which is correct at the time of publishing, is provided as a service to help you plan your diary, and includes:

- SAE-A events for members and non-members. For information T: 03 9696 5190 or visit [www.sae-a.com.au](http://www.sae-a.com.au)
- FAPM events for members. For information T: 03 9863 2401 or visit [www.fapm.com.au](http://www.fapm.com.au)
- AutoCRC events. For information T: 03 9948 0458 or visit [www.autocrc.com](http://www.autocrc.com)
- ITS Australia events. For information see below or visit [www.its-australia.com.au](http://www.its-australia.com.au)

### September

20 - 22	ITS Australia	National ITS Summit, Gold Coast, T: 03 3255 1002 <a href="http://www.itssummit.com">www.itssummit.com</a>
20	Deakin University	Second International Clean Vehicle Conference, Geelong <a href="http://www.deakin.edu.au/scitech/eng/icvc/icvc.php">www.deakin.edu.au/scitech/eng/icvc/icvc.php</a>
21	FAPM	Executive Council Meeting

### October

16	ITS Australia	18th ITS World Congress, Orlando, USA, T: 03 9646 6466
19	SAE-A	Latest Developments in Petrol, Diesel and LPG technology

### November

4	FAPM	Southern Region Annual Dinner
7	SAE-A	Plug in 4 Power with AutoCRC and Swinburne University
15	FAPM	Central Region Meeting (Christmas Drinks)
16	FAPM	Northern Region Meeting
30	FAPM	Executive Council Meeting Annual General Meeting
30	FAPM	Southern Region End of Year Dinner

### December

15 -18	SAE-A	Formula SAE-A
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## Vehicle sales up in August

> New motor vehicle sales rose significantly in August 2011 compared with the same month last year, according to official figures released today by the FCAI. During August 88,082 new vehicles were sold, which is an increase of 7.3% (or 5,960 vehicles) over August 2010.

The FCAI said these positive figures are good news for the automotive industry and put the industry on track to achieve the one million sales target for 2011. Among the reasons for the increase are new model launches, recovery of supply following the earthquake and tsunami damage to Japan's industry and recovery of sales in flood damaged Queensland.

While sales of Holden's locally manufactured vehicles were up 55% month-on-month, reflecting strong demand for the company's Commodore and Cruze models, Toyota was the best selling brand in August, selling 15,885 vehicles for an 18% market share, followed by Holden with 11,534 (13.1%) and Mazda with 9138 sales (10.4% market share).

Mazda3 was the best selling single model in August, with 4234 reported sales. Holden's Commodore and Cruze models placed second and third with 3682 and 3234 sales, followed by Toyota Corolla (3100) and Toyota HiLux (2823). Private and business customers continue their move to compact SUVs and 4x4 utility vehicles, with respective sales growing 4.9% and 6.7% year-to-date and Luxury SUV segment also continues to strengthen, up 18.9% year-to-date.

Despite these encouraging figures, year-to-date new vehicle sales are still trailing 2010 levels by some 4.4%, or 30,357 vehicles.



*Top selling model in August was the Mazda3.*

### Vehicle production volumes

	2011	2010
January	12,445	13,086
February	18,600	23,047
March	20,155	25,738
April	16,336	20,239
May	17,898	23,559
June	21,780	21,794
July	20,413	18,558
August	24,564	20,088*
September		21,364
October		19,369
November		19,594
December		13,007
Total	152,191*	239,443

\* 2010 production to August was 166,109 vehicles.

## ITS Australia CEO appointment

> Intelligent Transport Systems Australia has appointed transport and logistics executive Susan Harris as Chief Executive Officer. Intelligent Transport Systems Australia (ITS Australia) is the national organisation focused on facilitating the development and deployment of advanced technologies across all modes of transport - air, sea, road and rail - to improve safety and productivity.



*New Intelligent Transport Systems Australia Chief Executive Officer Susan Harris.*

Susan Harris brings 20 years' experience across the transport and supply chain sectors to the role. She has

worked in strategy development and delivered national and international projects involving ITS technologies.

### Australian 2011 ITS Summit

Among her first tasks is to help deliver the second Australian Intelligent Transport Systems Summit, to be held 20 to 22 September 2011 at the Queensland Gold Coast. Featuring more than 60 Australian and international speakers, the Summit theme Strategy into Action will address traffic congestion and management; tolling and pricing; bus, rail and tram public transport; freight management, heavy vehicle driver fatigue and electronic work diary systems; ITS standards, and the need for an holistic ITS business architecture approach to systems deployment. For Summit program and registration enquiries, contact +61 (0)7 3255 1002, or visit [www.itssummit.com](http://www.itssummit.com).

## FCAI appoints Chief Executive

> Ian Chalmers has been appointed chief executive of the Federal Chamber of Automotive Industries. He has a strong background in both corporate and government roles and was formerly the Chief Executive of Medicines Australia, the national industry association representing research based Australian and International pharmaceutical companies. Previously, he was Chief Executive of the Australian Local Government Association and the Australian Private Hospitals Association and served on the board of an ASX-listed bio-tech company and the ACT Asthma Foundation.

Ian Chalmers' appointment follows the resignation of former FCAI chief executive Andrew McKellar in July. Steve Payne acted as chief executive during the search process.

## Toyota unveils seventh-generation Camry

> Australia was part of the global reveal of the seventh-generation Camry in August. The Australian Camry range will feature a unique model variant named Atara, which has its own lower-body design and mesh upper grille section. Every exterior body panel on Camry is new. The design and engineering of the new model allow a more spacious interior, improved driving dynamics and an even quieter ride. A new 2.5-litre four-cylinder petrol engine delivers more responsive performance and better fuel economy.

An investment of about \$300 million will be made to build the new engine line. This new engine boosts Camry's power by more than 10% cent and lifts torque by more than 5% - including solid gains in the mid range. Camry will now be fitted with a six-speed automatic transmission - replacing the current generation's five-speed.

Camry and Atara sedans for the Australian market will be built at the Altona manufacturing plant near Melbourne and all new Camry models will be equipped with stability control, traction control, anti-skid brakes, brake assist and electronic brake-force distribution. Toyota Australia expects the car to achieve a five-star ANCAP rating.

The new Camry range, including Atara, is expected in Australian dealerships in late November. A new Camry Hybrid, also built in Australia, will be released in the first quarter of 2012.



*The Atara name used for the new Australian Camry has two origins: it is a Hebrew word for "crown" - which is a natural extension of Camry, which also means crown, and a derivation of the Japanese word "atarashii", which means "new".*

## New AAA Executive Director appointed

> Former FCAI Chief Executive Andrew McKellar has been appointed as the new Executive Director of the Australian Automobile Association (AAA). AAA President Raymond Grigg welcomed the appointment, saying it would lift the AAA's performance to new levels and increase its profile and role in representing motorists' interests to government and stakeholders.

In addition to his former FCAI role, Andrew McKellar has wide experience in public policy both in Government and as an advocate. He has held positions working for federal ministers, and in the private sector.

## R&D tax credit legislation

> Parliament has passed new R&D Tax Credit legislation which Innovation Minister Senator Kim Carr said will effectively double the support for small firms to 15 cents in the dollar and increases support for larger companies by a third, to 10 cents in the dollar.

The legislation is retrospective starting at 1 July 2011. The two core components of the Tax Credit are a 45% refundable R&D Tax Credit for small firms with turnover of less than \$20 million and a 40% non-refundable R&D Tax Credit for all other companies.

## General Motors to cut vehicle platforms

> General Motors has announced plans to reduce the number of vehicle platforms it uses globally by more than half over the next decade, in a bid to reduce complexity and product-development costs. Speaking to international analysts and media, GM CEO Dan Akerson said more of GM components will be common and more vehicles will be on global architectures.

The plan is to reduce the number of vehicle architectures, or the platform of parts and subcomponents that underpin

cars and trucks, from 30 in 2010 to 14 in 2018. These core architectures will account for 90% of GM's volume by 2018, up from 31% in 2010.

The company also aims to cut its engine platforms, from nearly 20 in 2009 to fewer than a dozen in 2018 and around 10 eventually. For example, a new, small gasoline engine platform, ranging from 1.0 to 1.5 litres, will be used globally and replace engines that now are on three separate engine platforms.

## Australia's world competitiveness slips

> Australia has fallen from 16th place to be ranked 20th out of 142 countries in the World Economic Forum's (WEF) 2011-12 Global Competitiveness Index (GCI) rankings. Australian Industry Group Chief Executive Heather Ridout said the drop in Australia's competitiveness ranking was partly due to other countries moving faster than Australia and Australia lagging behind the top performers of the GCI on key issues such as innovation (22nd) and labour market efficiency (13th), critical drivers of competitiveness for advanced economies.

"Our most highly rated advantage is our efficient financial system (6th), supported by a banking sector that counts among the most stable and sound in the world, ranked 4th. It is also pleasing to see us taking number 11 position in both the health and education areas," said Heather Ridout.

"Australia's macroeconomic situation is considered satisfactory by the World Economic Forum in the current context (26th), especially when considering the difficulties many other economies face in this area. However, as in previous years, we have made little progress on improving our infrastructure rating, which is down from 22nd to 24th position.

"This is another wake up call for Australia. We cannot be complacent about our performance in key areas such as innovation and we cannot ignore the need to continue to improve our labour market efficiency," Heather Ridout said.

Australian Industry Group is a Partner Institute of the World Economic Forum's Global Competitiveness Program and is responsible for carrying out the Forum's Executive Opinion Survey in Australia. The full Global Competitiveness Report 2011-2012 is at [www.weforum.org/gcr](http://www.weforum.org/gcr).

## Ateco claims on Chery J1 incorrect

> The Australasian New Car Assessment Program (ANCAP) expressed concerns over incorrect public comments made by ATECO Automotive regarding the recall of and modifications to the Chery J1 sedan. ANCAP tested this vehicle in May 2011 and assessed it as a 3-star safety rated vehicle.

ANCAP Chair, Lauchlan McIntosh, said ATECO has made claims that certain modifications would "almost certainly get a 4-star rating" if the vehicle was tested again. "We were surprised to hear ATECO's spokesman comment in the media that the modifications would now see the Chery J1 almost certainly get a 4-star rating if crash tested again," said Lauchlan McIntosh. "These comments are clearly incorrect, as the modifications would not impact the overall crash test result, and the ATECO engineering staff should be aware of this. The Chery J1 performed poorly in the crash tests - the



An ANCAP photograph of the Chery crash test.

passenger compartment lost structural integrity in the frontal impact test, providing limited protection from serious chest injury for the driver," he said.

Details of the ANCAP test and assessment can be found on the ANCAP data sheet at [www.ancap.com.au/pdf/398.PDF](http://www.ancap.com.au/pdf/398.PDF).

# Fuels and electric vehicles - the drive train debate continues

By Max Chanter, SAE-A Executive Director



**We are three quarters of the way through 2011, which has presented major financial problems for many countries. In Australia, we are surviving the crises confronting world economies, but our manufacturing and retail industries are suffering. Thousands of Australian manufacturing and retail workers have lost their jobs and predictions are that many more will be unemployed by the end of the year. This is of great concern to SAE-A for the sustainability of the Australian automobile industry.**

Another issue confronting many of our mechanical and crash repair members was the subject of a national conference in Melbourne on 6 September. This conference was in response to a Federal Government inquiry into data sharing between vehicle manufacturers and the independent aftermarket.

The debate about access to technical information relating to the repair of late model vehicles was robust with all sectors of the industry represented. However, there was almost universal agreement that the body repair sector needs to have access to essential information to safely and successfully reinstate damaged vehicles to pre-accident condition. The Australian Motor Industry Federation pledged to commence discussions with the Federal Chamber of Automotive Industries to resolve some key issues and the outcome of this Conference will be submitted to the inquiry. Submissions are due by 23 September.

In the face of these challenges, SAE-A continues to look forward. Our cooperation with other organisations to broaden the scope of our activities and improve our operating methods is building. We are working with a committee comprising representatives from AutoCRC, Society of Plastics Engineers and Low Emission Vehicles on an event to be held during Grand Prix Week in March 2012. This committee aims to present a conference with universal appeal and high level presentations to make it a "must attend event".

SAE-A is also producing a conference on the latest developments in petrol, diesel and LPG technology to be held in Melbourne on 19 October. It will showcase the enormous development in automotive fuels to reduce consumption and carbon emissions. The next major event will be "Plug in 4 Power" on 7 November. This is an electric vehicle conference being held in conjunction with Swinburne University and AutoCRC, another good industry collaboration.

These two events round out a year of varied activities covering a wide range of topics - vehicle light weighting, technical accident reconstruction, manufacturing, engine emissions, innovation management and the Change by Design conferences and Automotive Excellence Awards and Networking Dinner, which bring together people from all sectors of our industry.

## Formula SAE-A - a formula for career success

Our premier educational event Formula SAE-A will be held from 15 to 18 December 2011. Formula SAE-A is a project which takes students in their final year of Engineering at University, on an "educational journey" to prepare them for entry into the business world. It has attracted 28 entries from Australia and



*Tim Olding of EV Engineering presented at the SAE-A international Change by Design Conference.*

internationally for competition at Victoria University at Werribee. This is the largest number of entries for many years and will stretch the Society's resources. If you want to see some of the latest technology on display, please join us as a volunteer for this exciting event.

On a more sombre note I must mention the difficulties confronting the Society. Indications are that the future for many "not for profit" organisations, particularly in the automotive industry, is bleak. SAE-A membership numbers are slowly being eroded by company takeovers and closures, and by redundancies, retirements, or engineers leaving the automotive industry for other occupations. As we have noted, all Australian manufacturing is being impacted by the high value of the dollar and constant pressure of globalisation.

SAE-A has worked hard to provide services appropriate to the time and relevant to the advancing technologies. We have tried to keep membership fees and charges for our events reasonable - often lower than many other organisations. But event attendance is down 50% compared to previous years. This heavy impact on Society finances has been closely monitored and we can expect a new approach will be required.

# Automotive embraces electronics

By Patrick Ross, SAE-A President



**The need for fundamental change in SAE-A reflects the revolution in our industry. Much has been said about the “electrification” of the motor car - indeed, this issue of Autoengineer carries much news about “EVs”. While a fully electric vehicle fleet may not be an immediate reality, it remains an inevitable future, with on-going evolutionary steps.**

Much has also been said about the environmental benefits and the technologies required by electric vehicles, SAE-A considers it appropriate to focus on the implications for the industry and the automotive engineering profession.

In the fully electric vehicle of the future, the design and manufacture of the power train will shift from being traditionally in-house to being more externally sourced. It will also follow that there will be a shift in priority for vehicle manufacturers. Where engines have often been a key differentiator for their vehicles, electric motor will tend to become a commodity.

The electric vehicle of the future will be part of a more intelligent and integrated transport system. As the ease of driving these future vehicles increases, the drivers' and passengers' expectations will change. These vehicles will become an extension of their lifestyle, such that infotainment and customisation becomes a priority, much as the mobile phone has moved from being a basic communication tool to the lifestyle enhancer it is becoming. We can expect there to be a growing trend towards broader integration of technologies in vehicles, from a wider range of supply chains, many of which are not traditional participants in our industry.

Automotive engineering has so far evolved from being predominantly the domain of mechanical engineers, towards embracing electronic engineers in its core. It has also acknowledged niche professions, such as material engineers, chemical engineers as well as industrial designers. The vehicle of the future will require a complete scope of technical and technological competencies, as well as integration of other service functions ranging from telecommunications to urban planning.

