Motor Trades Association of Australia

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Senate Education, Employment and Workplace Relations Committee
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Via email: eewr.sen@aph.gov.au

Dear Dr Batge

I am writing to you on behalf of the Motor Trades Association of Australia (MTAA). MTAA is the peak national representative organisation for the retail, service and repair sector of the Australian automotive industry. The Association is a federation of various state and territory motor trades associations as well as the Australian Automobile Dealers Association.

MTAA also has 16 national Affiliated Trade Associations, which represent particular sub-sectors of the retail motor trades, ranging from sales and repair to automotive parts recycling. At the national level, the retail motor trades comprises over 100,000 businesses with a combined turnover of over $160 billion and which employ over 308,000 people.

The purpose of my writing to you is in connection with the Committee's Inquiry into Industry Skills Councils. I am grateful for the opportunity to provide the Committee with some broad commentary in the context of skills development and training in the Australian automotive industry and that sector's engagement with Industry Skills Councils (ISCs).

Committee Members may be aware that, up until quite recently, the responsibility for the administration of the two training packages for the Australian automotive industry – AUR 05 for the retail, service and repair (RS & R) sector and AUM 08 for the manufacturing sector – rested with Automotive Training Australia (ATA). ATA was a company limited by guarantee that had as its members MTAA, the Federal Chamber of Automotive Industries (FCAI) and the Australian Council of Trade Unions (ACTU).

ATA and the performance of its role preceded the establishment of the ISCs and, at the time of the establishment of the ISCs the automotive industry as a whole expressed its dissatisfaction with the proposals with respect to the training arrangements for the industry under that new structure. At that time, MTAA, FCAI and the AMWU Vehicle Division continued to advocate and lobby government for the establishment of an independent, dedicated automotive Industry Skills Council.

The industry as a whole agreed, therefore, to continue to have the administration of the AUR 05 and AUM 08 training packages carried out by ATA. ATA received ad hoc government funding and financial support from MTAA and FCAI to continue the performance of its functions.

In 2009, the then Minister for Education Employment and Workplace Relations, the Hon Julia Gillard MP, announced that automotive training arrangements and the administration of the AUR 05 and AUM 08 training packages was to become the responsibility of Manufacturing Skills Australia (MSA). That decision was not welcomed by the main automotive industry stakeholders in the form of MTAA, FCAI and AMWU Vehicle Division.

Contemporary motor vehicles are increasingly complex and technologically sophisticated pieces of engineering. The maintenance, service and repair of those vehicles requires the application of advanced specialist skills in a variety of fields. Some indication of the technology employed can be found in the attached Discussion Paper, which was developed by the MTAA National Secretariat in November 2009 as a mechanism to highlight the current and forthcoming trends in automotive technology and the consequences those trends held for the automotive training landscape. It is necessary therefore that there are appropriate training arrangements and skills development pathways which will provide the necessary levels of knowledge and skills (across a range of activities) for the appropriate repair and servicing of these increasingly complex vehicles.

Approximately 33,500 apprentices and trainees are undertaking training under the AUR 05 and AUM 08 packages at any given time. Of those, though, some 32,000 automotive trade trainees – the overwhelming majority – are undertaking training under the AUR 05, RS & R package. Notwithstanding the numbers in training, there are significant skills shortages within the retail motor trades and it is important that the training packages not only address the technical skill requirements of employers, but that they also provide for some flexibility in terms of training arrangements for apprentices and trainees.

Following a request earlier this year from the then Minister, the Hon Julia Gillard MP, of MSA that it create a subsidiary company to accommodate the particular training needs of the Australian automotive industry, the automotive industry stakeholders have been in discussions with MSA with a view to achieving that outcome. The dialogue between MSA and stakeholders in that regard is ongoing.

Nevertheless, and while it has done so and will continue to act in good faith with MSA in its discussions with it, MTAA remains of the firm view that the current and future interests of the RS & R sector in terms of training and skills development will be best met by the establishment of an independent, dedicated, specialist ISC. MTAA is therefore seeking the Committee's support for the establishment of such an ISC.

Thank you again for the opportunity to provide the Committee with these comments.

Yours sincerely

SUE SCANLAN
A/g Executive Director

6 August 2010

Motor Trades Association of Australia

Technology in the Motor Trades: Real and Forthcoming Issues

A Discussion Paper

November 2009

Technology in the Motor Trades: Real and Forthcoming Issues

- Technological specification and integration in motor vehicles is increasing at a fantastic rate. That reality has massive implications for the future skills and skills development needs of both the Retail Service and Repair (RS & R) sector and the manufacturing sector of the broader Australian automotive industry.
- Arguably the areas of vehicle design that will witness the most radical changes in terms of technology application and utilisation will be in the development of drive train and propulsion systems,
- Complex and highly advanced integrated electronic systems and sub-systems will continue to proliferate in vehicle specification.
- Factors such as concerns for the environment, a globally ageing demographic and changes in financing structures following the global financial crisis will all have an impact on vehicle design and market preference.
- Close to 1,000,000 vehicles are sold in Australia every year. Of that number, near enough to 800,000 are imported, while approximately 200,000 are locally produced. Of that 800,000 imported vehicles, however, there are approximately 140,000 vehicles sold that are of demonstratably superior technological specification and integration than each of those approximately 200,000 domestically produced vehicles. Considering, also, that commercial vehicles and SUV sales (nearly all imported) comprise approximately 40 per cent of the Australian market it makes the market density of advanced technology vehicles all the more stark.
- There needs to be a recognition that the overwhelming majority of automotive trades' trainees are – and will continue to be – in the RS & R sector: some 32,000 as distinct from some 1,500 in manufacturing.
- Access to, and communication of, technical information between the RS & R and manufacturing sectors remains as a strong binding force between the two sectors.
- There nevertheless remains a significant distinction between the skills sets required to manufacture a vehicle and those needed to service and repair that same vehicle. While the core knowledge sets may be similar or the same, the manner in which that knowledge is utilised and applied is vastly different.
- The manufacturing sector in Australia cannot build and sell its vehicles without the RS & R sector, while the RS & R sector also cannot sell and repair those vehicles without the manufacturers (be they domestic or otherwise).
- There needs to be recognition that by 2012 or 2013 there may well be no significant cohort of trained technicians competent to meet market needs with respect to the vehicles on Australian roads at that time.

Technology in the Motor Trades: Real and Forthcoming Issues

Ever since Karl Benz used his considerable engineering talents in 1885 to create what is widely regarded as the first car, the motor vehicle has more often than not been the showcase for the practical application of an epoch's cutting-edge engineering and technology. There have been exceptions to this, of course, in the military and aerospace spheres. But those periods of exception invariably remain comparatively short in duration as the technological breakthroughs they represent are soon adopted and applied into the automotive sphere.

The fact that it invariably takes the military and aerospace spheres to eclipse automotive technology is no shame and it is equally telling that it is the automotive industry that will usually be the first of the early adopters of technologies developed in those spheres. It must also be remembered that there are some automotive industry participants – the McLaren Group, normally associated with Formula 1, springs immediately to mind – that actually leads the world in technologies utilised primarily in the military and aerospace field[1].

As technological advances continue to march on at seeming exponential pace in all fields of industry and endeavour, so too has technology's uptake and utilisation in the automotive industry. With that, however, it needs to be remembered that many so-called technological advancements are simply re-discoveries of advances of the past. For example, 1913 saw a Peugeot driven by a Jules Goux win the Indianapolis 500. That car was powered by an inline-four engine, designed by Ernest Henry, that featured twin overhead camshafts and four valves per cylinder. Disc-style brakes development and use began in England as far back as the 1890s. The first caliper-type automobile disc brake was actually patented by Frederick William Lanchester in 1902 and used successfully on Lanchester cars. Many more recent developments in automotive technology are, then, merely refinements of old ideas, or ideas that are now possible due to changes in supporting technologies such as metallurgy or casting techniques.

Arguably, though, it is the advances in electronics, computers and micro-processor technology that has brought with it the most impact in terms of advances in automotive technology. Even if not by direct application, advances in those and similar fields have impacted upon engineering, design and systems modeling processes in a highly significant manner.

Aerodynamic detail of the front wing end plate of the 2009 McLaren F1 car

[1] McLaren have provided NASA with technical expertise in the area of composite materials technologies.

Wind-tunnel study of a contemporary vehicle. Highly advanced computational flow dynamics prediction software is utilised in the design process for vehicles. Wind tunnel testing is increasing used only to verify results of that work.

One of the first production examples of these advances that was perhaps also the first instance of integrated electronic / hydraulic / mechanical systems was 31 years ago when Mercedes Benz presented it's (by then) second-generation anti-lock braking system (ABS). This was also about the same time as supplementary restraint systems (SRS, or airbag systems) – which were actually invented in 1952 – started to appear in vehicles, though earlier airbag systems (they have been fitted to vehicles from the early 70s) were mainly mechanical in activation.

ABS development has not stopped since that first Bosch system was offered as an option for Mercedes W116 (S-Class) vehicles. ABS systems are now commonplace and, in some vehicles, also serve as the basis for the operation for other systems such as acceleration skid control (ASR or traction control), electronic stability control (ESC) and other speed related functions. For example, the wheel sensor data that ABS systems continually read is used in some vehicles in their navigation computers, or in electronically adaptive transmissions[2], or the windscreen wiper speed control, in fact, virtually any function in the vehicle that is controlled on the basis of speed.

SRS systems in contemporary vehicles also take data feed information from the ABS system and are themselves now highly integrated systems. Contemporary SRS systems are now much more than just an airbag. They are increasingly combined with sub-systems such as seat belt pre-tensioning devices. More recently there has been the appearance in the market of vehicles fitted with SRS systems that undertake an active assessment of the likelihood of a collision at all times of that vehicle's operation (even when stationary).

In the event of an imminent collision, those systems first weigh the vehicle's occupants (through sensors in the vehicle's seats) and, using that data and data from other feeds; commence a pre-tensioning sequence for the seat belts; calculate a limit to the extent of seat belt tension to be

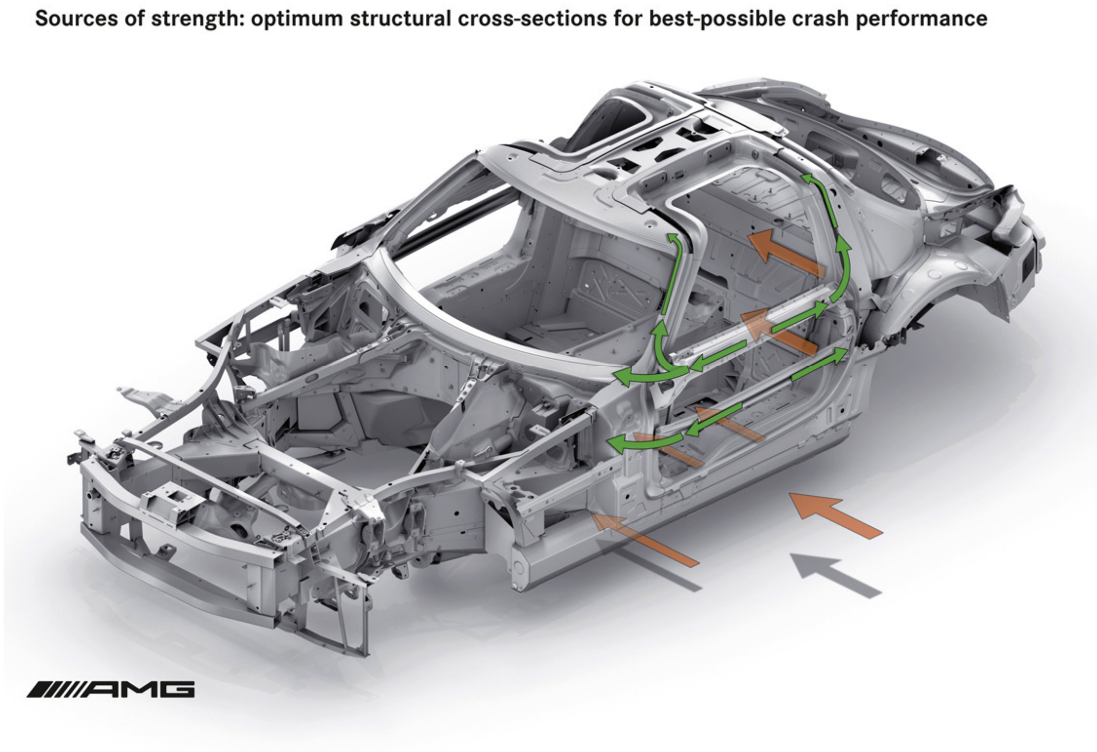
[2] That is, automatic transmissions that 'learn' a driver's patterns of behaviour and then 'programme' the operation and shifting of the transmission for the most efficient operation of the vehicle in accordance with the driver's needs.