## Preparing SAE-A for an “electric” future

The SAE-A must start preparing for this undeniable change now, by reviewing our membership criteria to ensure that we can best represent the automotive industry engineering professionals of the future.

Similar trends are expected in the automotive trades. Already many industry experts are predicting a reduction in accident damage due to intelligent transport systems technologies, such as traffic management infrastructure, collision avoidance, parking assistance, and others. Electrification of power trains will see a further step increase in reliability and consequently a reduction in need for vehicle maintenance.

An increased focus on environmental sustainability will drive a reduced demand for consumables, as waste disposal becomes more and more challenging and costly. The broader technological scope of these new vehicle functionalities and their fuller integration into the vehicle infrastructure will drive more sophisticated, and ultimately more automated, diagnostic requirements.

It is not inconceivable that a significant proportion of vehicle problems and malfunctions could be rectified on line. That is, without the vehicle needing to be in a repair shop or service centre. Early indicators of these trends are already evident in the automotive industry, and are becoming far more common place in consumer products.

More than ever, we need to acknowledge this future by expanding our membership to include this additional portfolio of trade skills.

These changes in vehicle architecture will drive corresponding changes in the business models of our industry. There are undeniable opportunities for the local industry, which are so far not being adequately leveraged.

The need for design and component manufacture to be co-located with vehicle producers is not now as high. In particular, design tools and technologies have advanced to the stage where electronic data exchange is a mandatory pre-requisite, and far more important than the traditional “face to face” exchanges between members of a design team.

In a recent media interview, we again raised our vision of an Automotive Centre of Competence in Australia, to service the needs of global customers. The core competency in vehicle design is an invaluable national intellectual asset, which needs to be more aggressively exploited.

SAE-A is concerned by recent trends where our best automotive talent is going off-shore to find employment, or

is simply leaving the industry. This talent must be retained locally, hence our challenge to local and federal authorities to establish an automotive "Silicon Valley" in Australia. While there is debate about the decline of manufacturing, the more rapid decline in local R & D is hardly getting noticed.

SAE-A believes that Australia's competitive advantage in vehicle and component design can result in sustaining manufacturing in Australia, but only if priority is given to establishing sustainable business models for delivering automotive innovation from Australia to the world.

The current policies linking R & D directly to manufacturing volume are no longer sustainable. There are some strong views that subsidies have been paid for R & D activities based on local manufacturing turnover, yet these did not guarantee long term manufacturing. Others have also expressed concern that many corporations have "grabbed the R & D dollars" and created value for their off-shore entities.

The emotive aspects of these views are understandable, especially when significant manufacturing job losses are an outcome. But the undeniable fact is that local R & D is competitive, otherwise it would never have been considered. It remains not only a differentiator, but a major success factor for the Australian automotive industry. Therefore, SAE-A strongly suggests that future state and federal policies should focus on innovation, and make R & D funding the priority, albeit contingent on on-going manufacturing commitment.

#### **A new way to reach members**

In my editorial in the July issue, I took the opportunity to highlight the many challenges we all face in maintaining a viable Society. In particular, I highlighted the ongoing concern

of dwindling attendances at our events, as well as the trend in reducing membership.

Since then, SAE-A has held a number of events, including Change by Design and the Automotive Engineering Excellence Awards, which we convened as part of Australian Automotive Week in Melbourne. Most recently we held a conference in partnership with Monash University on the theme of Innovation Management: Leveraging Innovation.

In all of these cases, we were universally praised by attendees and stakeholders alike for holding outstanding events, both in format and content. Yet we were generally underwhelmed by at best very average attendances. As well, we were able to gain significant coverage in the press as a result of the content of these events, further raising the profile of our society. SAE-A has recently been invited to participate in a formal review for a University course, which is further evidence of our recognition as a professional body.

But clearly, this is not translating to capacity attendances at events, or in increased membership. The SAE-A is not alone among professional associations experiencing these challenges. However, this has led the Board to conclude that we must fundamentally change the way we reach you, our members. A key enabler is a change in leadership of the Society, and we will deliver on this in the coming weeks, as we have recognised that the status quo is unacceptable.

Once again, I invite any member wishing to contribute to the Society to contact me [president@sae-a.com.au](mailto:president@sae-a.com.au), or anyone on the Board of Directors, as we need more of your talents and energy!

### **Coming SAE-A events:**

## ***Latest Developments in Petrol, Diesel and LPG Technology Conference***

**4.00pm to 7.30pm 19 October 2011**

## ***Plug-in-4-Power***

**7 November 2011**

Electric Vehicle Technology Update with AutoCRC and Swinburne University

Contact: Michela Bartels E: [mbartels@sae-a.com.au](mailto:mbartels@sae-a.com.au) T: 03 9696 5190

## Five minutes with > Mark Morarty



**What is your title / what organisation do you work for? >** I am a Project Manager in the Purchasing Division of Toyota Motor Corporation Australia Ltd. My section is the Supplier Risk group.

**Describe the work you do >** My work

focuses on strategies to ensure continuing supply of component parts to our Altona Manufacturing Facility producing Camry and Aurion Models. Suppliers often require support, either in times of short term business disruption (e.g. natural disasters, equipment failures, associated/critical supplier issues), or when they are embarking on longer term business changes (e.g. acquisitions, mergers, change to business model, etc).

**What do you enjoy the most about the automotive industry? >** Being involved in a large team of people who bring their various skills and aptitudes together to produce a range of high quality, reliable vehicles that satisfy customer expectations.

**What has been the most rewarding aspect of your career? >** Two events stand out: Firstly, going to

Japan in 1981 (the "frontier" days), where I was the first overseas engineer given special training at Toyota. This led to responsibility for evaluation of exhaust emission performance of new models during the development and quality confirmation stages - a task previously done by Japanese engineers assigned to Australia. Secondly, developing environmental test standards in the 1980s for Australian Toyota products to ensure our unique environmental factors were modelled during vehicle test and validation phases.

**What has your association with SAE-A given you?**

> My association has been primarily through Formula SAE. Since the first Australian event, I've been involved on the Consortium Organising Committee as the Toyota representative, and have had a judging or coordinating role in the Design event every year. I've had the pleasure of working with many interesting industry personalities and peers. I believe the students participating have greatly accelerated their professional development and capabilities through involvement in Formula.

**What are your leisure time interests? >** I'm building a Roaring Forties GT40 Replica (when time permits) and have a strong interest in aircraft (propeller driven more so than jet powered). Motor sport has always been a passion, but my interest thins out when it comes to current F1.



Australian Government

Department of Infrastructure  
and Transport

### Working for the Department of Infrastructure & Transport

The Vehicle Safety Standards Branch administers the *Motor Vehicle Standards Act 1989*, and Motor Vehicle Standards Regulations 1989 that set the framework for the technical regulation of road vehicles to the point where they are first supplied to the market in Australia. The Branch's responsibilities include:

- the international harmonisation of vehicle standards;
- development of new and amended Australian Design Rules (ADRs) through participation in international forums and the conduct of research activities;
- vehicle certification;
- processing of applications for vehicle import approval; and
- conformity of production audits on vehicle manufacturers.



We are looking for suitably qualified people to join us as Vehicle Safety Standards Inspectors (VSSIs) in senior and junior positions. We have several positions to fill and we need candidates that are able to work in a team environment with a strong client focus. Team members are expected to have an awareness of the APS Values and the Code of Conduct, and be able to apply these principles to their work. For more information and to apply, please visit our website <http://www.infrastructure.gov.au/department/careers/index.aspx>.

AG52242

## Introducing your Board of Directors



**In this issue we welcome Ray Beekman . . .**

**Qualifications >**

Automotive Engineer.

**Job Title >** Automotive Consultant.

**What do you most enjoy about the automotive industry?**

> Every part of this diverse industry and meeting people involved in it.

**What has been the most challenging/rewarding aspect of your career? >** Seeing apprentices completing their trade and eventually having their own businesses.

**What do you hope to bring to the SAE-A as a member of the Board of Directors? >** I look forward to being able to share my Industry knowledge with members and make SAE-A better known within the industry, and to supporting the training and encouragement of apprentices.

**What are your leisure time interests? >** Boating and sport in general, and my family and grandchildren.

## Vale Reginald Fulford - 1929 - 2011

Family, friends and colleagues farewelled former General Motors Holdens, BMC Australia, Leyland Australia, Commonwealth Aircraft Corporation and AWA engineer Reg Fulford in August. He joined GM in 1949 and was the youngest engineer to attend the GM training program in the USA, where he lived for two years.

## Membership Update

### New Members

First Name	Last Name	State	Member Grade				
Samuil	Acar	VIC	Student	Russell	Lamattina	VIC	Student
Natalie	Ajay	VIC	Student	Hao	Li	VIC	Student
Tristan	Alexander	VIC	Student	James	Lim	WA	Student
Simon	Anderson	VIC	Student	Jason	Lobsey	NSW	Student Award
Grant	Armstrong	NSW	Student Award	Brad	Lockett	SA	Student
Alex	Ayres	WA	Student	Zhao	Lu	SA	Student
Long	Bach	VIC	Student	Brian	Maddocks	SA	Student
Alexander	Barry	WA	Student	Harry	Marlow	SA	Student
Andrew	Bligh	NSW	Student	Eloise	Matthews	SA	Student
Bradley	Boundy	NSW	Student	Christopher	Micozzi	VIC	Student
Aaron	Brighton	VIC	Student	Clint	Mingoven	NSW	Student Award
Hashan	Caldera	VIC	Student	Varun	Nair	VIC	Student
Dwayne	Carins	VIC	Student	Mampe	Nakatsuji	New Zealand	Student
Rowan	Carter	VIC	Member	Oliver	Nam	VIC	Student
Jamie	Chaisty	WA	Student	Chung	Ng	VIC	Student
Nazar	Chapdjian	VIC	Associate Member -T	Jacky	Ngo	VIC	Student
Jennifer	Chau	New Zealand	Student	Bradley	Orchard	WA	Student
Kenny	Cheung	New Zealand	Student	Anthony	Papageorglou	SA	Student
Terence	Chong	NSW	Student	Westly	Partridge	WA	Student
Ashley	Christofelsz	VIC	Associate Member -T	Alexandra	Payne-Billard	VIC	Student
Ian	Craig	NSW	Student	Benjamin	Penna	WA	Student
Matthew	Crook	ACT	Student	Meg	Pethybridge	VIC	Student
Andrew	Davies	VIC	Student	Patrick	Phillips	VIC	Student
Todd	Dempsey	NSW	Student	Nathan	Pong	VIC	Student
Alexander	Denney	NSW	Student Award	Razlyn	Razak	VIC	Student
Kaustubh	Dongre	NSW	Student	Heather	Reynolds	NSW	Student
Nicholas	Doohan	WA	Student	John	Robertson	SA	Student
Malcolm	Finch	New Zealand	Student	Nicholas	Robins	VIC	Student
Joshua	Florence	NSW	Student	Fereidoun	Samghabadi	NSW	Member
Brett	Fox	NSW	Student Award	Matthew	Sendi	SA	Student
Brandon	Francis	SA	Student	Stephen	Shalders	VIC	Student
Chunyun	Fu	VIC	Student	Thomas	Sheaves	QLD	Student
Robert	Gell	SA	Associate Member	Ahmed	Talaat	VIC	Member
Rory	Gilbert	SA	Student	Kah	Tan	VIC	Student
Matthew	Greenslade	New Zealand	Student	Nicholas	Taylor	VIC	Student
Alex	Griffiths	SA	Student	Peter	Tilden	NSW	Student
James	Grygiel	NSW	Associate Member	Peter	Timmings	WA	Associate Member
William	Hagan	QLD	Student	Stephanie	Todd	NSW	Student
Ben	Hayward	VIC	Student	Madeleine	Tonkin	SA	Student
Mohd	Hazwan	VIC	Student	Harold	Van Breen	VIC	Associate Member -T
Alexander	Hermann	SA	Student	Samuel	Vonax	VIC	Student
Kyle	Hickling	VIC	Student	Thomas	Wettenhall	NSW	Student
Wisam	Homaisi	NSW	Student	Kanishka	Wimalasuriya	VIC	Student
Ian	Hooper	WA	Student	Timothy	Winter	SA	Student
Kelsie	Hughes	QLD	Student	Andrew	Yang	VIC	Student
Glen	Humphries	SA	Student	Clare	Young	NSW	Student
Geoffrey	Hung	NSW	Student	Danny	Yu	VIC	Student
David	Huynh	NSW	Student	Caterina	Zanier	NSW	Student
William	Huynh	VIC	Student				
Richard	Jamie	NSW	Student				
Chitvan	Jindal	New Zealand	Student				
Pawel	Kedziarski	WA	Student				
Ankit	Khoba	NSW	Student				
Daniel	Kotz	SA	Student				
Kwan Wai	Ku	SA	Student				
Mustafa	Kunduraci	VIC	Associate Member				

### Upgrades

First Name	Last Name	State	Past Grade	New Grade
Peter	Lambrides	QLD	Student	Associate Member
Stephen	Shean	NSW	Associate Member	Member
Abhay	Verma	VIC	Student	Associate Member

# Ford repositions LPG

At the recent SAE-A Road Transport Engine Emission course, Ford engineers Pritika Maharaj and Simon Flint presented the technology behind the new Ford Falcon EcoLPi (Liquid Phase injection) engine. This review of their presentation is by fuels and emissions scholar Prof Harry Watson of the University of Melbourne, a former SAE-A President and current Vice President.



**Australia has the third largest number of LPG cars after Korea and Italy. It has the second largest number of LPG refueling stations - Germany has most. As the owner of the first dedicated LPG Ford Falcon sold, I know you can drive anywhere in Australia and get a tank refill, provided you start to look for refueling with more than a 25% full tank.**

As far back as the 1980s in the wake of the oil price shocks (twice OPEC put the price up three times), it was a goal of the LPG providers to capture 10% of the petrol market. Nissan was encouraged to market an LPG Datsun 180. They sold half the fleet of 1000 cars to governments and lost \$2 million on the remainder.

Is it this sort of market failure that has made manufacturer's wary of directly entering the LPG market? Only Ford has produced a dedicated LPG power train, although there have been several instances of the emergence of mono-fuel competitors as evidenced by data in the Green Car Guide.

The lack of market penetration lies in the market itself. Apart from a few "early adopters" of new technology, few private purchasers, and especially not fleet buyers, are willing to invest more in a new vehicle with down graded

performance, increased cost and possibly reduced resale value. This is even with the Government rebate on LPG purchases, when the pay-back time for LPG at half the price of petrol, is ten months and usually more if the car is driven less than the average new car.

In an SAE-A study we did for the Commonwealth some time ago, only just over 15% of businesses would take advantage of LPG's financial benefit in a three year time horizon. "Not a big enough difference", or "too risky" were some of the responses from those interviewed.

## Falcon EcoLPi delivers more for less

Against this background what does the new Falcon EcoLPi offer?

In fact, with 198 kW of power at 5000 rpm and 409 Nm of torque at 3250 rpm, the latest LPG Falcon significantly exceeds the standard petrol engine's 195kW and 391Nm outputs on 91 RON unleaded. This represents a 27% improvement in power and a 10% gain in torque compared to the vapour mixer / carburetor system employed by the previous Falcon E-Gas engine, which delivered 156kW and 371Nm.