exerted at the instant of collision; calculate the force of airbag deployment and the air bag deployment speed required; assess the number of airbags that are to be deployed; and, adjust the front occupant seats to a position calculated to reduce injury from impact, including placing head restraints into a more optimal position if required.

Electronic stability control (ESC) systems monitor and acquire data on a vast amount of a vehicle's dynamic characteristics – such as a vehicle's yaw, pitch and roll rates when cornering, steering angle, vehicle speed, throttle position and so on – and then conduct an analysis of the data received to make an 'assessment' as to the capability of the vehicle to safely complete a particular vehicle manoeuvre (such as might be experienced at the time of a driver taking collision avoidance action for example). The ESC system will, while making these assessments, simultaneously communicate and 'collude' with other onboard systems – such as ABS – and may then automatically provide additional control inputs to the vehicle (such as selective individual wheel application of braking force) in an effort to improve the vehicle's stability, controllability and, hence, its chances of a successful completion of the manoeuvre the driver of the vehicle is attempting.

In a more recent development of that interaction often occurring between SRS, ABS and ESC systems, there is now a vehicle available on the Australian market that effectively remains vigilant at all times as to the risk of collision and makes an ongoing assessment as to the likelihood of a collision occurring. In the event of a collision unavoidably occurring – even if evasive actions are being undertaken by the driver – the vehicle, having assessed that a collision is nevertheless inevitable, effectively takes over all control of the vehicle in terms of its braking and suspension settings and commences to adopt control inputs measured to minimise, to the fullest extent possible, the effects of the collision on the occupants. It does this at the same time as activating the SRS system in the manner described above by the measuring of the weight of the occupants and calculating the extent of airbag and seat belt tension device deployment required to counter the inertial effects of the collision upon the vehicle's occupants.

The advances in safety-related technology have been matched equally by advances in other areas. Advances in metallurgy and metallurgical engineering techniques have seen manufacturers apply the maxim of Colin Chapman of Lotus Engineering of, "First, add lightness." Increasingly, vehicles are reducing in mass relative to their size, while at the same time making advances in terms of occupant safely, and chassis structural and torsional rigidity (which has a parallel effect of improving a vehicle's handling and road holding). Composite material technologies (such as carbon fibre or other carbon reinforced plastics) are also becoming increasingly utilised. Even vehicle construction techniques have benefited from advanced technologies. LASER welding, for instance, has allowed the usage of high-strength steel alloys.



Monocoque chassis of new SLS Mercedes Benz. High-level use of high-strength steels and other alloys.

All of these advances in technological application are in response to a diverse set of demands being placed either directly or indirectly on motor manufacturers. These demands come from governments, regulators and consumers. Vehicles need to be more comfortable, safer (both passively and actively), more fuel efficient or energy efficient and have as small an environmental impact as possible. Sometimes, these demands are incompatible, yet manufacturers inevitably find ways in which all demands can be met to varying degrees.

It must also be noted that the technological sophistication of today's vehicles is already regarded by some as bewildering. Certainly, the capability of many vehicles available today represents applications that were considered fanciful a little over a decade ago. For instance, the vehicle mentioned earlier that 'assumes control' in the final moments of an inevitable collision has a bigger sibling available on the market that has fitted a cruise control system that, once set, maintains a set distance behind the vehicle in front of it, even if that vehicle were to undertake emergency braking and there was no input made by the following vehicle's driver. That same vehicle will also monitor a driver's reaction times and 'blink rate' and make an automated suggestion to the driver that they take a break from driving if, in the vehicle's assessment, that driver is fatigued and in need of rest.

It is all staggering technological capability, but it is also all *current* technology. What, then, can be anticipated or imagined of future applications of technology and what impacts will that have on the vehicles we will be driving in the future and that our retail motor traders will be selling, servicing and repairing into the future?