With a compression ratio of 12 and lots of engine management system recalibration, aided by the upgrade from a four-speed to a six-speed (now ZF) automatic gearbox, fuel consumption of the EcoLPi equipped XT is

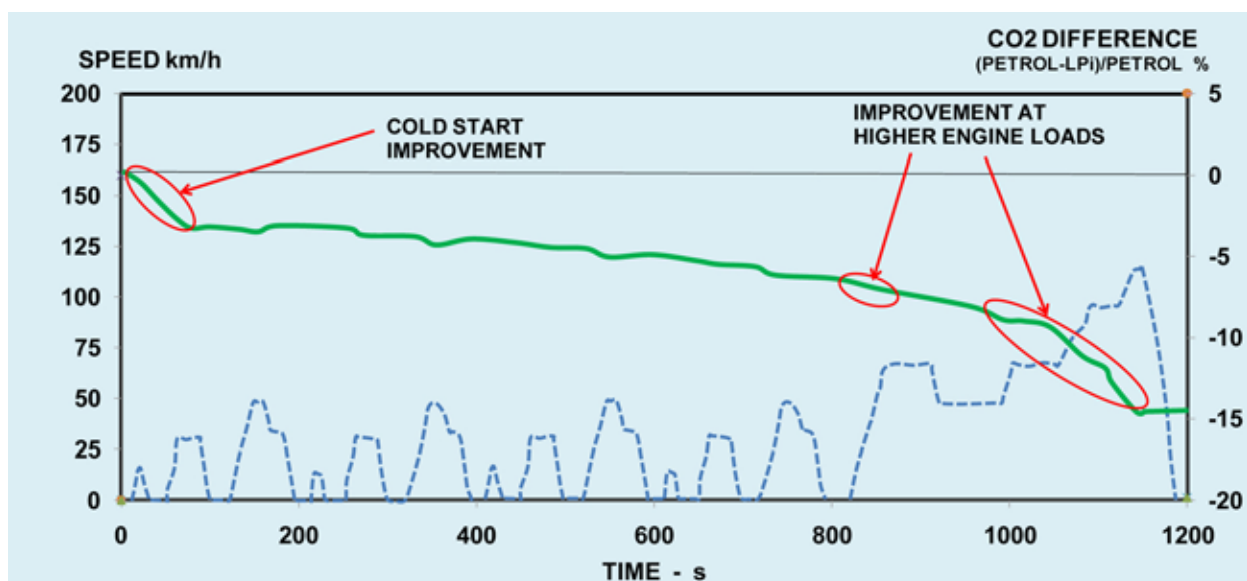


Figure 1 > CO2 reduction of EcoLPi compared with petrol over the ADR Euro drive cycle showing nearly 15% reduction at end of test.

16.1% less than the E-Gas at 12.5 l/100km. As a result, CO<sub>2</sub> emissions are down 15.4% to 203 g/km (E-Gas was 240g/km), as well as more than 14% less than the current XT petrol car (236g/km). Reductions for the FG series and Utes are of similar magnitudes.

Figure 1, taken from the SAE-As Road Transport Engine Emissions course paper presented by Pritika Maharaj and Simon Flint,<sup>1</sup> shows a comparison of the Petrol Falcon with and EcoLPi as the difference between their CO<sub>2</sub> emissions over the ADR (Euro NEDC) test.

Figure 1 illustrates notable features of the Ford technology, including the improved cold start, with much of the larger throttle and retarded ignition eliminated from the first half minute of engine operation on petrol to promote warm up and reduce HC emission before the catalyst in the exhaust "lights up" and becomes active.

In the next minutes of driving, during accelerations the "bumps" appear because of the different characteristics of the two fuels. Petrol has a low volatility, and when injected forms pools of liquid fuel, whose quantity varies with manifold pressure (MAP) related to throttle position. So, at throttle opening, extra petrol has to be supplied, and on throttle closing to cruise speed the pool boils off. These transient phenomena do not occur with LPi to any extent.

In the extra urban part of the cycle, after about 750s, the higher speeds call for up to 55 kW, more than twice the maximum power needed in the urban part. Overall the average power needed is 7.2 kW<sup>2</sup>. During the extra urban driving, Figure 1 shows the benefit of the LPi system with large reductions in CO<sub>2</sub> when larger amounts of throttle are needed during acceleration and cruising up to 120 km/h. Overall the reduction in CO<sub>2</sub> can be seen to be in excess of 14%.

### Early tests provided direction

It is interesting to compare this result with engine bench testing done at the University of Melbourne on an AU Falcon with five different fuel supply systems and three compression ratios. The liquid phase injection (LPI) gave the best efficiency results using a six point mini-map taken from the complete engine torque speed map data for each of the engine builds<sup>3</sup>. This method does not account for the calibration needed for smooth transients, cold starting and strategies for other emissions reduction, so is always optimistic.

Moreover the AU base engine uses over 1 l/100 km of fuel than more than the current XT Falcon. These results in Figure 2 suggest that the CO<sub>2</sub> benefit of LPi injection might be between 14% and 20%, the latter with an increase in three compression ratio (CR) numbers, compared with the two possible with the Eco LPi. Actually, the modified AU and the current EcoLPi have the same 12:1 CR, but the current base petrol engine is almost 1 CR higher than its predecessor. Thus, the Ford team has done a good job in getting over the 14% CO<sub>2</sub> reduction.

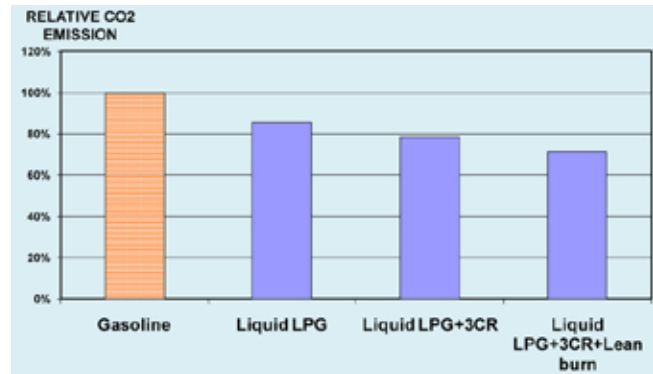


Figure 2 > CO<sub>2</sub> measured in engine tests simulating NEDC cycle on AU Falcon (3).

Figure 2 suggests that there could be further improvement possible with a lean burn strategy. LPG has the capability of burning somewhat leaner than petrol, so dealing with the lean burn NO<sub>x</sub> (nitrogen oxides) issue may not be so demanding. We shall have to wait and see.

Turning to the emissions of the EcoLPi, more data from the Pritika Maharaj and Simon Flint course paper<sup>1</sup> shows that LPG really is the clean fuel that it was claimed to be when it was first launched into the market in the 1960s. Figure 3 shows the cumulative hydrocarbon (HC) emission over the NEDC test for petrol and EcoLPi. These graphs are for the pre-catalyst, or engine-out measurements.

The lack of liquid fuel drops, the faster burning speed and the relatively poor absorption in the cylinder wall oil film all contribute to the lower emissions. Noticeably different for petrol are the "steps" in HC, which are the result of the in-port fuel pool boiling off when the throttle shut, following each change from cruise to deceleration. The result is that the HC from EcoLPi is about one third that from petrol going into the catalyst.

The NO<sub>x</sub> results are even more surprising. LPG burns at higher temperatures at the lambda = 1 (chemically correct) mixture needed for three way catalysts to work well on HC, CO and NO<sub>x</sub>. Normally all things being equal, the NO<sub>x</sub> should be higher than for petrol at higher temperatures. The faster burning may allow for slightly retarded ignition and likely in the optimisation of the cam phasers more internal EGR or residual gas may be allowed, even at a small fuel penalty.

The temperature effect just mentioned can be seen during the accelerations, which use more fuel and burn at higher temperatures, resulting in ramps in the NO<sub>x</sub>. Whatever the detail, at the end of the NEDC test the EcoLPi has produced only half the NO<sub>x</sub> of its petrol counterpart.

### Euro 6 regulation ready

The emissions that really count are those from the tail pipe, after the catalyst. The EcoLPi's HC, CO and NO<sub>x</sub> emissions are 30 %, 25% and 20% of their respective limits of 0.1, 0.1 and 0.08 g/km as required by ADR79/02 (Euro 4). On face

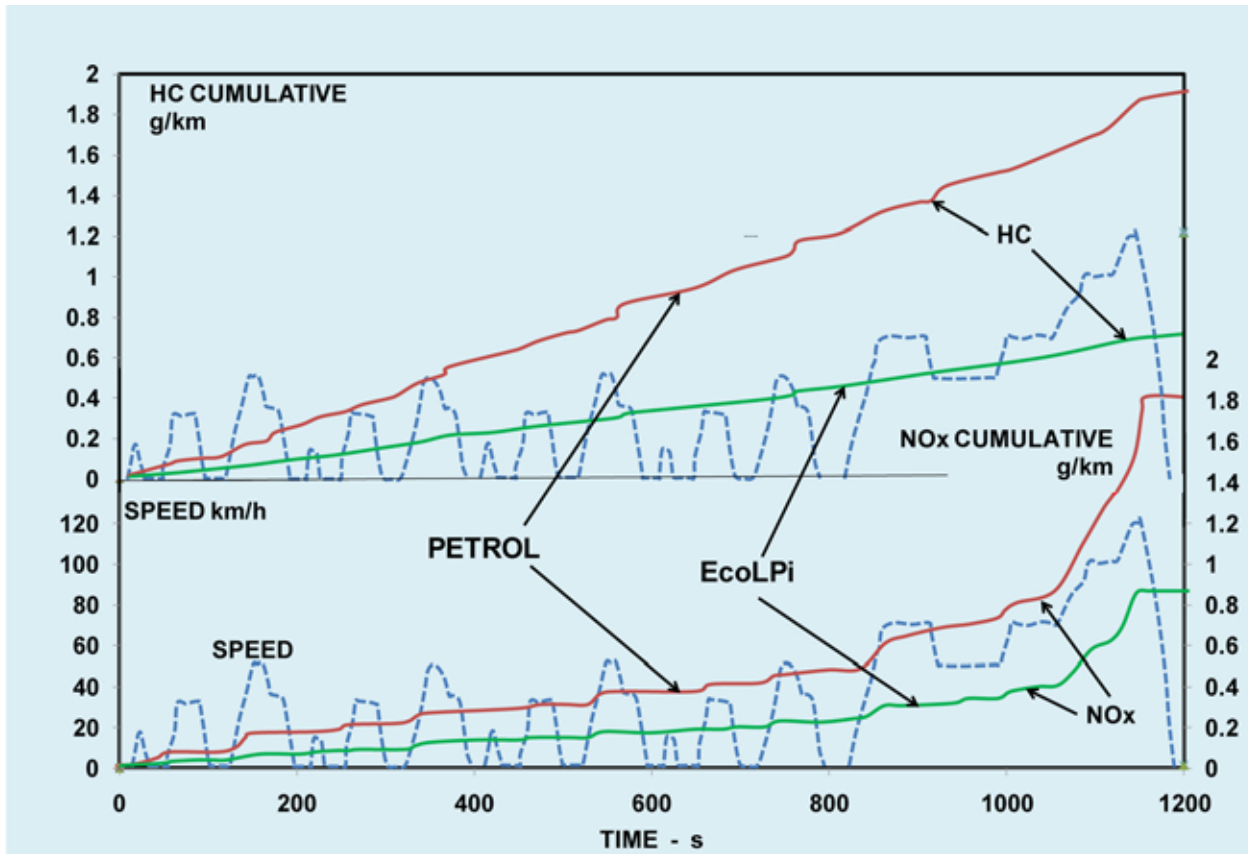


Figure 3 > LPG is a cleaner fuel. Exhaust HC and NOx pre-catalyst from the EcoLPi over the ADR Euro drive cycle are seen as less than half those of petrol.

value, these numbers would also allow the Falcon EcoLPi to meet Euro 6 now, but not proposed until 2017. Moreover there is mounting evidence that the particle emissions (not yet limited for petrol engines) are significantly less than for petrol engines.

This is really a fantastic achievement of in Eco engineering on all emission fronts through a commitment by Ford management to mount such a novel program (with Green car support) and implementation by Ford Australia's engineers. Such an offering would surely not have come to us without vision and conviction that LPG can play a very important role in a secure and clean energy supply for the country's future.

Back to the hardware, other changes over the old Falcon E-Gas engine include a new dedicated fuel rail – including injectors – designed and developed specifically for Ford, as well as different lightweight pistons, including a low friction ring pack.

A major challenge for liquid LPG injection is heat pick up into the fuel that can cause it to vaporize, which is highly undesirable anywhere in the fuel system except for the fuel vapor in the top of the tank. To combat this, new polymer fuel lines with a low thermal mass are designed to

keep the LPG fuel liquefied, and a new fuel line filter and in-tank filter are added to prevent system component contamination. The in-tank pump has six speeds that vary to meet demand, thus minimizing both electric power consumption and the generation of unwanted heat from pumping fuel not needed.

There are also significant modifications to the fuel tank, including all new internals and sub-level components, as well as the new high-pressure fuel pump, while a new catalytic converter is now common with the petrol I6.

Rounding out the changes are major re-calibration and engine and vehicle management systems' modification, including a new fuel priming strategy that begins when the driver's door is first opened.

<sup>1</sup> P Maharaj and S Flint: Falcon EcoLPi, Lecture 3.3 SEA-A, University of Melbourne, Horiba Systems Course on Roar Transport Engine Emissions, 2011

<sup>2</sup> AA Boretti, F Will, HC Watson, MJ Brear, R Dingli, and G Voice: Comparison of static and dynamic engine models on transient performance of a passenger car power train, FISITA paper F2008-12-287, 2008.

<sup>3</sup> PJ Baker, HC Watson: MPI Air/Fuel Mixing for Gaseous and Liquid LPG, SAE Paper 2005-01-0246, 2005.

# Leveraging Innovation - an innovative conference concept

**Collaboration between Monash University and SAE-A brought a new and important topic to the 2011 conference calendar. Held in August, the topic was Leveraging Innovation.**

SAE-A President Patrick Ross and Monash University Prof Michael Vitale led the conference organising team. The primary target audience was businesses in the Melbourne south east manufacturing region. This area is home to many companies that supply, or could supply, the automotive sector.

The purpose was to better prepare Australian industry to compete in the global markets that are changing daily. In addition to Patrick Ross and Prof Michael Vitale, speakers and topics included:

**Tim Holding**, Chief Engineer EV Engineering - *Leveraging local opportunities.*

**Michael Coates**, Managing Director and CEO INC Engineered Materials - *Recycling textiles - leveraging opportunities with like-minded companies.*

**Prof Rod Hill**, Pro Vice-Chancellor Monash University - *Transforming Australian industry through next generation product and process design technologies.*

**Dr Matthew Cuthbertson**, CEO AutoCRC - *CRCs as a catalyst for business innovation.*

**Linsey Siede**, Director Automotive Supplier Excellence Australia - *Benchmarking Australia's automotive supplier industry.*

These presenters discussed innovative manufacturing and research opportunities for financial assistance and support, and they encouraged innovation and networking among the businesses attending. The challenges facing Australian manufacturers were discussed, including:

- High value of the Australian dollar
- Under value of the Chinese Yuan
- Australian manufacturers must identify high value product and process niches:
  - Be different - don't try to compete in low value high volume markets.
- Global competitiveness in manufacturing is determined by productivity.
- Increased productivity is delivered through:
  - Enhanced skills.
  - Improved communication inside and outside your organisation.
  - Doing what you do best.
  - Inspiring leadership and creativity.

- Short time to market with best product.
- Manufacturing efficiency.
- Effective engagement with Australian and international supply chains.
- Leveraging related products / services.
- Collaborative manufacturing.
- Focus on environmental footprint.