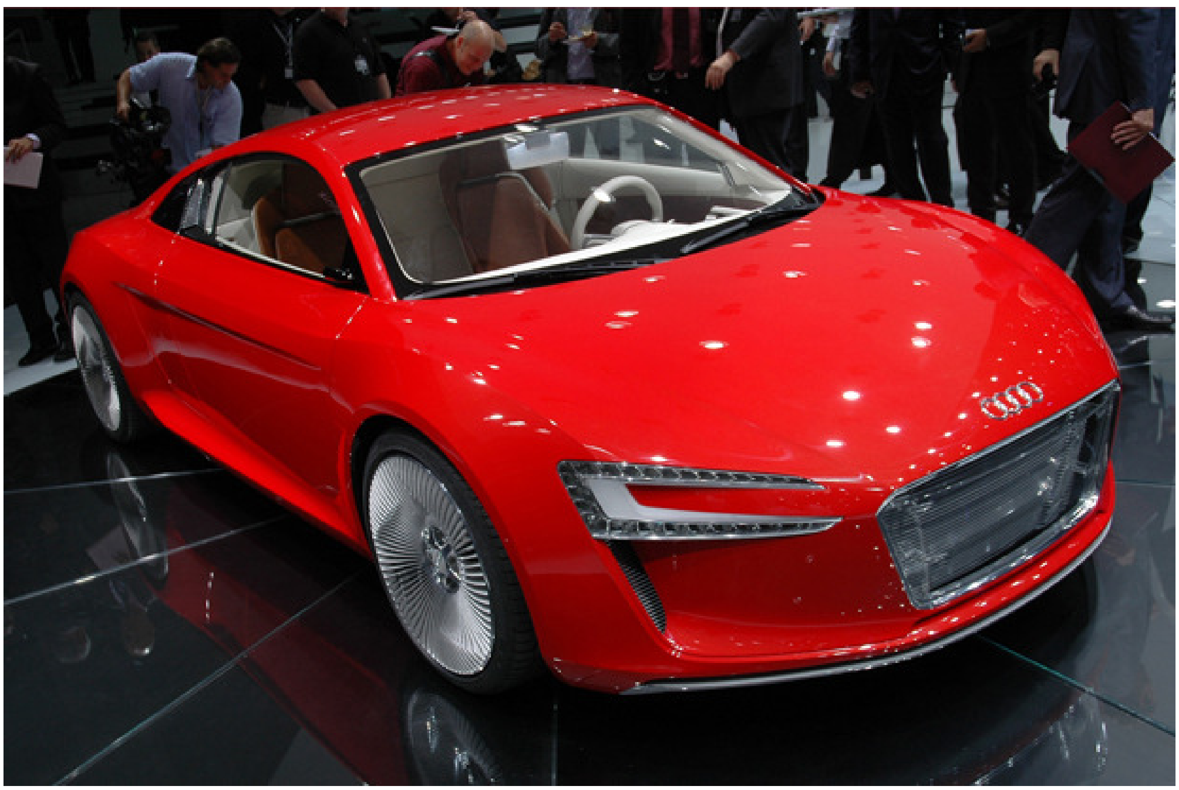
Without question the areas of vehicle design in which will be seen the most radical changes in terms of technology application and utilisation will be in propulsion and drive train systems. As an example of the rate of development in this area, consider the announcement by Mercedes Benz at the recent Frankfurt Motor Show of its S-Class ‘plug in’ hybrid that it plans to have available for sale as soon as 2011.

Anyone familiar with Mercedes Benz’s model designation system will know that an ‘S-Class’ is a large, luxury sedan. Yet, the vehicle unveiled at the Frankfurt show is an S-Class that achieves a combined-cycle fuel consumption of 3.2 litres / 100 km and CO_2 emissions of just 74g/km. At the same time, the vehicle is capable of accelerating from 0 to 100 km/hr in just 5.5 seconds. Compare those performance characteristics to the current ‘benchmark’ hybrid vehicle in the Toyota Prius, which achieves a combined-cycle fuel consumption of 3.9 litres / 100 km and CO_2 emissions of 89 g/km. The Prius’ 0 – 100 km/hr time is also 11.9 seconds. There might remain life in the market yet for large luxury vehicles.

Mercedes Benz S-Class Plug-in Hybrid

The gains made in this example by Mercedes Benz come to some extent from the layout of their hybrid drivetrain system. The Prius, and other Toyota and Lexus hybrids, have what is known as a parallel drivetrain layout. That is, their petrol and electric engines effectively sit side-by-side and utilise a comparatively conventional transmission. The Mercedes Benz, however, uses what is known as a series layout, in that its electric motor sits behind the petrol engine (which in the S-Class is of V6 configuration, making its economy all the more remarkable) and between it and a 'conventional' (though 'intelligent') transmission. That electric motor also takes the place of, and acts as, the engine's flywheel / torque converter and, therefore, coupling mechanism to the transmission, as well as performing the functions of alternator, power generator for the vehicle's drive batteries and as starter motor.

But the 2009 Frankfurt Motor Show has become more widely known among industry observers as the show at which virtually every major manufacturer announced – or, indeed, released – electric vehicles intended for general sale as soon as 2010 and most definitely by 2012. French manufacturer Renault presented four cars at Frankfurt that Renault / Nissan chief executive, Carlos Ghosn, declared would go on sale in 2011 or 2012. German car maker Audi unveiled an all-electric supercar – the e-Tron -- based on its hand-built R8 model, that would sport a range of about 250km while delivering 0-100 km/hr performance in the sub-five second bracket. General Motors unveiled its Ampera extended range battery / plug in hybrid car. Citroen its Revolt. One could easily be excused for concluding that the future of the automobile is electric (no pun intended).



Audi e-Tron at 2009 Frankfurt Motor Show

There appears, though, to remain a considerable amount of life in the internal combustion engine (be it petrol, diesel or the newly developed technology of diesotto engines[3]). Ford, at Frankfurt, unveiled its EcoBoost engine: a turbocharged four cylinder engine of 2.0 litre capacity that produces approximately 150 kw of power which, by 2011, will see fitment to Ford Australia's Falcon model range.