## Open your business to new ideas

A key point made at this conference was the need for Australian companies to engage with others outside their businesses, including competitors, and with organisations from different industries. This opens up your business to new ideas. In this way small businesses can work together to leverage off innovations that are available, but not widely known, or accessible by, businesses operating separately.

Conference delegates were invited inside some speakers' organisations with case studies. Patrick Ross used the Robert Bosch Australia experience to highlight the need to move away from "traditional" Australian approaches to manufacturing.

Patrick Ross believes in the 2000s Australia recognised it had to compete globally, that research and development was mandatory and innovative processes are required. One innovation he identified was that engineering services can be offered as a separate revenue source.

Now that Australian manufacturers have become more internationally aware, Patrick Ross said they are realising that, while the global market is huge, it is also segmented with volume scale similar to our local market. There is also the discovery that not all of the international market is sophisticated. He said there are many emerging markets where customers will pay for suppliers to set specifications and to fast track product development.

Prof Rod Hill promoted the case for digital manufacturing and the use of simulation technology as a key to rapid and effective innovation development. He argues these tools allows decisions to be made about new products, processes and services with greater certainty and with lower cost in materials, time and energy.

Michael Coates' INC Engineered Materials case history about treating waste as a resource inspired many. In his company's case, the waste was discarded textile materials that are recycled into materials for automotive and building applications as acoustic barriers, flooring underlay and architectural use.

# Electric vehicle Information

**An important role of the SAE-A is disseminating information about new technologies and the electric vehicle trend continues to be a focus of the Society's work. Often working in tandem with other organisations, such as the AutoCRC, SAE-A has organised and hosted pioneering conferences in Adelaide, Melbourne and Canberra.**

Agenda's for these conferences cover the critical issues related to the introduction of new technologies, including the basic power train systems technologies, product and operating standards, training about the technologies, electricity supply infrastructure and the cost structure.

Electric vehicles were also a popular topic at the recent Australian Automotive Week held in Melbourne. SAE-A

included the subject in the theme for the Change by Design Conference.

Among the challenges facing electric vehicle producers is sourcing the electricity. A lot of thinking is being invested in how to manage increased power demand through existing electricity grids and how to increase the performance of batteries.

As private electric vehicles begin to venture out on Australian roads in the next year or so, the Society will continue to provide platforms such as seminars and conferences for the exchange of information and to debate the best way forward with electric vehicles.

(See [Technical Talk Electric vehicles on the Australian scene page 27.](#))

# Formula SAE-Australasia ready for racing

**Preparations for the 2011 Formula SAE-Australasia competition are well advanced with the Consortium meeting regularly to finalise this international engineering educational experience. The 2011 event will be held 15 to 18 December and the host company is GM Holden.**

Tasks will be assigned to hundreds of volunteers needed to organise the 11 events for 28 competing teams running cars powered by RON 98 PULP fuel, Ethanol E85 fuel and electric motors.

Teams will represent universities from Australia, Germany, India, Japan, Malaysia, Pakistan and New Zealand. Students must be members of SAE-A to compete and all drivers must have a Level 2S licence from the Confederation of Australian Motor Sport. For details and the event handbook, visit: [www.saea.com.au/?page\\_id=12](http://www.saea.com.au/?page_id=12).

A new scoring system will be used in 2011, which gives greater recognition to Engineering Design, Fuel Economy and Skid Pad events, and reduces the scores for Presentation, Acceleration, Autocross and Endurance events. The changes do not add any new criteria, and by modifying the balance between some events provides greater flexibility for all types of power trains.

These changes were made to better reflect the increasing emphasis on reducing energy consumption, and to reduce the emphasis on the "racing" element of the competition. Formula SAE-Australasia is designed to primarily provide a unique learning environment to foster good design, team-work, business understanding, working to deadlines, and recognition that engineers must understand and meet changing societal expectations.

Similar score changes have also been made to the Formula SAE competitions held in Europe and the USA.

The 2011 competition scoring and the old scoring system are compared below.

2011 Revised Event Scoring	2011 Score	Old Event Scores
<b>Static Events:</b>		
Engineering Design	200	150
Presentation	50	75
Cost Analysis	100	100
	<b>350</b>	<b>325</b>
<b>Dynamic Events:</b>		
Acceleration	50	75
Skid-Pad	75	50
Autocross	100	150
Fuel Economy	125	50
Endurance	300	350
	<b>650</b>	<b>675</b>
<b>Total Points</b>	<b>1,000</b>	<b>1,000</b>



RMIT University pioneered electric motor power trains at Formula SAE-Australasia in 2009.

# Supporting automotive innovation and productivity

By Dr Matthew Cuthbertson, Chief Executive Officer, AutoCRC



**Given the declining volumes of motor vehicles being manufactured in Australia and the difficult export conditions facing manufacturers in general, it seems an opportune time to reflect on what contribution a Co-operative Research Centre might make in such circumstance to enable companies to respond successfully to these challenges.**

At inception, AutoCRC made a strong commitment to support innovation and productivity in the automotive industry in Australia and has lived up to that promise during the past six plus years. At a strategic whole-of-sector level, AutoCRC led the creation of the Automotive Australia 2020 Technology Roadmap which was endorsed by Minister Carr and the Automotive Industry Innovation Council. The roadmap identified a series of investment priorities that will enable Australian industry to exploit its strengths and capture emerging international opportunities.

Still at the sector level, the AutoCRC benchmarking and improvement program Automotive Supplier Excellence Australia (ASEA) now involves over 50 companies, with 140 improvement projects underway. How this is achieved is explained in more detail in the ASEA Director's update (see page 17).

Of course AutoCRC also works closely with individual enterprises on technology projects and I presented some personal reflections on this work during the recent SAE-A Leveraging Innovation conference at Monash University. A few examples follow:

## Diversification

Many of the successful automotive component suppliers are those pursuing technology based diversification strategies. This means companies in the automotive sector are applying their capabilities in different markets and also companies in other industries are diversifying into automotive.

A good example is Adelaide based automotive mirror manufacturer SMR Automotive Australia. SMR has worked closely with AutoCRC and the University of South Australia to produce the world's first plastic automotive mirror, based on applying high performance coatings to the plastic substrate (see page 19).

Just as important, SMR has leveraged this newly acquired coatings expertise as a core element of a new enterprise called SMR Technologies, which will work in non-automotive industries.

## Invest in people

Any company's capacity for innovation always comes back to people, and education has always been a vital part of AutoCRC activities. Our education program aims to produce industry ready graduates across a range of disciplines relevant to the automotive industry, and trained researchers with detailed knowledge in emerging technology areas.

Fifteen AutoCRC post graduate scholarship holders have already completed their studies, and a further 54 will graduate over the next two years. That's a very large pool of skilled researchers, who are poised to make a significant contribution to Australia's future. Furthermore around 400 final year undergraduate students have worked on 180 industry projects in AutoCRC. So every one of those graduates has had experience in working on a real world automotive industry problem.

AutoCRC has also focused on up-skilling of current employees in the sector, and its industry seminar program has already attracted over 800 attendees.

## Leveraging international opportunities

AutoCRC provides a framework for Australian manufacturers to engage internationally and use local capability to take advantage of resultant opportunities. Currently AutoCRC has collaboration agreements with automotive companies and research organisations in China, South Korea and Malaysia. An important new example is the Chery Automobile Co / AutoCRC Automotive Portal. The portal will allow a consortium of ten Victorian research organisations and technology companies to show their wares via a dedicated electronic meeting room and display area within Chery's Central Research Laboratory in Wuhu, China.

The full CRCs as a catalyst for business innovation presentation is available on the AutoCRC website. Visit: [www.autocrc.com/pub-event.htm](http://www.autocrc.com/pub-event.htm)



Prime Minister Julia Gillard and Minister Kim Carr discuss new AutoCRC technologies with Colin Hall (UniSA) during the technology showcase at Parliament House on 18 August.



**Australian Government**

**Department of Innovation, Industry, Science and Research**

# Automotive Supplier Excellence Australia

Director's Report by Linsey Siede.



**As we begin the 2011/12 financial year, we are half way through the second year of the Automotive Supply Chain Development Program (ASCDP) program. Since commencing this program in March of 2010, the ASEA team has conducted comprehensive business assessments of 65**

**individual automotive supplier sites / companies spread across five states.**

Following the assessment, each company received an in-depth "Benchmark Report" comparing their business to global best practices across 11 competencies and 52 metrics, identifying where they operate at best practice levels, and where they have gaps.

More importantly, each company received a set of prioritised "Improvement Plans" identifying the actions they need to implement to close the gaps, and help the company become globally competitive. The process of assessing and reporting back is critical in identifying the improvement opportunities, but unless the organisation actually implements the plans, it is all a huge waste of time and effort.

Therefore the most important part of the entire ASEA process - and the only part that adds real value to the company - is in completing the action projects. To help the company implement the projects, ASEA currently has over 40 coaches registered, and each coach has been certified via an independent assurance program.

Each step in the ASEA process is monitored by using questionnaires completed by the participating companies. This feedback is used to continuously monitor, update and improve the process, including the assessment and the action projects.

Recent unsolicited feedback on the program - obtained during Automotive Week - has been both encouraging and rewarding, and validates feedback obtained from those companies already participating. It would appear the ASEA processes and products are becoming more widely known within and outside of the automotive sector, particularly as participating companies talk about the improvements they implemented, and the benefits realised.

In this current program ASEA is well on the way to reaching our target of implementing 140 projects. Completed projects have covered a broad array of disciplines. The average feedback scores from participants on the completion of their projects have been well into the "exceeded expectations" category.



## About Automotive Supplier Excellence Australia (ASEA)

ASEA is charged with the task of assisting Australian automotive suppliers in achieving world class capability and competency levels through:

- Assessment component suppliers, based on a range of metrics agreed by MVPs and suppliers.
- Planning and implement prioritised supply chain development projects to raise Australian component supplier capability to globally competitive standards.

ASEA is supported by Ford, Toyota, and GM Holden, the Victorian and South Australian Governments, the Federation for Automotive Products Manufacturers and the Commonwealth. The ASEA program is managed and delivered by the AutoCRC.

Using the rating system of 1 & 2 for "below expectations", 3, 4 & 5 for "met expectations" and 6 & 7 for "exceeding expectations", the two questions achieving the highest ratings were Q4 "Could another ASEA project be conducted elsewhere within the organisation" with a score of 6 out of 7, and Q6 "I would recommend my company participates in additional ASEA projects" with an incredible 6.3 out of 7.

## Forums prove valuable

Recently we completed our sixth successful Forum, which was held at the Holden head office in Port Melbourne. As well as hearing from executives representing Holden, Ford and Toyota, attendees at the Forum also heard from four companies that have undertaken projects with ASEA. Their presentations covering the important topics of diversification, innovation and consolidation were well received, and created much discussion during networking sessions.

The ASEA Forums are a unique way of companies gaining knowledge and learning from the experiences of their peers. These events can only work thanks to the willingness and openness of the speakers to share information. So special thanks to all speakers.

The success of the ASEA program relies heavily not only on a disciplined set of processes, but also on the commitment of the leadership and project managers at the suppliers. As projects are completed, deadlines met, results delivered and savings realised, we see the confidence within suppliers continue to build.

The processes used and some of the product offerings (training/coaching courses) ASEA can provide, are documented in a brochure available in hardcopy from the ASEA Office, or in softcopy from the ASEA website at

[www.asea.net.au](http://www.asea.net.au)

# Researcher Profile

In this issue our question and answer profile introduces AutoCRC project team member Dr Michelle Dunn.



**Currently employed as >** I am a Research Engineer, Industrial Research Institute (IRIS), Faculty of Engineering and Industrial Sciences, Swinburne University of Technology. Within IRIS I am a member of the Non-Contact Inspection and Robotics team.

**Background is >** I completed a Bachelor of Engineering (Mechatronics) at UNSW in Sydney. At UNSW I was part of the Co-op program and completed industrial work placements at Bishop, BHP, Baulderstone Hornibrook and Amcor. This gave me experience in a range of different industries and was an excellent introduction to working as a professional engineer.

After graduating I worked for two years at BTR Automotive as a member of the Electronics team, which developed control software and calibration software for automatic transmissions.

I then travelled for a year and on returning to Australia I moved to Melbourne to start a PhD at Swinburne. My project was with Ford Australia using computer vision techniques to inspect the underside of vehicles on the production line. As part of my research, I developed and tested algorithms to increase the performance of current image processing techniques.

After completing my PhD I stayed at Swinburne and joined the Lightweight Modular Vehicle Platform project with the AutoCRC.

**Career highlight is >** When I see vehicles on the streets that contain software that I have helped develop. It's good to know that in some way I've made a contribution.

**Relationship to AutoCRC >** I am part of the main design team for the Lightweight Modular Vehicle Platform project (C2-23). This is a cross-institutional project with five research partners - Swinburne University of Technology, Deakin University, RMIT, ANU, and VPAC. My role is to advise on the manufacturing, assembly and joining. The aim of the project is to develop a vehicle structure that is simple, lightweight and low cost. It must also be configurable to suit a range of customers and markets. Ultimately our goal is to offer an alternative vision for the automotive industry.

As part of the LMVP project I am also researching the use of non-destructive testing techniques for validating joint integrity. The use of multiple lightweight materials in the vehicle structure requires less conventional joining methods, such as adhesives and self piercing rivets. I am

investigating inspection methods, such as ultrasonics, laser stripe projection and computer vision, to determine if joints are strong, with the aim of increasing the lifetime and safety of the vehicle.

I am also the Research Students' Interest Group Coordinator for the Lightweight Materials group. This group brings together PhD students from the various AutoCRC universities who are interested in light weighting. We share our knowledge and experiences.

**Typical day is >** I don't think there is a typical day. Some days I spend the majority of my time in the lab setting up and running experiments. Other days I'm at my desk working on analysing results, writing code, looking at the literature or reporting results. I also spend lots of time working with students and other researchers and in design group meetings. Variety is part of what makes my job interesting, although I do enjoy working in the lab more than at my desk!

**My motivations are >** I really love being a researcher. I like learning about new ideas and applying them to difficult problems. I also enjoy searching for and developing my own new ideas and testing out how effective they are. I hope to continue collaborating with other groups – I get a lot of satisfaction from the challenge of applying my knowledge to other disciplines. In the future I would love to develop sensing and robotic technologies that directly assist people in their everyday lives.

**One thing I often wonder is >** How can I make it better?



*The platform for the AutoCRC Lightweight Modula Vehicle project.*

# Reflecting on automotive innovation

**An AutoCRC research project between the University of South Australia (UniSA) and SMR Automotive has completed the transition from innovative science to real world product with the commissioning of a multi-million dollar thin film coating facility in Adelaide.**

Opened by Senator Kim Carr, this facility will produce plastic mirrors for export in early 2012. The light weight plastic mirror offers many consumer and environmental benefits, including:

- Weight reduction of the mirror reflector by 50%.
- Reduction of 15% in overall mass of the mirror assembly, including mirror reflector, housing and actuator.
- Green house gas emissions reduction of up to 400,000 tonnes of CO<sub>2</sub> over 5 years due to less mirror mass.
- Enhanced safety in a crash situation as polycarbonate plastic does not shatter like glass.

The plastic mirror is unique because its realisation resulted from the combination of collaborative design, innovative processing, novel materials science and surface engineering. This exciting product won the 2011 Society of Automotive Engineers - Australasia Automotive Engineering Excellence Silver Ward.

Working with the thin film coatings group at UniSA, a multi-layer thin film coating system was developed to withstand harsh environmental conditions, ranging from -40C to +80C and UV exposure, while remaining firmly bonded to the polycarbonate substrate and providing abrasion resistance equivalent to that of glass.

The integrated plastic mirror is produced using an expansion-compression moulding procedure. This process produces optical quality substrates with inherently low stress levels – an essential requirement for the stability of the optical design of the mirror. Clips on the rear surface allow direct attachment of the mirror actuator, resulting in fewer components - no backing plate or anti-shatter tape - and simplified assembly process. This saves weight and costs.

The reduction in mirror head mass improves vibration performance and enables further weight reduction by decreasing the need for structural materials in the base and case frames. Due to the positive environmental impact, SMR was awarded Green Car Innovation Funding in 2010 to co-fund the commercialisation of this technology.

The plastic reflector is safer than glass in a crash because it does not shatter, preventing previously reported eye injuries caused by glass from traditional mirrors entering the car through an open window. Additional value is created by the plastic reflector, which can be moulded into complex 3D shapes, or more comprehensively incorporated in the casing structure, providing new design opportunities for stylists.

All of this is made possible by enabling plastic to perform at or above the levels of glass through the application of the nano-engineered thin film coating to the front surface of the mirror. This multi-layer coating imparts environmental stability, abrasion resistance and product longevity, yet it has a total thickness of less than 5 microns, or around 1/10th the thickness of a human hair.

This project delivered unique and wide ranging benefits for Australian research and industry. It forged a highly effective collaboration between the University of South Australia and SMR Automotive (through the AutoCRC), that has seen science converted into commercial ready product. This has been achieved using an interdisciplinary project team comprised of materials scientists, physicists, process engineers and mechanical engineers.

Staff exchanges during the project enabled UniSA researchers to gain insight into the demands of the manufacturing environment, and SMR staff acquired skills in materials science and thin film coating to be used in their new manufacturing facility. The team worked seamlessly to deliver technically complex and challenging milestones ahead of schedule.

The venture by SMR into the new technology domain of thin film coating creates an opportunity for an Australian Tier 1 automotive component supplier to diversify expertise and expand manufacturing into new industries, such as defence, aerospace and biomedical. Over the next 18 to 24 months, this will up-skill the workforce and create several new jobs within SMR.

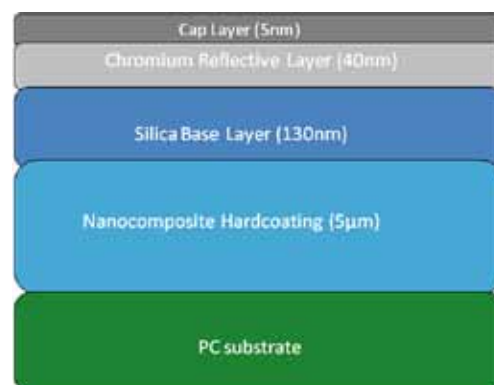


Figure 1 > Schematic diagram of coating shows the multi-layered thin film coating system, incorporating a silicon-based hard-coat and a three-layer vacuum sputtered, thin film coating system.

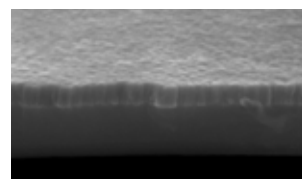


Figure 2 > This Scanning Electron Microscope image shows the cross sectional structure of the chromium reflective layer and chromium alloy capping layer. The cap layer is essential for high levels of abrasion resistance and environmental stability (moisture barrier). The columnar structure of the cap layer is clearly visible.

# Manufacturing makes the headlines

By Richard Reilly, Chief Executive Officer,  
Federation of Automotive Products Manufacturers



**Wow! When a topic of national interest hits the headlines, it really gets a going over in the national discourse. Manufacturing has been the topic of debate over the last few weeks, following the loss of over 1,000 jobs at BlueScope and the phrase "Dutch disease" entering the lexicon. <sup>1</sup>**

Unfortunately, the headlines are not saying what manufacturers want to read, because the economic situation manufacturers currently find themselves in is not pretty.

The dollar is entrenched above parity with the US dollar, cruelling our exporters' businesses, there will be the introduction of a price on carbon, which we expect to negatively affect the competitiveness of members of the automotive supply chain, and the mining boom is drawing capital and labour from other industries, of which manufacturing is but one that is being affected.

Our members are concerned for the sustainability and competitiveness of their businesses. FAPM recently participated in a "Friends of Manufacturing" breakfast and lunch in Parliament House, Canberra, with members of the Coalition (breakfast) and with Government members (lunch). The functions were an initiative of the Federal Chamber of Automotive Industries (FCAI).

The purpose of the events were to highlight to the parliamentary backbench, in particular, the importance of vehicle and component manufacture in Australia, and to ensure they were fully briefed on the benefits the automotive industry plays in the wellbeing of Australian manufacturing.

Mike Devereux, Chairman and Managing Director of GM Holden in Australia, who is also FCAI President, presented at both events and really hit home the importance of our industry to the Australian economy in terms of employment, R&D investment, export revenue and technical leadership. He impressed on parliamentarians the need for co-investment in the industry between governments and their automotive industries for the industry to be sustained.

Mike was supported by his industry colleagues, Bob Graziano, President and CEO of Ford and Toyota General Manager Corporate Affairs Peter Griffin. After Mike's presentations, all three OEM executives participated in a Q&A session. This was a very important event to be a part of and it enabled FAPM to discuss issues with a range of politicians relating to the component manufacturing sector.

It is vitally important that we all play our part in promoting the benefits of manufacturing to our elected representatives. Many of our elected federal representatives are ignorant of the importance of the manufacturing sector. It is therefore incumbent on all of us, as we're living through an apparent hollowing out of the manufacturing economy, that we inform and lobby policy makers of the vital nature of the manufacturing sector and the untold damage that would occur to the



Mike Devereux, Chairman and Managing Director of GM Holden.



The closing panel discussion at the FAPM Conference fostered animated discussion about the future of the automotive components industry in Australia. Panellists were (from left) Mike Filazzola, Carl Parkin, Barry Budge and Andrew Bayley

economy if the sector continues to shrink due to the mining boom, the exchange rate and imports negatively affecting our competitiveness.

FAPM is looking to hold a similar event in the near future in Canberra to continue to reinforce the message that our manufacturing sector is too crucial to be ignored and allowed to fail. Our members have restructured over many years to be some of the most internationally trade exposed companies in the country. We are not against change and can hold our own against any goods manufactured overseas and imported.

But we do ask for a fair trading position and seek government assistance to ensure co-investment into this vital industry.

### FAPM Regional Executive Committees

FAPM is currently conducting its regional Annual General Meetings. The following members were elected to the Southern Region Executive for 2011/12:

- David Chuter (Futuris) – President
- Glenn Paine (ZF Lemforder) - Vice President
- Russell Jopson (Denso)
- Mark Dwyer (OzPress)
- Rob Wilson (Palm Plastics)
- Lothar Schmidt (Hella)
- Michael Pennings (Nexteer)

It's worth noting that the former Southern Regional president, Jim Griffin from Diver Consolidated Industries, didn't nominate again this year and leaves the committee after five years of tremendous service. Mark DeWit from Futuris similarly elected not to nominate for a Southern Region committee position this year.

The following members were elected to the Northern Region Executive for 2011/12:

- Shiromi Brell (Bluescope Steel)
- Gary Layton (ICOA Australia)

The following members were elected to the Central Region Executive for 2011/12:

- Greg Lowe (TI Automotive) - President
- Mark Coupe (Futuris) – Vice President

- Sandro Gaggini (Tenneco)
- Maurice Windley (Arcelor Mittal)
- Tony Bond (SMR)
- Thinus Steyn (ZF Lemforder)
- Hamish Hogben (TI Automotive)

All three regions have a really strong group of representatives, which is great for their respective regions and also the FAPM as a whole. We look forward to working with them all during the year.

### FAPM National Conference

The FAPM National Conference was held in Melbourne on Friday 8 July 2011. This Conference is a widely recognised focal point for discussion of both local and global automotive issues, and this year was no exception.

Feedback from participants highlighted the quality of the speaking program this year. The Conference opened with Victorian Minister for Manufacturing Richard Dalla-Riva. Ford CEO and President, Bob Graziano and Professor Tim Flannery generated some thought provoking discussion on our industry and how we move forward to a more sustainable footing.

### Resignation of FAPM President

We were shocked and saddened by the resignation of our President, Zoran Angelkovski from his position in early July. Zoran resigned from his position as CEO of Continental Australia Pty Ltd, and so subsequently resigned his voluntary position as president of FAPM.

Zoran was in the chair for over 4 years and in that time led the component sector in a number of initiatives, not least of which was the sector's response to the Bracks Inquiry into the automotive industry. Zoran provided leadership and counsel to many individuals and companies in the component sector and was a tireless advocate for the automotive industry in particular, but also the manufacturing sector in general. He will be missed by all at FAPM and we wish him well with his future career.

<sup>1</sup> Dutch Disease describes the decline of manufacturing that seems to accompany the discovery of natural resources – Business Day, The Age Newspaper, 27 August 2011, page 10.

# Motor show proves *green is sexy*

By SAE-A Editor Barry Oosthuizen

One of the big themes at the 2011 Australian International Motor Show was that environmentally friendly vehicles are getting sleeker, sexy and sought after. Early electric and hybrid vehicles were once almost exclusively the domain of small hatchbacks and boxy city cars. Now the future of electric powered motoring includes chic sedans and low-slung sports cars. *Autoengineer* previews here some of the green vehicles displayed at the Motor Show.



## Hyundai Blue2

The Blue2 concept vehicle is Hyundai's first sedan style hydrogen powered fuel cell electric vehicle. A sporty and luxurious model combining futuristic, flowing design and eco-friendly features, it is powered by a fuel cell electric system delivering power of 90 kW and fuel economy of 2.86 l/100km.

State of the art design and engineering includes conventional side mirrors replaced with side and roof cameras, the exterior of the vehicle is monitored via LED screen panels fixed to the front and rear, a welcome system with automatic door opening, and tablet mounts for iPads, or similar providing infotainment. Hyundai hopes to have its first fuel cell electric vehicle vehicles available for sale 2014.

## Volvo V60 Plug-in Hybrid

Volvo claims its pioneering turbo diesel V60 plug-in Hybrid is a "virtually production-ready car" able to deliver a driving mode to suit all needs:

- Pure electric with a range of up to 50 km.
- Hybrid high-efficiency with an average fuel consumption of 1.9 l/100km and CO2 emissions of 49 g/km.
- Power for spirited 6.9 seconds time for acceleration from 0 to 100 km/h comes from the combined output of the diesel engine and electric motor of 200 kW with 640 Nm of torque.

The front wheels will be driven by a five cylinder 2.4 litre D5 turbo diesel, while the rear axle has electric drive powered by a 12 kW lithium-ion battery. The car features a six speed automatic transmission. Volvo predicts fuel costs will be one third compared with a conventional combustion engine. The plug in hybrid can be fully charged in about five hours using a household electricity socket, and can be topped up at a commercial charging facility.

Volvo also displayed its C30 Electric car, which had been crash tested in a 64 km/h 40% offset collision. Volvo said the test produced the desired results. The front motor compartment deformed and distributed the crash energy and the batteries and cables remained intact. This car is now in production with initial deliveries going to lease customers in Sweden, Belgium, the Netherlands and Norway.





### Audi e-tron

The electric drive Audi e-tron concept was a golden highlight of the Motor Show. Proposed for production in 2012, this luxury vehicle uses state of the art technology to provide comfort and convenience, while minimising environmental impact.

It is driven by four asynchronous motors, with a total output of 230 kilowatts allowing acceleration from 0 to 100 km/h in 4.8 seconds. Top speed is limited to 200 km/h, because the energy demand of the electric motors increases disproportionately to speed. Torque flows selectively to the wheels based on the driving situation and the condition of the road surface for high levels of traction and handling.

Travel range in the NECD combined cycle is approximately 248 kilometres. The liquid cooled battery pack capacity is about 53 kilowatt hours,

with the usable portion restricted to 42.4 kWh in the interest of service life. Charging with household current (230 volts, 16 amperes) takes six to eight hours. A charge at 400 volts, 63 amperes reduces time to about 2.5 hours. Audi engineers are developing a wireless inductive charging system for use at home or commercially.

The lightweight ceramic brake system includes a hydraulic fixed calliper brake on the front axle and two electric floating calliper brakes on the rear axle. The floating callipers eliminate frictional losses due to residual slip when the brakes are not being applied. This decoupling of the brake enables the electric motors to convert all of the braking energy into recoverable electricity.

### Toyota Prius c Concept and Prius v

Toyota Australia tested market reaction to two new models of the Prius at the Motor Show. The two new vehicles being evaluated for the local market will be based on the compact Prius c Concept city friendly car aimed at the young, and versatile Prius v wagon, which will target families and fleet buyers.

The Prius v has the same proven Hybrid Synergy Drive® system as the third-generation Prius, which never needs to be recharged. Toyota hopes bring the new Prius hybrid models to Australia in 2012.



### BMW Vision EfficientDynamics Concept

The BMW stand at the Motor Show featured a single vehicle - the Vision EfficientDynamics Concept - an eye catching performance car destined for production in 2013. The four seat sports car features drive train technology combining a three cylinder turbo diesel with a hybrid synchronous motor at the front axle, and a full hybrid engine at the rear axle, enabling a maximum power output of 241 kW.

This innovative system provides a 0-100 km/h time of 4.8 seconds while the car consumes a 3.76 litres per 100 km and emits 99 g/km of CO<sub>2</sub>. As a "plug-in" hybrid, the car features a lithium-polymer rechargeable battery housed in the chassis. Charging requires a conventional power socket and two and a half hours. The electrical storage produces zero emissions motoring for a range of 50 kilometres, with the 24 litre diesel tank extending that range to 700 km.

See *Technical Talk Electric vehicles on the Australian scene* page 27.

# Driven to despair in Australia's outer suburbs

Recent studies show that developed countries are now experiencing a decline in the use of private cars. This article by Peter Newman, Prof of Sustainability, Curtin University of Technology, posted on the new independent information source The Conversation website on 30 May 2011, introduces his views on reasons why people may be driving less.

"Peak car use" could have important implications for the Australian automotive industry, particularly local manufacturing.

**In cities all over the industrial world, people are driving less. Changes to society and the structures of our cities have made jumping in the car less popular. But what does this mean for people who have no choice but to drive?**

In most American and Australian cities, car use has been declining since early this century. John Stanley and Simon Barrett's 2010 study found car use has been dropping per capita in Australian cities since 2004. Between 1995 and 2005 our data showed no growth in car use at all.

So why is it happening? There are many factors to which declining car use can be attributed.

The first is a cultural shift. Younger people want a more urban lifestyle, one where they don't have to drive as much. They want to be around friends and around urban activity without long commutes from distant suburbs. We're even seeing this among older Australians, who want to live somewhere they can drive less and walk more, particularly as it becomes more difficult for them to drive.

At the same time, we're hitting the wall with sprawl. A city can only grow so far before it becomes dysfunctional.

In most Australian cities, suburbs have been going out for a long time, and freeways have been built to bring people back in. But now the freeways are full, and commuting is just taking too long.

Marchetti's Constant tells us that most people – no matter where they live or how they travel – won't commute more than an hour a day. For many people in Australian cities, this "travel time budget" is being breached. When people have to commute for longer than that, they can get angry. And we're seeing that for a lot of these people, the solution is to move back into the city.