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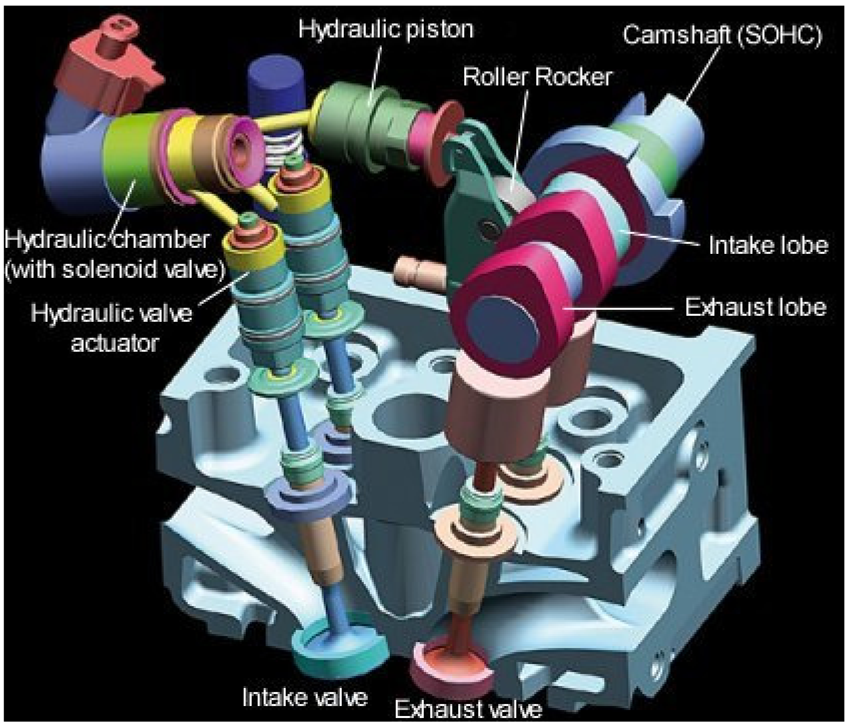
[3] Diesotto engines are engines that operate as a normal, spark ignition, petrol engine at start and high load operation, yet operate as a diesel at low to medium speeds.

Italian manufacturer Fiat has also released and intended for production a technology it has called Multiair. Multiair is a system whereby the inlet and exhaust valves in an engine are no longer actuated by a camshaft. Instead, they are actuated by an electro-hydraulic system, which is controlled by an electronic 'brain' unit comprising part of the engine management system. This means that the timing, duration and lift of the engine's inlet and exhaust valve's opening can be infinitely varied (between physical design limits at least and at the avoidance of piston to valve interference) so that at any time an optimal gas flow / combustion control regime can be applied over the engine. Once again, however, this technology is not a new idea, as Renault Formula 1 cars and engines of the 80s had a similar hydro-pneumatic valve operation[4].



Fiat's Multiair system.

The 'packaging' of vehicles is also undergoing change. Volkswagen unveiled at Frankfurt its L1: a concept car that uses a third of the fuel of a Toyota Prius (1.2 litres / 100 km) and has carbon dioxide emissions of 39 grams per kilometre. What is unusual in one sense about the L1 is that it carries its two occupants one behind the other as opposed to the more conventional and familiar side-by-side arrangement[5]. The L1 – a diesel-electric hybrid – also demonstrates that there will likely remain life yet in the internal combustion engine, especially as different fuel technologies (such as hydrogen) begin to enjoy a more readily accessible presence in the market.

[4] The Renault F1 system was even more sophisticated in that engine parameters and characteristics were constantly monitored, via satellite, to Renault's engine facility in Paris. Technicians at that facility also had the capability to 'alter' engine characteristics and dynamics while a race was in progress, irrespective of where that race was being held in the world.

[5] Once again demonstrating little that is 'new'. The L1 shares a great deal with the 1955 Messerschmitt KR 200

Messerschmitt and Volkswagen L1. Conceptually similar.

Indeed, the head of Volkswagen Group powertrain management, Wolfgang Hatz, has recently spoken publically of his doubts about electric vehicles, which doubts range from issues of price and range to that of energy storage. As Mr Hatz points out, it takes 100 kgs of batteries containing stored energy to deliver the same energy output as 1 kg of petrol. He considers that it will not be until around the year 2030 that battery technology with the capability to match the energy equation potential of petrol will be available[6]. Mr Hatz has also suggested that, when the total energy chain is compared between petrol and electrically powered vehicles, the efficiency of electric vehicles drops significantly.

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[6] See: www.goato.com.au/mellor/mellor.nsf/stroy2/30A36C76C25AC704CA2576460019A84B Accessed 6 October 2009

Other commentators have also questioned the vision of Australian roads being filled with electric vehicles in the near future. They suggest that, first, there will be issues of cost involved. When the Mitsubishi iMiev becomes available for sale in Australia sometime in the next twelve months, it is anticipated to cost somewhere slightly in excess of $58,000-00. More fundamentally, however, Australian buyers seemingly continue to demand vehicles of a certain size, functionality and practicality. Recall that a current Toyota Corolla is not much different in physical size than a 1978 VB Commodore (incidentally, the 1978 KE50 Corolla would still be slightly physically smaller than a current Ford Fiesta). Most electric vehicles are, though, small cars and a small car is a small car regardless of how it is powered.

Mitsubishi iMiev. Due for sale in Australia in next twelve months for around $58,000-00.

Australians still prefer vehicles that can tow (a boat, trailer, caravan), that can comfortably move a family of four, that do so over significant distances in comfort and with ease and that also engender themselves with some feeling of safety and security in the event of, say, an 'at-dusk' encounter with a large macropod. It is worth considering, too, that if one looks at and compares the 'literal' specifications between a current-model Corolla[7] and a VB Commodore (both top selling vehicles in their respective epochs) that some sense of market stability – as distinct from trend towards a certain type of vehicle – might in reality be discerned. Both have similar dimensions in terms of track, wheelbase and height (physical size similarity). Both also have similar mass and power output (performance similarity). This suggests that there might actually

[7] But, it could just as equally be a current-model Volkswagen Golf, or Mazda 3, or Mitsubishi Lancer, or Fiat Punto. Each of which 70s ancestors were genuinely small vehicles that would almost be considered 'mini' cars today

exist an ‘envelope’ with respect to preferred vehicle size and performance in the Australian market within which cars are best able to meet the Australian market’s needs.