At the same time, fuel prices are going up. The acknowledgment that petrol isn't going to get any cheaper is to some extent killing off the idea that cars are a critical part of life. In fact, for many people, cars have become less a desirable commodity, and more of a burden. For people who are dependent on their cars, it can become very hard to keep control of the budget when fuel prices are so unpredictable.

Many of these people don't have the option of moving closer to the city. High real estate prices and poor public transport mean the only option is outer suburbs and long, car-bound commutes.

The future for these people isn't promising. The outer suburbs will become places where only the poor will live.

Opponents of development, such as Save our Suburbs, have campaigned against inner-city densification on the grounds it will create ghettos, but the real ghettos are going to be on the urban fringes.

The wealthy are moving. They're finding places to live where it's easy to get to activity, where there's plenty of public transport and where there are good walking conditions. City centres are becoming eco-enclaves: you can see that in the Greens vote.

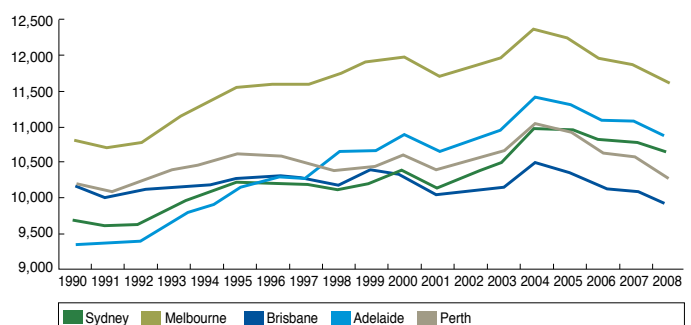
But it's more and more desperate the further out you go. Australia's 50-year suburban experiment isn't delivering all the wonderful things we'd hoped for. The great Australian dream is actually a bit of a nightmare. Governments aren't really addressing this issue. They talk about developing polycentric cities with substantial employment and activities in the suburbs and small cities. They say there should be good public transport linking them all together.

But in most cases they haven't worked out how to fund or implement these plans. It's just talk. In fact, most of the planning bodies in government departments still assume further sprawl and still assume more car use.

There are always going to be journeys that are too difficult to make by foot, bike or public transport. There will always be places that are difficult to reach without a car. And for many people with disabilities, a car is vital. But cars need to be just a part of the package, not the soul of our transport system. We've been planning as though we can't live without cars. We have almost killed our cities in the process.

Visit The Conversation at [www.theconversation.edu.au](http://www.theconversation.edu.au) and this article at [www.theconversation.edu.au/driven-to-despair-in-australias-outer-suburbs-1435](http://www.theconversation.edu.au/driven-to-despair-in-australias-outer-suburbs-1435)

**Estimated car passenger kms per capita per year**



# Victorian Manufacturing Hall of Fame 2011 inductees

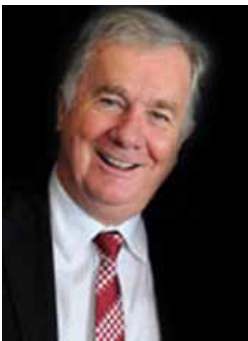
By SAE-A Editor Barry Oosthuizen

The Victorian Manufacturing Hall of Fame celebrates the leading people and businesses in Victoria's diverse manufacturing sector. This awards program also recognises a Young Manufacturer of the Year and an individual Hall of Fame Honour Roll inductee.

Victoria's manufacturing sector, which contributes more than \$30 billion in gross state product, employs over 300,000 people and at the aggregate level, is Victoria's lead export sector. Now in its 10th year, 117 companies, 23 honour roll recipients and 9 outstanding young industry leaders have been inducted into the Victorian Manufacturing Hall of Fame.

Among the 10 awards made in 2011, six of the recipients were from the transport sector. The Awards were presented at a gala dinner by Victorian Manufacturing, Exports and Trade Minister, Richard Dalla-Riva. We congratulate those innovative winners committed to manufacturing.

## Manufacturing Hall of Fame Honour Roll - Gerry Ryan, OAM



Jayco Caravans founder Gerry Ryan, OAM was welcomed to the Manufacturing Hall of Fame Honour Roll in recognition of his outstanding contribution to the manufacturing sector. Since the first Jayco produced in 1976, the company has grown into an Australian icon producing about 10,000 units a year, with an annual turnover of around \$350 million and 1,000 employees.

In recent years, Gerry Ryan has diversified his manufacturing activities to produce the dinosaurs for the successful Walking with Dinosaurs – The Arena Spectacular interactive show, now one of Australia's biggest cultural export earners. This show has been seen by over 6.5 million people world-wide and has generated ticket sales in excess of over \$350 million. His community commitments through youth support initiatives, including the Dandenong-based Visy Centres, and sporting clubs are inspirational for the next generation of business leaders.

## Young Manufacturer of the Year - Jason Oliver

Black Widow Enterprises Operations Manager, 27 year old Jason Oliver was named Young Manufacturer of the Year. He is responsible for all aspects of the company's production, including outputs, quality, safety and environmental standards, and manages 20 production employees as well as the purchasing and supplier relationships.



He commenced work at Black Widow while in secondary school, continued as a part-time employee during university studies, and took up his current management role in 2006. He has a Bachelor of Business degree, has studied CAD and fabrications engineering and lean manufacturing and is completing a MBA.

Black Widow manufactures vehicle storage solutions, including drawer systems, roof racks, canvas products and a range of related accessories for four wheel drives, recreational and light commercial vehicles.

## Enabling Technology Young Entrepreneur of the Year - Agnel D'Souza

Rapid Parts Technician Agnel D'Souza of AW Bell was awarded the Enabling Technology Young Entrepreneur of the Year for reducing quality rejection rates and improving project lead times using sophisticated engineering technologies. He joined AW Bell in 1996. This private company was founded in Melbourne in 1952 to supply the automotive industry.

At 33 years of age, Agnel D'Souza has a Diploma in Tool and Die Making, a Graduate Certificate of Business and is completing a Certificate IV in Lean Six Sigma. He is currently working in conjunction with CSIRO to develop new technology using the electron beam melting process.



**Inductees into the Victorian Manufacturing Hall of Fame:**

■ **Australian Rollforming Manufacturers** - This Dandenong South company is regarded as a world leading supplier of custom metal roll formed sections. Each year, the company roll forms over one million metres of metal and it was awarded the 2010 Endeavour Award for Australian Steel Innovation. In addition to the construction and mining industries, it is strong in the rail industry, as evidenced by providing stainless steel components for 130 passenger carriages being manufactured by Bombardier Transportation Australia for Victoria's VLocity Train Project. Roll formed rail rolling stock components have also been supplied to Queensland Rail. Minister Richard Dalla-Riva presented the award to Managing Director Henry Wolfkamp.



and invests 20% of revenue in R&D. AW Bell has experienced export growth of 50% year on year for three years with destinations including Canada, China, France, Germany, India, Mexico, Russia, and the UK and USA. The award was presented to Chairman Geoff Bell.

■ **AW Bell** - This family owned investment casting business employs state of the art technologies to supply the aerospace, automotive, military and transport industries, as well as food producers. The company specialises in the design, rapid prototyping and manufacture of complex parts in a variety of ferrous and non ferrous alloys

■ **Backwell IXL** - Established in 1858, Backwell IXL is Geelong oldest manufacturer and is one of Australia's oldest, privately owned companies. It began manufacturing stoves and has diversified into the manufacture of bathroom heating and ventilation products, metal stamped automotive components and high integrity, and complex foundry castings. The company uses innovative manufacturing to remain an important innovator with export success in Thailand, South Africa and Argentina. The award was presented to General Manager David Sykes.



■ **Bombardier Transportation Australia** - This rail manufacturing and transportation systems company strongly supports the Victorian Government's strategies for local content, achieving more than double the 25% local content requirement across the major projects. Established in the 1950s, Bombardier has contributed to all metropolitan passenger light rail and passenger train and tram networks in Australia. The capabilities include locomotives, passenger rail vehicles, propulsion and rail control solutions, as well as complete rail transportation systems. The award was presented to Managing Director Dan Osborne.



■ **Futuris** - Recognised as a leading Australian automotive components manufacturer, multi-award winning automotive seating and interior systems designer and manufacturer, Futuris Automotive customers include General Motors, Ford and Toyota in Australia, Chery, JAC, GAC Gonow and Brilliance in China, Tesla in the USA and Mercedes in South Africa. From its design and engineering base in Port Melbourne, the company has manufacturing facilities in China, South Africa and Thailand, and business development, procurement and design and technology centres in China and the USA. Futuris employs some 1,350 people globally, including 850 in Australia. The award was presented to Managing Director and CEO Mark de Wit.



# Electric vehicles on the Australian scene

By SAE-A Editor Barry Oosthuizen

In the past decade there has been a dramatic change in the Australian private car parc. Demand for smaller more economical vehicles increased and, as the cars made in Australia did not meet that need, imports grew to dominate the market.

Consistent technological development is a given in the automotive world. Australian car buying trends may lead our engineers to conflicting views about the future of local manufacturing. For example:

- Australian engineering optimists may think a growing market of caring citizens choosing sustainable transport options presents great opportunities for local development of new drive train systems and vehicles.
- Pessimistic Australian engineers may see this move away from our traditional large cars with internal combustion engines as a threat because local industry will be left behind those global giants investing in alternate drive trains.



*This replica of Camille Jenatzy's electric racer, which was the first car to break the 100 km/h barrier in 1899, was built by French students and is on display in Compiègne, France.*

Given the pressure and large scale of global competition, the reality for Australian engineers will probably be somewhere between these two scenarios. Often overlooked in discussion about Australian automotive manufacturing is the fact that the three remaining local manufacturers are not "ultimate decision makers". They must defer to their global headquarters where the competition between the company's plants across the globe is judged.

The automotive industry's engineering skills, technology base and supply chain have played a significant role in maintaining Australian manufacturing. Can this contribution to the economy, and the nation's employment levels and living standards continue?

The answer may depend on how well Australia prepares for the looming return of electric vehicles (EVs). We say "return" because electric cars were very popular at the turn of the 20th Century. In 1899, Belgian race car driver Camille Jenatzy drove the first car to achieve 100 km/h. It was an electric car he called "The Never Satisfied" and was powered by two 25 kW motors. It is timely to review of some of the electric vehicles arriving on the Australian scene.

## Mitsubishi i-MiEV

**During 2010, 110 i-MiEVs were brought to Australia and leased to local, state and federal government departments, universities and to a range of industry organisations as part of various EV trials. i-MiEVs have also been included in trials conducted in Asia, the EU and the USA.**

With its Australian release in August at Aus\$48,800, the Mitsubishi i-MiEV (Mitsubishi innovative Electric Vehicle) was the first fully EV to be offered to the Australian public since the early 1900s.

Autoengineer used an early press fleet i-MiEV for a few days as a daily driver, which allowed some claims for the car to be tested. It is a small car with an upright look and feel on the road. Clever design allows four adults to sit comfortably and offers a reasonable rear luggage



*The i-MiEV2 press car.*

compartment. Space is maximised by the 2550 mm wheelbase placing the tyres right at the corners.

With 330 V and 16 kWh, the compact permanent magnet synchronous motor produces 47 kW of power and 180 Nm of instant torque and resides under the back seat. The Lithium-ion battery is under the floor and requires seven hours to fully charge from a domestic household 200 V power supply.

Claimed top speed is 130 kmh with a range of around 160 km (Japan 10.15 Drive Cycle) from a single charge. The i-MiEV has rear-wheel drive with three settings: Drive (normal power), Eco (save power) and Brake (regenerative braking).

As most testers remark, the first impression of EVs is the quiet drive. Tyre to tarmac noise is the most heard and one becomes more aware of wind noise.

Although a little slow on takeoff, this i-MiEV gained sufficient momentum to keep up with city and freeway traffic. The vehicle's dynamics are best suited to the basic city and suburban A to B transport role - it is not a sports car.

An interesting learning was the impact of even slight gradients on the range. On the slightly down hill freeway drive from the outer eastern Melbourne suburbs Mitsubishi dealer to the Mornington Peninsula, the car achieved a range of about 110 kilometres in Drive mode before the battery warning activated. A few days later with the battery fully charged and using the same freeway, the i-MiEV just made it back ("up hill") to the dealer with the use of the Brake mode for the last 10 kilometres of the journey. On arrival, the odometer showed only 82 kilometres and the battery alarm was on full alert.

At its launch, Mitsubishi promoted the i-MiEV as a zero emissions car that would deliver running (fuel/charge) costs per kilometre roughly one third lower than a similar sized petrol car, and if charged off-peak, the operating costs will be even less. The zero emission promotional message neglects mention of the electricity generation. Cost of ownership calculations will be a less attractive result when trade-in values are considered and the battery has aged.

i-MiEV Specifications		Mitsubishi i
L x W x H		3395 x1475 x1610 mm
Vehicle weight		1100 kg
Occupants		4
Maximum speed		130 km/h
Cruising range/charge (Japan 10-15 Drive Cycle)		155km / 132 Whr/km*1
Charging time	240V on-board charger (15Amp)	Approx. 7 hrs (full charge)
	DC Quick Charger	Approx. 30 min (80% charge)*2
Motor	Type	Permanent magnet synchronous AC
	Max. output	49kW / 3000 – 6000 rpm
	Max. torque	180 Nm / 0 – 2000 rpm
	Max. speed	8500 rpm
Battery system	Type	Lithium-ion
	Rated voltage	330 V
	Rated capacity	16 kWh
Controller		Inverter
Drive		Rear wheel
Transmission		One-speed fixed gear
Suspension		Front Macpherson strut and coil spring

## Mercedes Benz B-Class F-CELL

**As part of the 125th anniversary celebrations of the Carl Benz patent application for his tricycle "vehicle with gas engine operation", Daimler AG launched the Mercedes-Benz F-CELL World Drive.**

Starting from Stuttgart on 30 January, three Mercedes-Benz B-Class sedans, fitted with electric motors powered by Hydrogen fuel cell electricity generators, began a 125-day drive across 14 countries on four continents. The 30,000 km trip finished at Stuttgart and included a trans Australia Sydney, Canberra, Melbourne, Adelaide to Perth leg.

Autoengineer attended a Mercedes Benz drive day while the B-Class F-CELL team was in Melbourne. In 2007, Autoengineer drove an earlier Mercedes Benz F-CELL vehicle during a drive train seminar in Stuttgart. Mercedes Benz describes the F-CELL technology as producing "zero local emissions".

The aim of the F-CELL World Drive was to confirm the technical maturity of fuel cell technology, illustrate its suitability for everyday use, and to highlight politically the benefits of establishing the infrastructure required to fuel Hydrogen vehicles.

This is the second time Mercedes-Benz has tested Hydrogen fuel cell vehicles in Australia. The first was in Perth from 2004 to 2007 when three Mercedes-Benz fuel cell powered buses operated on the city's public transport system. They demonstrated reliability and performance potential by covering more than 261,000 km.

### The fuel cell: Clean, efficient energy converter

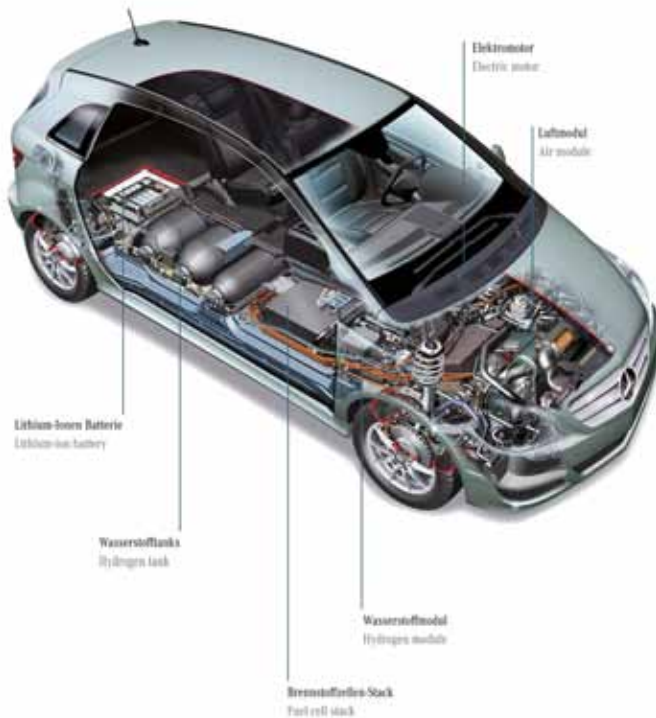
A fuel cell is a voltaic cell that, in this case, converts the reaction energy of an added fuel (Hydrogen) and an oxidising agent (airborne oxygen) into electrical energy. A fuel cell is an energy converter, not an energy storage device like a rechargeable battery.

Mercedes Benz claims a fuel cell vehicle is twice as efficient as a vehicle with a combustion engine, because the fuel's (hydrogen) chemical energy is converted directly into electrical energy. At the heart of the Polymer Electrolyte Membrane Fuel Cell (PEMFC) is the proton exchange membrane, a plastic film that conducts protons, and which separates the reaction agents oxygen and hydrogen. Mercedes-Benz chose PEMFC technology because it operates at temperatures of up to about 80°C.

The plastic film measuring tenths of a millimetre thick is coated with a thin layer of platinum on both sides. This platinum layer acts as a catalyst for the chemical reaction that breaks the hydrogen down into protons and electrons.

While the protons flow through the membrane to the oxygen, the electrons do not pass through.

The hydrogen reacts with the oxygen to create water, which is dissipated into the atmosphere through the "exhaust". The excess electrons on the hydrogen side and the lack of electrons on the oxygen side induce an electrical voltage.



Good packaging of the fuel cell powered electric drive train ensures the B-Class body remains spacious.

When the two poles are connected, an electric current flows, which drives the electric motor in the vehicle. The reaction in the fuel cell also generates heat that can be used to heat the vehicle.

To achieve sufficient electrical power, individual fuel cells are connected in series to create stacks. A control unit ensures the stack is supplied with the right amounts of hydrogen and oxygen from the air. The hydrogen is fed into the stack via the anode module, while the air is added via the cathode module. A humidifier module keeps the stack moist to achieve optimum operating conditions. A cooling system maintains the fuel cell at its optimum operating temperature.

The Automotive Fuel Cell Cooperative in Vancouver, Canada produces the fuel cell stacks used in the B-Class F-CELL. Established in 2007 with Daimler as the majority shareholder (50.1%), the other partners are Ford Motor Company (30%) and Ballard Power Systems (19.9%).

Daimler has also invested heavily in Lithium-ion battery development with over 380 patents filed and partnerships such as the Deutsche Accumotive GmbH & Co KG joint venture with Evonik Industries AG, which is scheduled to produce batteries for Daimler vehicles in 2012. The 1.4 kWh Lithium-ion battery in the B-Class F-CELL is cooled via a car air conditioning system circuit. Regenerative battery charging begins immediately the accelerator is released.

There are about 200 B-Class F-CELL powered electric cars on roads in Europe and the USA. With a power train delivering 100 kW and torque of 290 Nm to the front wheels, Mercedes-Benz claims the range for these vehicles is about 380 km, which equates to about 3.3 litres of diesel

per 100 km in the New European Driving Cycle. It takes is about 3 minutes to re-fuel the Hydrogen tanks and cold-start capability is down to minus 25°C.

To keep the centre of gravity low and provide high crash safety standards, the main drive system components are accommodated in the underfloor "sandwich" (three 700 bar Hydrogen tanks, battery pack, fuel cell stack), with the electric motor and ancillaries between the front wheels.

The Autoengineer test drive was limited to a short circuit around busy suburban feeder roads near Mercedes Benz headquarters in outer eastern Melbourne, so there was no opportunity to challenge the vehicle dynamics or test the management systems. Mercedes Benz said the vehicle is programmed so the fuel cell switches on automatically when the battery charge level is not sufficient and the system automatically decides whether electricity comes from battery, fuel cell, or combination of the two.

The vehicle provided as smooth a drive as would be expected from any other B-Class Mercedes Benz. Response to the accelerator on the test car was sluggish, but speed built up once underway and, compared to the earlier F-CELL drive in Stuttgart, the performance was as expected of a "normal" car. The overwhelming impression made by the B-Class F-CELL Mercedes Benz was its virtually total silence.

### Mercedes Benz F-CELL

Drive	Electric motor with fuel cell
Rated output (kW/hp)	100/136
Rated torque (Nm)	290
Max. speed (km/h)	170
NEDC fuel consumption (diesel equivalent in l/100 km)	3.3
FTP combined EPA-Label consumption (mpg)	54
CO2 comb. (g/km min.-max.)	0.0
Range (km) NEDC	380
Energy content / output	
Lithium-ion battery (kWh/kW)	1.4 /35
Cold-start capability	down to -25 °C



An interesting aspect of the Mercedes Benz F-CELL World Drive project was the logistics involved in delivering the Hydrogen fuel to the teams. The Linde Group (BOC in Australia) provided global support with mobile tankers.

## Nissan LEAF

**In January, the Nissan LEAF was awarded the 2011 European Car of the Year Award - the first time an electric car won the honour.**

The jury described it as "a big leap forward for the pure electric car - it drives and behaves very much like a modern car - and in some respects even better." This award citation is accurate. It has a poise and responsiveness reflecting the fact that it was designed from a clean sheet of paper as an electric vehicle.

In June, the Nissan LEAF was awarded five stars by the Australasian New Car Assessment Program - the first electric vehicle to achieve this. ANCAP Chair Lauchlan McIntosh said the LEAF has a full suite of air bags, anti-lock brakes, electronic brake distribution, electronic stability control and intelligent seat belt reminders among other standard features. It performed very well in crash testing, with the passenger compartment, holding its shape and thus offering superior protection for the occupants.

The LEAF is part of the Victorian Government EV trial and is due for Australian release in April 2012. Autoengineer was allowed a very short demonstration drive in the LEAF near the Nissan offices in Dandenong, in southeast Melbourne.

The LEAF is a small hatch back with good interior space and good ride characteristics. At 4450 mm long, 1770 mm wide and 1550 mm high, the LEAF has a 2700mm wheel-base. Direct steering and refined balance offer reasonable handling for this type of car.

The front wheels are driven by an 80 kW electric motor providing torque of 280 Nm, which Nissan claims will give

LEAF - ZE0		EUR LHD / RHD
Body type		5 door hatchback
Available grades		unique grade
Seating capacity	persons	5
<b>Engine</b>		
Elec. Motor type		AC synchronous
Max. engine power 1)	kW(PS)/min-1	80[109] /2730-9800rpm
Max. torque 1)	Nm/min-1	280 /0-2730rpm
max RPM		10,390
Energy type		Electricity
<b>Battery</b>		
Type		Laminated Lithium ion
Voltage	V	360
Capacity	kWh	24
Number of cells		192
<b>Charger</b>		
On-board charger	kW	3.3
Quick charger	kW	50
Charging cable		6m long - 4.0kg
<b>Drive train</b>		
Clutch type (AT)		Automatic
Transmission code		RE1F61A
Gear ratio		Single Speed Gear Reduction
Final drive ratio (AT)		7.9377
Driven wheels		Front



The Nissan LEAF will be in Australian showrooms in April 2012.

a 140 km top speed. The sloping front features large vertical LED headlights designed to direct airflow away from the door mirrors to improve the aerodynamics.

There are two charging points for the Lithium-ion battery pack under a mini "bonnet" at the front. One is for normal charging at home using a 240 V 16 A connection requiring up to eight hours. The second point is for a "commercial quick charger", which would provide 80% battery capacity in about 30 minutes.

Nissan said the LEAF has a range of 160 km. Regenerative energy is routed back to the battery when the accelerator is released and under braking. The Eco drive mode is claimed to increase the range 10% by activating a power saving air conditioning mode and increasing the rate of energy regeneration.

A talking point for the LEAF when it reaches our roads will be its sound synthesiser and speaker system to warn pedestrians of its approach. The under bonnet speaker is loudest on takeoff and fades to silent at 30 kmh. From 2012, artificial noise for electric vehicles will be law in Japan, and European and USA officials are evaluating the benefits of such systems.

The Nissan LEAF is expected in Australian showrooms by April 2012. On sale in Europe and the USA, the LEAF is priced at about Aus\$37,400. Nissan said the LEAF will be built in Japan, the USA and the UK, while the batteries will be manufactured in Portugal, France, Japan, USA and the UK.

## **EDay - an electric car and home energy package**

**At the recent International Motor show, the Melbourne based EDay Life Limited (EDay) company led by former GM Holden technology chief Dr Laurie Sparke and international vehicle sales executive Robert Lane launched a unique "green" product offering.**

The Australian owned business is launching a range of low emission vehicles into the Australian market, including a rechargeable battery powered electric car, an LPG fuel car, and a range of petrol vehicles, that are based on an existing Chinese made vehicle platform using a petrol engine.

An Australian team of engineers and some local suppliers are contributing to the enterprise, including super capacitor technology being developed with CSIRO. This will increase performance compared to the Lithium-ion battery system being used in early models. Laurie Sparke said this super capacitor development began at CSIRO when he was working on the ECommodore and would reduce the battery weight by up to 50%.

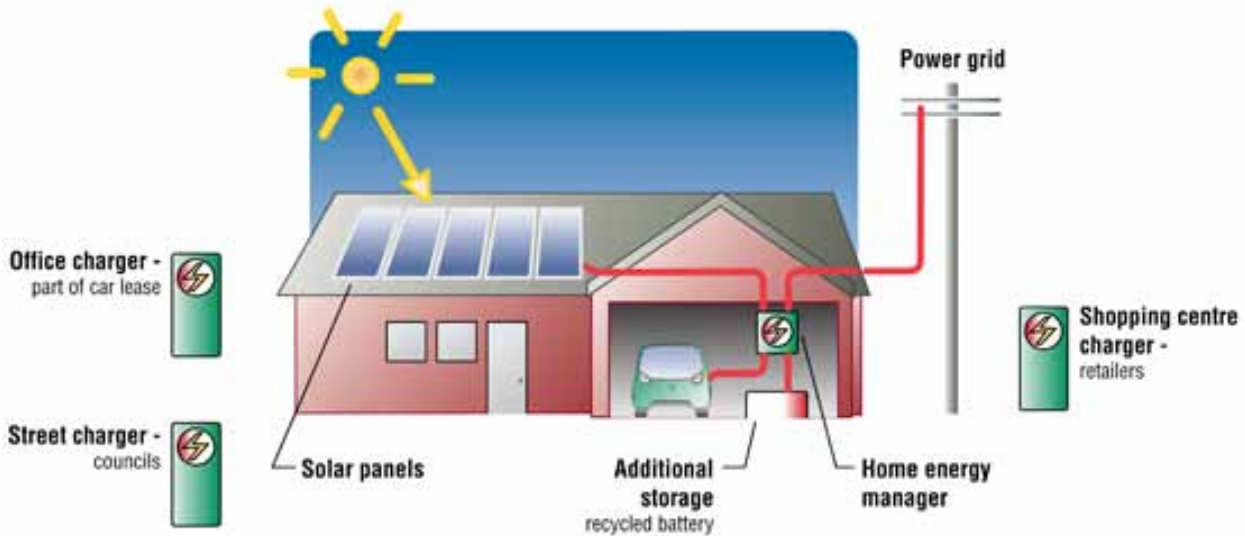
EDay interiors are designed and supplied by Futuris and incorporate low mass materials and new safety technologies developed in collaboration with the AutoCRC, VCAM, MUARC, RMIT and other leading Australian researchers.

The EDay electric vehicle will be sold in a unique way to appeal to the green and technology savvy Generation Y market. The EDay package will include the vehicle plus a home energy management system that includes the equipment to charge the battery.



*EDay Life Managing Director Robert Lane and Technical Director Laurie Sparke OAM with their soon to be launched EDay E15 electric car.*

## EDay Home Energy Management



*The unique selling proposition for the EDay electric vehicle includes a home energy management system that includes the charging system for the car.*

EDay predicts a rapidly approaching change to battery and low emissions vehicles, with 20% of all vehicles on Australian roads in 10 years powered by electric motors. The first vehicle EDay is launching is the electric powered EDay E15 3 door hatch city car targeting business commuters, which offers a 40 kWh motor powered by a 20 kWh Lithium-ion battery. EDay claims this is good for a top speed of about 120 km/h and a range of 150 km. It is 3.46m long sitting on a 2.34m wheel base.

An innovation unique to EDay at this point is the EDay Tablet - a portable iPad-like device located in a docking station on the instrument panel. In addition to providing all of the existing features of an iPad including navigation, music and other applications, this device incorporates the additional features to monitor the vehicle's performance, maintenance schedule, required technology updates, and to automatically communicate with your service centre.

The EDay Tablet also has remote functions which enable the driver to disable or enable the vehicle and switch on heating or air conditioning before getting in the vehicle to start a journey. It has the ability to display a map showing where the driver is standing and where s/he parked the car, advice on the travel range remaining and the location of nearest charging station.

### Home power management

The EDay home power management technology purchases energy from grid at off-peak times, sells energy back into grid at peak times, and manages home power use to minimise the electric energy drawn from the grid to reduce household electricity cost. The equipment uses some CSIRO technology, includes solar panels to capture green

energy and uses recycled electric car batteries to store energy. EDay vehicles will also be able to be recharged at public charging stations.

Customers will lease the EDay package for two years. At the end of the lease, the vehicle is returned to EDay, where it will be rebuilt and fitted with the next generation batteries and electronic controls, new mechanicals, paint, and interior. Customers can then lease a new EDay, or choose a renewed vehicle at a discounted lease rate.

EDay said their home power management plan reduces demand on the national grid, reduces power generation emissions and delays investment in electricity grid capacity, and the recycling of vehicles will greatly reduce the embedded energy in new car manufacture.

Visit: [www.edaylife.com.au/about](http://www.edaylife.com.au/about) .



*EDay vehicles will be fitted with an iPad-like Tablet, which is portable and is an information, entertainment and vehicle command centre.*

# Personal Property Securities Act - an alert to component suppliers



By Evan Stents,  
Lead Partner  
Automotive Industry  
Group, HWL  
Ebsworth Lawyers

**The Personal Property Securities Act 2009 (PPSA), previously scheduled to commence in Australia in October 2011, is now expected to come into force in early 2012.**

The PPSA was introduced to align Commonwealth, State and Territory laws and registers regarding security interests in personal property under one national system. The policy behind the PPSA is to improve the ability of individuals and businesses, particularly small-to-medium size

businesses, to use their property in raising capital. It is also intended to provide consumers with greater certainty in acquiring unencumbered goods.

The PPSA will significantly affect the way that an automotive component supplier can protect their title, or interest in personal property they have supplied. Personal property includes goods, tooling, machinery or equipment.

Significantly, it will impact on the supplier's ability to recover any personal property they have supplied at the conclusion of a lease or bailment arrangement, or upon a purchaser failing to meet their payment obligations when the personal property has been sold pursuant to a retention of title clause.