Other commentators also suggest that for electric vehicles (for instance) to be taken up in large numbers in Australia that Government incentives will need to be offered. Market research firm Frost and Sullivan points to the take up of hybrid vehicles in Australia as a possibly useful indicator. Since they became available on the Australian market in 2001, just 20,000 hybrid vehicles have been sold. Volkswagen -- which expects to have at least one small electric vehicle on the market by 2013 and anticipates overtaking Toyota to become the world’s number 1 car maker by 2015 – anticipates battery cars to be a very small part of the future market picture, with just 1.5 to 2 per cent of total volume by 2020. Frost and Sullivan estimates that, together with hybrids, electric vehicles are unlikely to exceed 5 per cent of the market by 2020, with sales at 5,000 to 10,000 a year from 2015[8]. None of which is to suggest that sales of that magnitude are, on their own, insignificant.

It might also be that vehicles with other drivetrain technologies or variations run at similar volumes to electric and hybrid vehicles. Mercedes Benz will commence limited production later this year of its first fuel cell car; the B-Class F-CELL. The technological ‘heart’ of that vehicle is a compact, high-performance ‘fuel cell’ system, in which hydrogen reacts with atmospheric oxygen at 700 bar pressure to generate current for an electric motor. The F-CELL also carries a lithium-ion battery with an output of 35 kW and a capacity of 1.4 kWh to provide additional power when needed but also to recover braking energy[9]. Vehicles like the F-CELL may also not be all that prevalent unless a network of hydrogen filling stations are established.

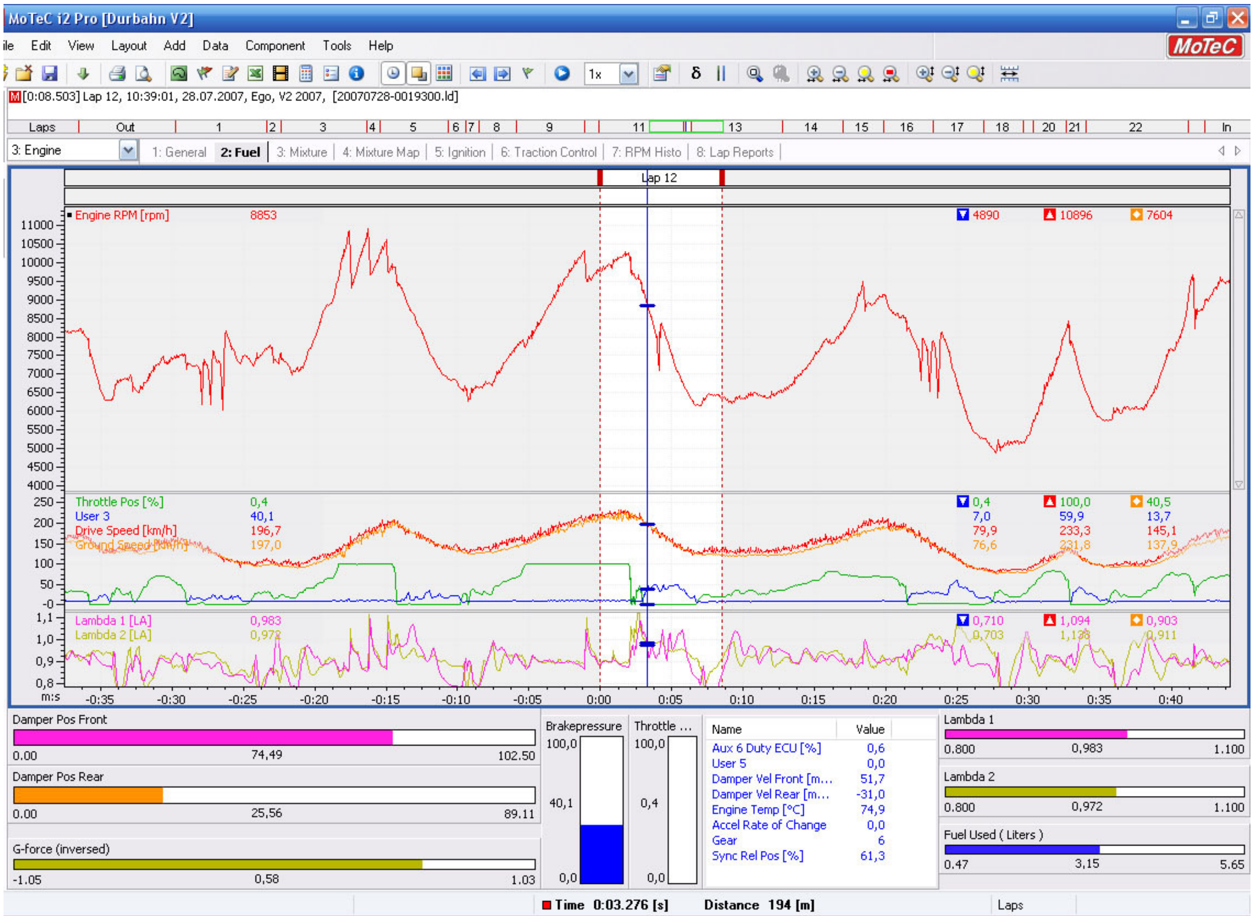
The F-CELL is also but one of three ‘variants’ of Mercedes Benz’s Concept BlueZero vehicles that, based on the B-Class ‘sandwich-floor’ architecture, will be available in E-CELL (battery electric drive with a range of up to 200 km); the aforementioned F-CELL, and; E-CELL PLUS, which is essentially an electric drive, plug in, serial hybrid.

What does all this suggest for the vehicles in the future that the retail motor trades will need to sell, service and repair? In some instances, little. Vehicles will still have braking systems whose fundamental principles of operation will be similar to what they are now (even the Audi e-Tron, despite being ‘electrically’ braked through its wheel motors, has a ‘standard’ disc / calliper set up also installed, not for the purposes of providing retardation so much as providing the driver with ‘pedal feel’). Vehicles will also still have suspension systems that will likely derive springing and damping force from (albeit to some extent electronically controlled) mechanical components.