The PPSA will affect those component producers and after market suppliers who:

1. Sell goods pursuant to a "retention of title clause". In other words, the terms of sale allow you to take back goods you have sold, if the purchaser has not paid for them (as in a liquidation scenario).
2. Provide personal property to other suppliers on bailment, or what is often referred to as a "vendor" or "customer tooling arrangement".
3. Lease any personal property, such as vehicles or machinery, to other parties.

Under the PPSA, for a supplier to secure their title to the personal property they have supplied, in most cases, they will need to have registered their title to the personal property (referred to in the PPSA as a "security interest") in the Personal Property Security Register (PPSR).

## Register correctly to avoid risk

Registration of security interests in the PPSR is completed by an online process. Certain details of the agreement between the supplier and the customer that creates the security interest must also be set out. It is essential that the

registration of the security interest is done correctly, as defective registration can invalidate the registration, and may result in penalties being imposed against the holder of the security interest.

If a supplier has not registered their security interest in any personal property they have supplied to other parties, the following consequences may occur:

1. A supplier's security interest in the personal property may be defeated by, or lose priority to, a third party's registered security interest, even if the supplier's security interest was created earlier in time. This means the supplier may not be able to:

- a. Sell the personal property while the third party's security interest exists.

- b. Recover and retain the personal property from a defaulting supplying party that was supplied with the personal property, as the registered third party's claim to the personal property takes priority.

2. The supplier's ability to seize the personal property from the party who was supplied with the personal property, and who has failed to meet their payment or performance obligations under the relevant supply agreement, may be restricted.

3. The party who is supplied with the personal property can more easily sell or transfer the personal property to other parties, as the supplier's security interest will not be revealed in a search of the PPSR.

4. The party who is supplied with the personal property may transfer the personal property to third parties free of your security interest, and your ability to recover the personal property will be limited.

5. If the party you supplied the personal property to becomes bankrupt or insolvent, the personal property may become the property of the supplied party in liquidation or bankruptcy.

The PPSA allows for a two year transitional period for the registration of security interests created before the commencement date of the act. After the commencement date, careful consideration should be given as to whether security interests need to be registered.

Despite the recently announced delay in the commencement of the PPSA, component producers must start thinking about changing their business practices to ensure they are PPSA compliant once the PPSA commences. At the very least, component producers need to ensure that their retention of title clauses in their sale agreements comply with the requirements of the PPSA, otherwise the retention of title clause may not effectively create a security interest.

## 2012 Commodore range will be flex-fuel capable

Holden has made fuel-efficiency improvements across its V6 powered Commodore range for the 2012 model year update, which will go on sale in mid-September. Combined with on-going vehicle mass reduction, Holden engineers made a number of enhancements to the new model year V6 models to improve fuel economy, including a more efficient transmission, which reduces mechanical losses, and the air-conditioning system draws less engine power.

The Australian-built 3.0 litre SIDI (Spark Ignition Direct Injection) V6 engine now achieves 8.9 l/100km, down from 9.1 l/100 km on the previous model.

Both 3.0 and 3.6 litre Commodore will become flex-fuel capable. Holden claims Commodore drivers who run their car on bio-ethanol/E85 will reduce their well-to-wheel CO2 emissions by up to 40% compared to petrol. Ethanol blended fuels are a cleaner burning and some made in Australia use the waste by-products of wheat and sugar, sorghum and, in the future potentially, household garbage.



*Caltex, Holden and USA company Coskata are partners in Flex Ethanol Australia, which plans to produce ethanol from household and building rubbish.*

Holden said a range of dedicated LPG models will be released in early 2012. Since the launch of the VE range in 2006, Commodore fuel economy has improved 18% thanks for SIDI, calibration improvements, light weighting and aero enhancements.

## Holden engineers calibrate Holden Malibu



*Pictured on public roads near Holden's Lang Lang Proving in Victorian was the new mid-size Malibu.*

Holden power train engineers are currently calibrating the Malibu for GM's global markets, where it will play an important role in the global Chevrolet portfolio. Work is progressing at Holden's Lang Lang Proving Ground in Victoria and on public roads.

Holden said the work forms part of GM's global work share strategy, which uses the available resources and skills of the company's engineers from around the world to perform development work on future model cars. The Australian team will continue to work on Malibu until the end of 2012.

Holden will introduce the mid-size Malibu to Australia in late 2012 with a line-up of fuel efficient and responsive four cylinder engines. Outside Australia, it will be sold under the Chevrolet name in nearly 100 countries around the world.

## Opel brand launches in Australia

Norwegian born William (Bill) Mott, 43, has been appointed Managing Director of Opel Australia effective 1 November 2011. He has spent the majority of his career in Europe and the last 16 years with Opel, most recently as Group Marketing Manager for mini and small cars at Adam Opel Haus in Rüsselsheim, Germany.

Part of GM's International Operations structure, Opel Australia will be co-located with GM sister brand Holden in its Port Melbourne headquarters and will launch in the second half of 2012.

General Motors' premium European brand Opel will go on sale in Australia in 2012. The Opel sub-brand Astra

enjoyed a long and popular history in Australia under the Holden name. Holden said Opel presents a new opportunity for GM in Australia, with a growing demand for German design and technology at affordable prices. Australia was one of three new Opel markets, including Israel and Chile, announced in recent months.



*Opel Australia Managing Director Bill Mott will report to Opel Executive Director of International Operations, Michael Klaus, and will work closely with GM Holden Chairman and Managing Director, Mike Devereux.*

## Ford upgrades fuel injection system for LPG Falcon

Ford Australia has released its next generation EcoLPi liquid injection LPG system developed in tandem with Orbital Corporation. Fitted to the inline six cylinder engines in the latest FG Falcon sedan and ute range, the new EcoLPi model is a dedicated LPG power plant using a new injection system.

While traditional LPG systems turn liquefied gas into vapour before feeding the fuel into the engine via a throttle body venturi, the liquid phase injection system takes the gas in liquid state all the way to the injectors. As the LPG is no longer under pressure once it is released from the injector, its sudden expansion and rapid cooling of the incoming air charge creates ideal conditions for maximum fuel burning efficiency.

The new EcoLPi engine develops 198 kW of power at 5000 rpm and 409 Nm of torque at 3250 rpm, which is identical to the petrol I6 engine when operating on higher octane 95 RON unleaded fuel (versus regular 91 RON unleaded).

Compared to the previous E-Gas LPG engine, that is a 27% improvement in power and a 10% improvement in torque.

Fuel efficiency has improved with ADR 81/02 fuel consumption certification testing returning combined cycle results of 12.5 L/100km on Falcon XT and 12.6 L/100km

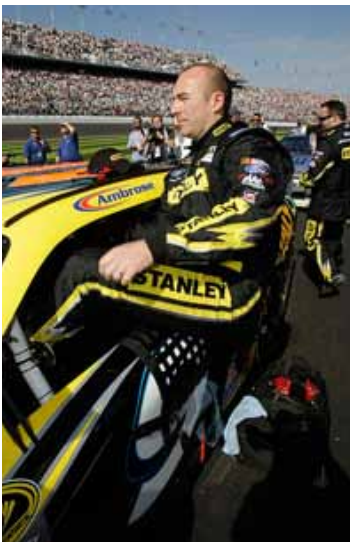


The new EcoLPi liquid injection LPG system.

on G6, G6E and XR6 models, which are improvements of 16.1% and 15.4% respectively. Similar reductions were also achieved on CO2 emissions, with Falcon XT coming in at 203 g/km and G6, G6E and XR6 models at 204 g/km, representing improvements of 15.4% and 15%.

Orbital claims that, with Federal Government rebates, the payback period on the new Falcon EcoLPi can be as little as six months.

## Australian performance product mission to USA races for another win



Australian NASCAR Sprint Cup Series racing driver Marcos Ambrose is the Performance Racing and Tuning Council ambassador for its export drive into the AUS\$14 billion USA race equipment market.

Following the accelerating success of Australian Performance Racing & Tuning Council (PRTC) trade missions to the Performance Racing Industry (PRI) Trade Show in Orlando, Florida, the team is tuning up for greater sales of Australian products at the 2011 PRI event.

With strong support from the Victorian Government, and promising discussions with other Government agencies, the PRTC is planning an Australian pavilion of at least 360 square metres at the PRI Trade Show to be held 1 to 3 December, 2011.

AAAA Senior Manager – Government and International Relations, Ben Bartlett, said the 25 Australian companies that participated in the 2010 mission achieved multi-million

dollar sales orders. "This is a significant result, particularly given the low unit cost of the products. Sales of Australian products following the 2010 PRI Trade Show are 25% higher than for the previous year," he said. "We thank Austrade and the New South Wales and Victorian Governments for their services and funding support, and look forward to working with them again this year.

"We went to the PRI Trade Show with some great product. The response from the US trade was 'wow - look at the quality of this gear'. The time and money invested by the PRTC and its members are now paying dividends. Australian performance and racing products are growing in acceptance on the global market because our products are based on innovative technologies and they are manufactured to high quality standards.

"In addition to the buzz created by our Australian pavilion, we also generated excellent publicity in the USA racing media in 2010, thanks to our Victorian Government supported mission ambassador Marcos Ambrose," said Ben Bartlett.

For information about the 2011 PRTC mission to the PRI Trade Show, contact Ben Bartlett at E: [bbartlett@aaa.com.au](mailto:bbartlett@aaa.com.au) or T: 03 9545 3333.

# Federal Government vehicle data sharing inquiry

By SAE-A Editor Barry Oosthuizen.

**> Parliamentary Secretary Assisting the Treasurer on Competition Policy and Consumer Affairs David Bradbury has called for submissions to a Commonwealth Consumer Affairs Advisory Council inquiry into data sharing between vehicle manufacturers and the independent aftermarket by 23 September 2011.**

The inquiry follows direct approaches from the independent aftermarket seeking Government intervention to ensure that independent crash and mechanical repair businesses have access to the current information required to repair and maintain modern vehicles.

Leading the call for an inquiry was the Australian Automotive Aftermarket Association (AAAA), which had launched a Choice of Repairer campaign in April 2009. The campaign was the independent aftermarket's response to the increasing difficulty it faced in obtaining from vehicle manufacturers and their authorised dealers the critical data (technical manuals, update bulletins, silent recall information, software patches, tools, etc) required to keep today's complex computer managed vehicles on the road.

AAAA Executive Director Stuart Charity said Secretary David Bradbury's initiative was a major step forward for the AAAA Choice of Repairer campaign, which aims to create a level playing field enabling consumers to freely choose between dealer supplied parts and service, or independent aftermarket parts and service.

"This inquiry signaled the Federal Government's acknowledgement that withholding critical data required to work with the sophisticated technologies now being built into vehicles is a consumer rights issue," he said.

"The question has become: 'Who owns the vehicle - the owner, or the manufacturer and dealer?'. Clearly, owners

have the right to have their vehicles serviced and repaired with fit-for-the-purpose accessories, parts and systems by any qualified technician of their choosing.

"While this is only the start of the process from the Government perspective, it is a necessary step prior to the Government taking any action - regulatory, legislative, or otherwise - and is a positive step for vehicle owners and the automotive aftermarket that services over 65% of the vehicles on Australian roads," said Stuart Charity.

### Industry data sharing conference

An important step in progressing debate about the sharing of data between the manufacturers/dealers and the independent crash and mechanical repair sector was a conference convened by the VACC on 6 September.

With representatives of the manufacturing sector, importers, dealers, service and repairers, insurers and parts retailers, as well as industry associations, Governments and others gathered together, the manufacturers/dealers and the independent aftermarket agreed to disagree.

VACC Executive Director David Purchase said that the opportunity to hear so many views and opinions was enlightening and it is clear that this is a very complex issue. "It is also clear – and we thought this would be the case – that it is not possible to neatly wrap the issue up with one outcome or in one sentence," he said.

"There are a number of different angles and each one has merit. The various interested parties will now focus their attention on their submissions to the CCAAC inquiry. This issue has serious consequences for motorists and business owners in the future," David Purchase said.

### Representatives from most sectors of the automotive industry presented papers at the Vehicle Service and Repair Data Sharing Conference hosted by the VACC in Melbourne.



*The Repairers' View - Mark Awramenko, Managing Director Highton Automotive Services.*



*The Consumers' View - Andrew McKellar, Executive Director, Australian Automobile Association.*



*The Dealers' View - Ian Field, Chairman, Q Automotive Group and MTAQ Chief Executive Officer.*



*The Manufacturers' View - Stefanee Lovett, General Counsel and Director of Legal Affairs, FCAI.*



*The Parts Suppliers' View - Stuart Charity, Executive Director, AAAA.*

## Queensland student wins Prime Minister's Award

➤ **Year 12 student and Sheet metal apprentice Alissa Young, 17 of Rochedale, Queensland is the recipient of the Prime Minister's Award for Skills Excellence in School.**

A second year apprentice completing her Certificate III Engineering – Fabrication Trade (Sheet metal), Alissa Young said she is looking forward to becoming a qualified sheet metal tradesperson. "I would like to thank SkillsTech Australia and their wonderful teachers. The training has been great. It has helped me excel further," said Alissa Young.

"They have not just allowed me to learn the typical basics - the TAFE institute has gone through each competency and broken it down into easy tasks which are more manageable for students to learn. I highly recommend it to other young students thinking about what to do for a career. I am stoked to be recognised as the highest achieving student in Queensland for the Prime Minister's Award - a real honour."

She is among six students from the Queensland Government's SkillsTech Australia recognised in the nation's top vocational education and skills award for schools. There were 400 winners nationally. For information about being a woman in a trade visit:



*Proud instructor Harry McMahon with Prime Minister's Award winning student Alissa Young.*

[www.women.qld.gov.au/hardhats](http://www.women.qld.gov.au/hardhats) . For information about Queensland's SkillsTech Australia visit: [www.skillstech.tafe.qld.gov.au/prospective\\_students/school.html](http://www.skillstech.tafe.qld.gov.au/prospective_students/school.html) .

## NSW Vehicle Safety Compliance Certification Scheme

➤ **The New South Wales Roads & Traffic Authority is introducing a new Vehicle Safety Compliance Certification Scheme (VSCCS) to license competent people to inspect non-standard vehicles and certify compliance with the relevant vehicle safety standards. The VSCCS will be introduced in 2011 to replace the Engineering Certification Scheme (ECS).**

Until the VSCCS commences, there will be no changes that affect vehicle owners or vehicle modifiers. Current ECS signatories will continue to issue certificates as they do now. Any vehicle that currently requires an engineering certificate will continue to do so. The processes for registering vehicles requiring an engineering certificate remain the same.

Visit [www.rta.nsw.gov.au/registration/authorisedinspectors/vscs/index.html](http://www.rta.nsw.gov.au/registration/authorisedinspectors/vscs/index.html) .

## New rules for registering repaired write-offs

➤ **New regulations for repairing written off vehicles have been introduced by the New South Wales Roads & Traffic Authority to improve road safety and protect consumers when buying used vehicles. The reforms will ensure repaired write offs are repaired properly, so they can get back on the road safely.**

From 1 August all written-off vehicles eligible for repair must have a certificate of compliance from their licensed repairer to be reregistered. This certificate of compliance states the vehicle has been repaired to required safety standards.

The changes were developed in consultation with the Motor Traders Association, the NSW Police and the NSW Department of Fair Trading. They represent clamp down on organised crime selling severely damaged vehicles to unsuspecting buyers, which are often repaired using stolen parts and dangerous practices," the spokesperson said.

Visit: [www.rta.nsw.gov.au/wov](http://www.rta.nsw.gov.au/wov).

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