What will be more prevalent; however, will be electronic control units (ECU). Given that there are ten-year old cars on our roads that have their functions controlled by as many as six ECUs, and that there are currently vehicles on the road with as many as 36 ECUs (Land Rover Discovery Series III) one has to wonder what the future offers. A reasonable assessment might be, however, that with increased computing power, a vehicle might be controlled by but one or two ECUs – or, indeed, the equivalent of a true on-board computer -- with all systems and sub-

[8] *Weekend Australian Inquirer*. October 3 – 4, 2009
[9] A system similar in principle to the Kinetic Energy Recover System (KERS) currently used by some F1 teams.

systems fully integrated. If overlaid with this are elements of telemetics or infotronics (in that vehicles actually communicate with one another, as has been proposed) then the future represents electronic and computer sophistication that would possibly require qualifications not far removed from those deemed necessary to repair a current desk-top computer or computer network. That is, a degree-level qualification in information technology.



An example of the range of data which may be acquired by just one ECU fitted to a vehicle. The data depicted is in relation to fuel usage metrics. Note, however, the numbered tabs across the top of the screen showing other data sets captured (mixture – which relates to stoichiometric fuel / air mixture -- mixture map, ignition, traction control and so on). Other ECUs may track other factors such as lateral G force, damper position, damper rate of movement, brake system pressure, yaw and roll rates and so on.

Vehicle size may well continue to decrease (despite Mercedes Benz's S-Class Hybrid). It has been suggested that the operation and extent of leasing arrangements that has been made untenable, to some extent, in the aftermath of the global financial crisis will see manufacturers be forced to produce greater numbers of smaller, cheaper vehicles. The capacity to support larger vehicles through manufacturer supported financing arrangements being heavily compromised in a post-GFC world. Additionally, an aging demographic – globally – is going to have an impact. Trend analysis by Credit Suisse suggests that by 2020, 40 per cent of new car buyers in developed countries will be over 60 years of age, compared with less than 30 per cent now.

Ongoing tightening of emissions regulations in almost every car market of significance must also have an impact[10].

The recent Automotive Industry Innovation Council (AIIC) Vision Statement – *Automotive Australia 2020* – captures and considers some of the factors and issues that have been discussed in this paper. The AIIC Vision dares to see a vision for the Australian automotive industry as one that, by 2020, has a capability and capacity to mesh with the broader, global, capability and capacity needs of the industry. There is much consideration within the Vision Document of factors such as lightweight materials, battery and power system development, advanced metallurgical applications, electric-integrated drivelines and battery charging infrastructure.

Sadly, however, not only does the AIIC Vision make scant reference or give little consideration to the skills and training development needs that will need to make pace alongside the steps towards this vision, but it also talks in terms of technological milestones for 2020 that have already been passed by some overseas manufacturers. A practical example demonstrating this might be found with Korean manufacturer Kia. It now seems likely that the Korean manufacturer will be the first to market in Australia a direct liquid petroleum injection (that is, LPG in liquid form) electric hybrid (which is of series layout) with its Cerato Forte model. By comparison, it will not be until late next year that Ford Australia will upgrade its E-Gas Falcon -- a dedicated, factory-fitted LPG car that has been on the market for many years -- to direct injection.

Kia Cerato Forte. Direct injection, liquid LPG, series hybrid.

[10] *Small Isn't Beautiful.* The Economist. September 19th, 2009

In many respects, the technicians in the retail motor trades will need to be forever standing at the cutting edge of vehicle technologies and technological advancement on many fronts. It is perhaps also not unreasonable to suggest that the amount of information pertaining to these technologies will be so detailed and complex that brand specialisation may be the only viable manner in which the extent of knowledge relating to the vehicles of the future may be humanly managed (yet another area in which the internet and computing power will undoubtedly have a significant impact). It may even be that particular drive train technology specificity of knowledge might be required.

Irrespective of what the needs for the cars of the future are in terms of the manner in which our trades will need to support them, the aspect that requires the most attention by those trades is the issue of time. For what has been discussed in this paper is not some 'Flash Gordon' or 'Jetsons' bold prediction as to the vehicles we will be driving in twenty years, or even ten years, time. Rather, these are technologies that we will see in our dealerships, and in our driveways, in the next five years and, in some instances, even shorter. Perhaps the biggest questions that needs to be asked and addressed, then, is not so much about what are we, as the retail motor trades, going to do about the appearance in the market of these vehicles then, but what is it that we are going to do, now, about the inevitable appearance of those vehicles.

It would also be a sustainable argument to make – with little or no caveats aside from those that are perhaps power-train related – that these vehicles are already here[11]. What is unfortunate about that is the reality that virtually all of the vehicles available on the market currently that have the levels of technological sophistication and integration discussed in this paper are not manufactured domestically. That is not to say that the vehicles of domestic manufacture are inferior, as a good many of them utilise to some extent the technologies mentioned (such as high-strength steels and manufacturing and engineering technologies). It is also not to say that the manufacturing and engineering technologies employed in the design, development and ultimate construction of those vehicles is anything but cutting edge.

But, it is equally fair to state that there are significant numbers of vehicles of considerably higher technological specification and integration, to those vehicles of domestic manufacture, already available in the Australian market. Close to 1,000,000 vehicles are sold in Australia every year. Of that number, near enough to 800,000 are imported, while approximately 200,000 are locally produced. Of that 800,000 imported vehicles, however, there are approximately 140,000 vehicles sold that are of demonstratably superior technological specification and integration than each of those approximately 200,000 domestically produced vehicles. Considering, also, that commercial vehicles and SUV sales comprise approximately 40 per cent of the Australian market it makes the market density of advanced technology vehicles all the more stark. It also makes the skills challenges for the retail motor trades all that more critical.[12]

While this has obvious implications for the medium term future skills needs of the retail motor trades, it also has implications in the short and near immediate term. It needs to be acknowledged – and acknowledged now – that in three to five years time there may well be a

[11] Many of the technologies discussed are standard fitment to many vehicles, most notably the recently released in Australia Mercedes W212 E Class or Mk VI VW Golf GTI.
[12] VFACTS Industry Summary – December 2008.

limited capacity to service and repair many of the vehicles currently available in Australia. Additionally, it may well be a mistake to completely integrate and put into total synchronisation with domestic manufacturing the development of the future training needs for the Australian retail service and repair (RS & R) sector. To do so risks consigning to a default of 'knowledge deficit' the majority of graduates of training packages developed with just that philosophical underpinning.

It has been suggested by some commentators and policy developers that the skills needs and sets of both the manufacturing sector and the RS & R sector of the Australian automotive industry will be not dissimilar in the future. That needs to be urgently recognised as an argument that is near impossible to sustain or, at the very least, incomplete in its basis: that reality being particularly the case if factors such as technological integration and market preference realities are to be considered. If that argument is then also imbued with the realities of the distinction between, say, a production robot LASER welding a rear quarter panel onto a vehicle on a chassis production line as distinct from having a skilled human technician replace the same panel using an inverter or pulse MIG welder (and /or adhesives) and manufacturer-approved techniques, or having a skilled human spray painter colour match -- following a repair of accident damage on that same high-strength steel quarter panel -- a water based metallic paint that was also originally applied by a robot, then the argument becomes highly spurious indeed. Clearly there are vastly different skills sets needed despite any similarity in core knowledge.

Certainly, there needs to remain conduits of information between the RS & R and manufacturing sectors. Often, each has a level of dependency on the other: the RS & R sector for technical information and the manufacturers for ongoing development and monitoring of their products in the field. It would be fair comment to make that the manufacturing sector in Australia cannot build and sell its vehicles without the RS & R sector, while the RS & R sector also cannot sell and repair those vehicles without the manufacturers (be they domestic or otherwise). The core of the knowledge required in these sectors is the same, but the practical application of that knowledge and the levels at which that knowledge is applied or utilised is very different indeed.

But, to argue that there remains major consistencies with respect to the skills sets required for the manufacturing sector and those required for the RS & R sector, or to assert *ipso facto* that it is the constructs around the re-invigoration of the domestic vehicle manufacturing sector (which currently meets only 20 per cent of Australian consumer's preferences for new vehicles and that also has only approximately 5 per cent of the nation's automotive trades trainees) that needs to provide the lead for the breadth and depth of automotive training needs and specifics in Australia is plainly illogical and, potentially, disastrous.

As mentioned earlier, whatever the vehicles of the future and their configuration, technicians in the retail motor trades will need to be forever standing at the cutting edge of vehicle technologies and technological advancement. This will not necessarily mean an opportunity for lower skilled and 'routine maintenance' roles within the retail trades, as there is always a need (and has always been a need) for the ability to read witness marks, tyre wear patterns and other indicators (skills simply not needed in manufacture) and intuitively assess a vehicle's general condition whenever it is being even routinely serviced. Rather, it points to a need for skills such as lifelong learning, for an understanding of theoretical basics and the concept of ‘first principles’. Every technician needs to be – to some degree – an expert diagnostician.

Crucially, however, the parties that are ultimately responsible for the design and maintenance of the skills training needs for the retail motor trades and the domestic automotive industry generally need to be parties with intimate knowledge of that industry and those trades. It is imperative that those parties have no need to ‘get up to speed’ or ‘learn the nuances’: there simply is not the time for that indulgence. It is imperative that those parties understand and ‘get’ the industry in all its manifestations and facets. For those that do ‘get’ the industry to that level and in all its intricacy there has been a lot of recent events that have brought with them disappointment, as well as a demonstration that the industry isn’t being ‘got’, at all, in some quarters.

The retail motor trades currently stand at the precipice of a crisis point. As is often the case when faced with circumstances placed between a current position and a goal there are a number of ways in which the goal can be attained. Generally, however, these ways can be classified into two types: hard ways and smart ways. What the retail motor trades need are the smart ways.

The smart ways in this instance require recognition of the true and immediate future of the motor vehicle itself and the market into which it will be immersed. There needs to also be a recognition that the skills demands of the manufacturing and RS & R sectors will more likely diverge rather than converge. There needs to be an immediate recognition of the current levels and application of technology in motor vehicle design, engineering, construction and specification and in the trends in that technology. There needs to be recognition that by 2012 or 2013 there may well be no significant cohort of trained technicians competent to meet market needs with respect to the vehicles on Australian roads at that time. There needs to be recognition that the fallback position of manufacturers providing that level of service is tenuous at best in a market where the overwhelming majority of vehicles sold are not even manufactured in Australia and, therefore, the capacity to put the capital stock into training is less than optimal. There needs to be a recognition that the overwhelming majority of automotive trades’ trainees are – and will continue to be – in the RS & R sector: some 32,000 as distinct from some 1,500 in manufacturing.

Synchronisation of the family of all automotive training arrangements with the smallest sibling of domestic manufacturing represents none of those crucial realisations and admissions. Rather, it is a misguided contrivance that disproportionately places the imperatives of the many at the mercy of the interests of the few. The RS & R sector needs not of that. It needs to be able to step away from the precipice, not be led over the edge.

The Motor Trades Association of Australia (MTAA) and its Member Bodies recognises all of these factors and is crucially aware of the discussions that have taken place in this paper. It is MTAA’s detailed understanding of these issues that led it to produce this paper in the first instance. It is also that same understanding that led MTAA to immediately see the deficiencies in the current and proposed automotive training arrangements and that caused it to act. For the members of the Association’s Member Bodies there is no alternative. MTAA and its Member

Bodies 'get' the automotive industry, its intricacies and nuances and are clearly highly attuned to the prospects for the future.

It is by that reasoning that MTAA presently sees no alternative but to make its own training arrangements that recognise the future and that also reflect the realities faced by the retail motor trades both in the present and in that future. MTAA sees, clearly, the real and forthcoming needs of the retail motor trades and the relationships between those needs and the needs of the broader Australian automotive industry. MTAA seeks the smart way of meeting the challenges of the future. A future that, in reality, is in many ways already upon us.